XXVI. International Balkan and Near Eastern Congress Series on Economics, Business and Management
Mitrovica / Kosovo

October 10-11, 2026

University “Isa Boletini”- Mitrovica, Faculty of Economics / Republic of Kosovo
University "St. Kliment Ohridski" Faculty of Economics/Republic of North Macedonia
University of Agribusiness and Rural Development/Bulgaria
IBANESS

PROCEEDINGS

Editors
Prof.Dr. Qazim TMAVA
Prof.Dr. Tatjana SPASESKA
Prof.Dr. Rasim YILMAZ

XXVI. International Balkan and Near Eastern Congress Series on Economics, Business and Management-Mitrovico / Kosovo

October 10-11, 2026
Mitrovica, Kosovo

University “Isa Boletini”- Mitrovica, Faculty of Economics / Republic of Kosovo
University "St. Kliment Ohridski" Faculty of Economics / Republic of North Macedonia
University of Agribusiness and Rural Development / Bulgaria
IBANESS

PROCEEDINGS

Editors
Prof.Dr. Qazim TMAVA
Prof.Dr. Tatjana SPASESKA
Prof.Dr. Rasim YILMAZ

2026

Cataloging-In-Publication Data

Proceedings of XXVI. International Balkan and Near Eastern Social Sciences Congress Series on Economics, Business and Management-Mitrovico / Kosovo, October 10-11, 2026 / Ed. Qazim TMAVA, Tatjana SPASESKA, Rasim YILMAZ.

ISBN:

First Printed: October-2026

FOREWORD

International Balkan and Near Eastern Congress Series brings together many distinguished social and behavioral science researchers from all over the world. Participants find opportunities for presenting new research, exchanging information, and discussing current issues.

We are delighted and honored to host the IBANESS Congress Series in Mitrovica / Kosovo. Presented papers have been selected from submitted papers by the referees. Sincere thanks to those all who have submitted papers.

We hope that through exchange of the presented researches and experiences, the Congress will enhance communication and dissemination of knowledge in Balkan and Near Eastern Countries.

The Organization Committee
October 10-11, 2026

Organization Committee

CO-PRESIDENTS

Prof.Dr. Tatjana SPASESKA, University St. Kliment Ohridski-Bitola, Republic of North Madeconia
Prof.Dr. Svetla DIMITROVA, University of Agribusiness and Rural Development, Bulgaria
Prof. Dr. Qazim TMAVA, University "Isa Boletini"- Mitrovica, Republic of Kosovo
Prof.Dr. Rasim YILMAZ, Tekirdağ Namık Kemal University, Turkey

ORGANAZING COMMITTEE

Prof.Dr. Ahmet KUBAŞ, Tekirdağ Namık Kemal University, Turkey
Prof.Dr. Olivera KOSTOSKA, University "St. Kliment Ohridski"-Bitola, Republic of North Macedonia
Prof.Dr. Ekaterina ARABSKA, University of Agribusiness and Rural Development, Bulgaria
Prof.Dr. Dejan ZDRAVESKI, University "St. Kliment Ohridski"-Bitola, Republic of North Macedonia
Asst. Prof. Dr. Filloreta Kunoviku DEMIRI, University "Isa Boletini"- Mitrovica, Republic of Kosovo

SCIENTIFIC COMMITTEE

Prof. Dr. Alpay HEKİMLER, Eskisehir Osmangazi University, Turkey
Prof. Dr. Ajtene AVDULLAHİ, University of Mitrovica "Isa Boletini", Kosovo
Prof. Dr. Andreas G. KOUTOUPIS, University of Thessaly, Greece
Prof. Dr. Aneta RISTESKA, University St. Kliment Ohridski-Bitola, North Macedonia
Prof. Dr. Annamalia M. SAKKTHIVEL, Sur University College, Oman
Prof. Dr. Dragica ODZAKLIESKA, University St. Kliment Ohridski-Bitola, Republic of North Macedonia
Prof. Dr. Gerhard RING, TU Bergakademie Freiberg, Germany
Prof. Dr. Günther LOSCHNIGG, University of Graz, Austria
Prof. Dr. Herbert REGİNBOGIN, Touro College, USA
Prof. Dr. Klodina GORICA, University of Tirana, Albania
Prof. Dr. Ksenija DUMIČIĆ, University of Zagreb, Croatia
Prof. Dr. Letlhokwa George MPEDI, University of Johannesburg, South Africa
Prof. Dr. Martha STARR, American University Washington D.C., USA
Prof. Dr. Mariana IVANOVA, University of Agribusiness and Rural Development
Prof. Dr. Mi Jung PARK, Freie Universitat Berlin, Germany
Prof. Dr. Nadka KOSTADINOVA, Trakia University, Bulgaria
Prof. Dr. Otto KAUFMANN, Max Planck Institut München, Germany
Prof. Dr. Patricia GEORGIEVA, University of Agribusiness and Rural Development
Assoc. Prof. Dr. Qazim TMAVA, University of Mitrovica "Isa Boletini" , Kosovo
Prof. Dr. Safet KOZAREVIĆ, University of Tuzla, Bosnia and Herzegovina
Prof. Dr. Shushma PATEL, London South Bank University, UK
Prof. Dr. Slavica ROCHESKA, University "St. Kliment Ohridski"-Bitola, North Macedonia
Prof. Dr. Srdjan REDZEPAGIĆ, University of Nice – Sophia Antipolis, France
Prof. Dr. Thomas PAUL, University of South Pacific
Prof. Dr. Todor RADEV, International University College, Bulgaria
Prof. Dr. Todorka ATANASSOVA-KALAYDZIEVA, Trakia University, Bulgaria
Prof. Dr. Zoran ĆIRIĆ, University of Novi Sad, Serbia

REFEREES

Prof.Dr. Ahmet AĞCA, Dumlupınar University, Turkey

Prof.Dr. Alpay HEKİMLER, Eskişehir Osmangazi University, Turkey
Prof.Dr. Annamalia M. SAKKTHIVEL, Sur University College, Oman
Prof.Dr. Dilek ALTAŞ, Marmara Univesity, Turkey
Prof.Dr. Günther LOSCHNIGG, University of Graz, Austria
Prof.Dr. İbrahim BAKIRTAŞ, Aksaray University, Turkey
Prof.Dr. Ömer AZABAĞAOĞLU, Tekirdağ Namık Kemal University, Turkey
Prof.Dr. Kemal YILDIRIM, Anadolu University, Turkey
Prof.Dr. Mariana IVANOVA, University of Agribusiness and Rural Development, Bulgaria
Prof.Dr. Nurcan METİN, Trakya University, Turkey
Prof.Dr. Nadka KOSTADINOVA, Trakia University, Bulgaria
Prof.Dr. Slavica ROCHESKA, University "St. Kliment Ohridski"-Bitola, North Macedonia

SESSION CHAIRS

Androniki KATARACHIA
Anna DUNAY
Aykut TAVŞANCI
Bige KÜÇÜKEFE
Cristian POPESCU
Csaba Bálint ILLÉS
Cüneyt KOYUNCU
Dilek ALTAŞ KARACA
Eleni ZAFEIRIOU
Elif GİLANLI
Florentina MOISESCU
Hikmet ASUTAY
Ivana BUTORACOVÁ ŠINDLERYOVÁ
Katarína BELANOVÁ
Maria K. BIRBILI
Megi MARKU
Michal MEŠŤAN
Nurcan ÖZKAN
Raşit GÜLTEKİN
Resül YAZICI
Ruhangiz ALIYEVA

CONGRESS ID

TITLE OF CONGRESS

XXVI. International Balkan and Near Eastern Congresses Series on Economics, Business and Management-Mitrovico/Kosovo

DATE – PLACE

October 10-11, 2026
Mitrovico, Kosovo

ORGANIZATION

University “Isa Boletini”- Mitrovica, Faculty of Economics / Republic of Kosovo
University "St. Kliment Ohridski" Faculty of Economics / Republic of North Macedonia
University of Agribusiness and Rural Development / Bulgaria

PROCEEDINGS BOOK EDITED BY

Prof. Dr. Qazim TMAVA, University “Isa Boletini”- Mitrovica, Republic of Kosovo

Prof. Dr. Tatjana SPASESKA, University St. Kliment Ohridski-Bitola, Republic of North Madeconia

Prof. Dr. Rasim YILMAZ, Tekirdağ Namık Kemal University, Turkey

ISBN

EVALUATION PROCESS

All submitted articles have undergone a double-blind peer review process.

PARTICIPANT COUNTRIES (11)

Azerbaijan, Albania, Greece, Hungary, Kosovo, Latvia, Moldova, Romania, Slovakia, Slovenia, Türkiye
TOTAL NUMBER OF PAPERS: 83
THE NUMBER OF PAPERS FROM TURKEY: 39
THE NUMBER OF PAPERS FROM OTHER COUNTRIES: 44

Program

10:00 – 11:00	Parallel Session I	Hall 1 Chair Person: Asst.Prof.Dr. Michal MEŠŤAN	
		Nadia ELBASANI	**The EU AI Act and SMEs in the Western Balkans: Compliance Costs, Legal Risks and Business Competitiveness**
		Michal MEŠŤAN	**AI Adoption in Central and Eastern European Enterprises: A Descriptive Analysis by Firm Size**
		Agris RAIPALIS Anastasija KOVALOVA	**The High Cost of Cheap Compliance: Evaluating the Reputational Risks of AI-Driven Accessibility Tools in Digital Marketing**
		Szabolcs DIÓSI	**Infinite Intelligence on a Finite Planet? The Environmental, Energy, Technological, and Economic Limits of AI Growth**
10:00 – 11:00	Parallel Session I	Hall 2 Chair Person: Assoc.Prof.Dr. Raşit GÜLTEKİN	
		Vildan YAVUZ AKINCI	**Teknolojik İşsizlik Tartışmasında Kuramsal Süreklilik Sorunu: Yapay Zekâ ve Emek Piyasası Yazınının Bibliyometrik Çözümlemesi (2002–2026)**
		Raşit GÜLTEKİN Derya DİNÇER GÜLTEKİN	**Türkiye'de Aktüeryal Denge ve Mali Risklerin Yönetim Stratejileri**
		Kenan DUMAN	**Dijital Platformlarda Şeffaflık ve Hesap Verebilirlik Krizi: Avrupa Birliği Düzenlemeleri Bağlamında Veri Raporlama Standartları Üzerine İnceleme**
10:00 – 11:00	Parallel Session I	Hall 3 Chair Person: Assoc.Prof.Dr. Megi MARKU	
		Michael PUTTER	**Measuring Hotel Visibility in Generative AI Systems: Inter-System Agreement and the Case Against Single-Channel Monitoring**
		Ilona GÁL	**A Bibliometric Analysis of the Human**

		Bálint Csaba ILLÉS László PATAKI	**Organisational and Institutional Dimensions of Artificial Intelligence in Healthcare**
		Elnur ALASKARLI	**Migrant entrepreneurship and technological innovation: A literature review of theoretical perspectives and empirical evidence**
		Megi MARKU	**Tacit and Technical Capability: Distinct Associations with BDA-Related Performance in Albania**
11:00 – 12:00	Parallel Session II	Hall 1 Chair Person: Assoc.Prof.Dr. Resül YAZICI	
		Resül YAZICI	**Yeşil Sigortacılığın Sürdürülebilir Kalkınmaya Katkısı**
		Pınar AVCI	**Yeşil Finans ve Sürdürülebilir Kalkınma Amaçları Çalışmalarının Bibliyometrik Analizi**
		Erdal ARSLAN Ali BORA	**Türkiye'de Katılım Sigorta Şirketlerinin Kârlılık ve Verimlilik Analizi: 2020-2025 Dönemi**
		Erdal ARSLAN Safiye BORA	**Türkiye'de Sermaye Piyasasında Faaliyet Gösteren Portföy Yönetim Şirketleri ve Yatırım Fonlarının Risk ve Getiri Açısından Değerlendirilmesi: 28 Ağustos 2026 Kararının Piyasalara Olası Etkileri**
11:00 – 12:00	Parallel Session II	Hall 2 Chair Person: Prof.Dr. Cüneyt KOYUNCU	
		Konstantinos G. PARCHARIDIS	**The Integration Of E-Government Systems into Hellenic Social Security**
		Maria Cristina ACHIM Maria Amorina STOIAN	**Assessing Public Sector Innovation Capacity in Romania: Institutional Conditions, Organizational Capabilities and Digital Transformation**
		Maria Amorina STOIAN Maria Cristina ACHIM	**Administrative Innovation: The Role of Digital Transformation in Public Sector**
		Zamira Gerra YILDIRIM	**Fiscalisation As a Control Boundary: Internal Control in Digitally Transforming SMEs**
11:00 – 12:00	Parallel Session II	Hall 3 Chair Person: Asst.Prof.Dr. Aykut TAVŞANCI	

		Aykut TAVŞANCI	**Avrupa Birliği Vergi Politikası ve Vergilendirme Yetkisinin Sınırlandırılması**
		Aykut TAVŞANCI	**Avrupa Birliği ve Türkiye İlişkilerinin Anayasa Hukuku Açısından Değerlendirilmesi**
		Raşit GÜLTEKİN	**Tarife ve Kıymet İhtilafları Bağlamında Gümrük Kabahatleri: Gümrük Kanununun 234üncü Maddesi Kapsamında Değerlendirmeler**
		Selin BAHAR	**Türkiye Gümrük Antrepo Sektöründe Mekânsal Dağılım, İşletici Yoğunlaşması ve Lisans Sahipliği Yapısı**
12:00 – 13:00	Lunch		
13:00 – 14:00	Parallel Session III	Hall 1 Chair Person: Assoc.Prof.Dr. Katarína BELANOVÁ	
		Katarína BELANOVÁ	**Entrepreneurial Support Infrastructure and Startup Activity: Evidence from Slovak Regions**
		Filloreta KUNOVIKU DEMIRI Besë SADIKAJ Leard LATIFI	**SME Internationalization Strategies in Kosovo: Challenges and Success Factors for Entering Foreign Markets**
		Manan DUA	**The Template Effect: How Model Legislation Manufactured a National Camping-Ban Wave After Grants Pass v. Johnson**
		Aylin BAŞKAYA Fatih KOÇ	**The Effect of Greenhushing on Consumer Responses: An Empirical Study on Demographic Differences**
13:00 – 14:00	Parallel Session III	Hall 2 Chair Person: Assoc.Prof.Dr. Ruhangiz ALIYEVA	
		Ruhangiz ALIYEVA	**İşgücü Piyasasının Düzenlenmesi Ve Sosyal Koruma Mekanizmaları**
		Ruhangiz ALIYEVA	**Azerbaycan'da Eğitim Düzeyinin Kadın İstihdamına Etkisi**
		Burcu YİĞİT	**İş Yeri Yalnızlığı ve Tükenmişlik Sendromu Arasındaki İlişkide Örgütsel Dedikodunun Düzenleyici Rolü**

		Gürkan VARDAR Saniye HAYDAROĞLU	**Vizyoner Liderliğin Çalışan Performansına Etkisi: Bilecik İlinde Bir Alan Araştırması**
13:00 – 14:00	Parallel Session III	Hall 3 Chair Person: Prof.Dr. Eleni ZAFEIRIOU	
		Kyriaki EFTHALITSIDOU Eleni ZAFEIRIOU Konstantinos SPINTHIROPOULOS Nikolaos SARIANNIDIS	**Banking Soundness, Institutional Quality and Private-Sector Credit in the EU-27: A Panel Data Analysis**
		Rasim YILMAZ	**Physical, Account-Based, and Digital Gold: The Evolution of Gold in the Financial Transformation Process**
		Rasim YILMAZ	**Gold, Wealth Effects, and Inflation: Historical Evidence and Contemporary Implications for Monetary Policy in Türkiye**
		Tuna ŞENER	**A Comparative Analysis of The Turkish and Greek Economies in Terms of Risk Indicators in the Post-Covid-19 Period**
14:00 – 15:00	Parallel Session IV	Hall 1 Chair Person: Assoc.Prof.Dr. Bige KÜÇÜKEFE	
		Aysun BULUT Neslihan CAVLAK Bige KÜÇÜKEFE	**Destinasyon Pazarlamasında Dijitalleşme**
		Zinnet ARICI TARAKÇI Kamer Ilgın ÇAKIROĞLU	**Çekicilikten İmaja ve Sadakate: İstanbul'un Marka Şehir Dinamikleri**
		Duygu YÜCEL Havva ARABACI	**Sürdürülebilir Bölgesel Kalkınmada Turizmin Stratejik Rolü**
14:00 – 15:00	Parallel Session IV	Hall 2 Chair Person: Prof.Dr. Dilek ALTAŞ KARACA	
		Miray ÖZDEN Seray Özden KELEŞ	Küreselden Yerele İklim Yönetişimi: COP31'in Türkiye'de Yerel Yönetimler Açısından Sunduğu Fırsatlar Üzerine Bir Değerlendirme

		Zekiye ŞENGÜL ABEDI Gamze SANER	Tozlaşma Hizmeti Güvenliği: Tarımsal Risk Yönetişimi için Bir Stok–Akış–Tahsis–Refah Çerçevesi
		Dilek ALTAŞ KARACA Aysen ŞIMŞEK KANDEMİR	G20 Ülkelerini Ayırt Eden Refah Boyutları: 2026 Legatum Prosperity Index Üzerinden Karar Ağacı Analizi
14:00 – 15:00	Parallel Session IV	Hall 3 Chair Person: Prof.Dr. Cristian POPESCU	
		Cristian POPESCU Anca-Emilia IOJĂ	Institutional Moderation of Fiscal Policy in High-Informality Economies: Distributional, Asymmetric, and Spatial Evidence from the EU-27
		Utku ALTUNÖZ	Excise Taxes, Inflation, and Illicit Tobacco Consumption: Evidence from Nonlinear Panel Models
		Anna GIOVOU Stavros KALOGIANNIDIS Konstantinos SPINTHIROPOULOS Dimitrios PARRIS Ioannis NEVESKIOTIS	Why Environmental Costs Stay Invisible: Implementation Barriers to Environmental Cost Accounting in Shipping Companies and Their Strategic Consequences
		Dilara ÇAKMAKOĞLU	Waiting for the Next Amnesty: Tax Compliance and the Tanzi Effect in Türkiye
15:00 – 16:00	Parallel Session V	Hall 1 Chair Person: Asst.Prof.Dr. Elif GİLANLI	
		Esmanur YILMAZ Sadiye OKTAY	Teknoloji Geliştirme Bölgelerinde Girişim Sermayesi Yatırım Yükümlülüğü Kapsamında Kuluçka Firmalarının Analitik Hiyerarşi Süreci ile Değerlendirilmesi
		Yasin AKKUŞ	Girişimcilik, İnovasyon ve STEM Eğitimi Ekseninde Bir Bibliyometrik Analiz: Web of Science Veri Tabanı Üzerinden Bir İnceleme
		Elif GİLANLI	Son Kilometre Lojistiği: Kavramsal Çerçeve ve Literatür İncelemesi
		Yaprak KARADAĞ DUYMAZLAR	Avrupa ve Batı Asya Ülkelerinde Yerel Vergilerin ve Mali Yerelleşmenin Mekânsal Otokorelasyon Analizi

Sunday Sessions

10:00 – 11:00	Parallel Session VI	Hall 1 Chair Person: Prof.Dr. Nurcan ÖZKAN	
		Nurcan ÖZKAN	**Plastic Pollution in the Oceans and the Most Polluting Countries**
		Nurcan ÖZKAN	**The Importance of Wetlands and Ramsar Sites in Turkey**
		Miray ÖZDEN Seray Özden KELEŞ	**Digital Communication in Fighting Wildfires: An Examination of Municipalities' Social Media Use**
		Endre Akos PAPP Anna DUNAY	**Modeling Sustainable Product Development in Zoos Integrating Service-Dominant Logic and Customer Journey Mapping**
10:00 – 11:00	Parallel Session VI	Hall 2 Chair Person: Prof. Dr. Anna DUNAY	
		Etleva SHORE Fatmir GURI Saimir TOLLIA	**Land Tenure Security and Farm Economic Efficiency in Albania: A Propensity Score Matching and Stochastic Frontier Analysis Approach**
		Jozef REPISKÝ Denisa LAKATOVÁ	**Identification of the Optimal Crop Production Structure in Slovakia's Production Regions under Uncertainty**
		Nikolett FARAGÓ Anna DUNAY Róbert MAGDA	**Generational Renewal as a Land Policy and Sustainability Challenge**
		Eva BOGNÁR Anna DUNAY	**The Points of Connection Between Agrotourism and Short Food Supply Chains**
11:00 – 12:00	Parallel Session VII	Hall 1 Chair Person: Prof.Dr. Csaba Bálint ILLÉS	
		Daniel BULIN	**North American Tourism and the 2026 World Cup: A Preliminary Assessment**
		Attila KORENIKA Bálint Csaba ILLÉS	**Infrastructure as a Driver of Kitchen Service Quality in Hungarian Public Catering: A**

			Comprehensive Assessment Framework
		Ildikó DÓSA Csaba Bálint ILLÉS	**Regulating Forests for Recreation in the EU: Perspectives for Forest-Based Ecotourism**
		Rasim YILMAZ	**The Economic Implications of EU Deforestation Policies for Non-EU Countries: Trade, Compliance Costs, and Sustainable Supply Chains**
11:00 – 12:00	Parallel Session VII	Hall 2 Chair Person: Prof.Dr. Androniki KATARACHIA	
		Ľubica ZUBAĽOVÁ Kristína DRIENIKOVÁ Erika JUČOVÁ Andrea HRUBŠOVÁ	**An Index-Based Assessment of Bilateral Trade and Comparative Advantages Between Slovakia and Türkiye**
		Stavros P. MIGKOS Androniki KATARACHIA Polytimi M. FARMAKI	**From Austerity to Just Transition: Cumulative Regional Vulnerability and Structural Transformation in Western Macedonia, Greece**
		Eleonóra MATOUŠKOVÁ	**Risks to the Development of External Demand for a Small Open Economy**
		Alexandru-Costel MANOLEA Andreea-Oana IACOBUȚĂ-MIHĂIȚĂ	**When There Is No Untreated Region: Predetermined Exposure and Causal Measurement of Regional Resilience**
12:00-13:00	Lunch		
13:00 – 14:00	Parallel Session VIII	Hall 1 Chair Person: Prof.Dr. Maria K. BIRBILI	
		Antonis D. PAPAOIKONOMOU Maria K. BIRBILI	**Higher Education and Democratic Institutions in Southeastern Europe (2000–2022): A Panel Data Econometric Analysis**
		Anastasia ROMANOVA Angela PIRLOG	**Progression to Master's Education: Student Motivations, Barriers, and Institutional Perspectives**
		Beyzanur TURGUT Selma DENEME GENÇOĞLU	**Investigating Third-Grade EFL Students' Motivation for Storytelling-Based Vocabulary Instruction**

		Amir VELIU	**The Socioeconomic Paradox of Modern Development Economic Well-Being versus Social and Psychological Costs**
13:00 – 14:00	Parallel Session VIII	Hall 2 Chair Person: Prof.Dr. Ivana BUTORACOVÁ ŠINDLERYOVÁ	
		Ivan LUCHIAN Angela FILIP	Burnout in Financial Institutions: Challenges and Remedies
		Helena BOŠKAJOVÁ Ivana BUTORACOVÁ ŠINDLERYOVÁ	**The Role of Spokespersons in Strategic Communication Management: A Case Study of Slovakia**
		Ulker IMAMALİYEVA	**Hybrid Threats to National Security**
		Thanassis KAZANAS Spiros PLOMARITIS Faidon KOMISOPOULOS	**An Integrated Framework for Risk and Cost Management in Industrial Construction Projects: Case Study Evidence from a PipeRack P-1100 Installation**
14:00 – 15:00	Parallel Session IX	Hall 1 Chair Person: Prof.Dr. Hikmet ASUTAY	
		Hikmet ASUTAY	**Almanya'da Gençlik ve İsyan: Alman Çocuk ve Gençlik Yazınında Başkaldırı Örnekleri**
		Rahim ŞENTÜRK	**Yapay Zekânın Almanca Dil Bilgisi Hatalarına Yönelik Geri Bildirimlerinin İncelenmesi**
		Kevser ERGIN ÜRÜT	**Donald Trump Dönemi Amerika Birleşik Devletleri Savunma Politikalarında Yapay Zekâ: Maven Projesi**
14:00 – 15:00	Parallel Session IX	Hall 2 Chair Person: Assoc.Prof.Dr. Florentina MOISESCU	
		Florentina MOISESCU	**Energy Security and Corporate Reporting: Evidence from Romanian Listed Energy Companies, 2020–2025**
		Daniel BULIN	**The World Economy Under the Impact of the Energy Shock: Developments and Prospects**
		Fatih ÇOLAKOĞLU Matej ŠVIGELJ	**Wind Energy Development in Türkiye: Current Status, Policy Framework and Future Challenges**

		Dániel Kristóf BEDŐ	**Assessing the Impact of Bus Fleet Electrification on the Kehlstein Line: A Physics-Based Energy Model with Monte Carlo Uncertainty Analysis**

CONTENTS

Land Tenure Security and Farm Economic Efficiency in Albania: A Propensity Score Matching and Stochastic Frontier Analysis Approach 1
Higher Education and Democratic Institutions in Southeastern Europe: A Comparative Panel Econometric Analysis of Four Diverse Regimes (2000–2022) 11
Measuring Hotel Visibility In Generative AI Systems: Inter-System Agreement And The Case Against Single-Channel Monitoring 21
The EU AI Act and SMEs in the Western Balkans Compliance Costs Legal Risks and Business Competitiveness . 32
Infrastructure as a Driver of Kitchen Service Quality in Hungarian Public Catering: A Comprehensive Assessment Framework: *A Complex Service-Quality-Oriented Examination of Infrastructural Conditions* 37
The High Cost of Cheap Compliance: Evaluating the Reputational Risks of AI-Driven Accessibility Tools in Digital Marketing 44
From Austerity to Just Transition: Cumulative Regional Vulnerability and Structural Transformation in Western Macedonia, Greece 61
Energy Security and Corporate Reporting: Evidence from Romanian Listed Energy Companies, 2020–2025 80
Burnout in Financial Institutions: Challenges and Remedies 92
Tacit and Technical Capability: Distinct Associations with BDA-Related Performance in Albania 101
Entrepreneurial Support Infrastructure and Startup Activity: Evidence from Slovak Regions 108
Why Environmental Costs Stay Invisible: Implementation Barriers to Environmental Cost Accounting in Shipping Companies and Their Strategic Consequences 117
SME Internationalization Strategies in Kosovo: Challenges and Success Factors for Entering Foreign Markets 123
Banking Soundness, Institutional Quality and Private-Sector Credit in the EU-27: A Panel Data Analysis 132
The Role of Spokespersons in Strategic Communication Management: A Case Study of Slovakia 140
The Integration Of E-Government Systems Into Hellenic Social Security 149
Assessing Public Sector Innovation Capacity in Romania: Institutional Conditions, Organizational Capabilities and Digital Transformation 153
An Integrated Framework for Risk and Cost Management in Industrial Construction Projects: Case Study Evidence from a PipeRack P-1100 Installation 160
Wind Energy Development in Türkiye: Current Status, Policy Framework and Future Challenges 170
Identification of the Optimal Crop Production Structure in Slovakia's Production Regions under Uncertainty 179
The Template Effect: How Model Legislation Manufactured a National Camping-Ban Wave After Grants Pass v. Johnson 190
Administrative Innovation: The Role of Digital Transformation in Public Sector 201
Fiscalisation as a Control Boundary: Internal Control in Digitally Transforming SMEs 210
Risks to the Development of External Demand for a Small Open Economy 218
Modeling Sustainable Product Development in Zoos: Integrating Service-Dominant Logic and Customer Journey Mapping 224
The points of connection between agrotourism and short food supply chains 238
Generational Renewal As A Land Policy And Sustainability Challenge 243
A Bibliometric Analysis of the Human Organisational and Institutional Dimensions of Artificial Intelligence in Healthcare 255
Plastic Pollution in the Oceans and the Most Polluting Countries 268
Yeşil Sigortacılığın Sürdürülebilir Kalkınmaya Katkısı 275
The Importance of Wetlands and Ramsar Sites in Turkey 280
Investigating Third-Grade EFL Students' Motivation for Storytelling-Based Vocabulary Instruction: A Mixed-Methods Study 290
Excise Taxes, Inflation, and Illicit Tobacco Consumption: Evidence from Nonlinear Panel Models 304
Yapay Zekânın Almanca Dil Bilgisi Hatalarına Yönelik Geri Bildirimlerinin İncelenmesi 315

Küreselden Yerele İklim Yönetişimi: COP31'in Türkiye'de Yerel Yönetimler Açısından Sunduğu Fırsatlar Üzerine Bir Değerlendirme 322
Digital Communication In Fighting Wildfires: An Examination Of Municipalities' Social Media Use 328
Avrupa Birliği Vergi Politikası ve Vergilendirme Yetkisinin Sınırlandırılması 334
Avrupa Birliği ve Türkiye İlişkilerinin Anayasa Hukuku Açısından Değerlendirilmesi 341
Tarife ve Kıymet İhtilafları Bağlamında Gümrük Kabahatleri: Gümrük Kanununun 234 üncü Maddesi Kapsamında Değerlendirmeler 348
Türkiye'de Aktüeryal Denge ve Mali Risklerin Yönetim Stratejileri 372
Avrupa ve Batı Asya Ülkelerinde Yerel Vergilerin ve Mali Yerelleşmenin Mekânsal Otokorelasyon Analizi 392
Destinasyon Pazarlamasında Dijitalleşme 396
A Comparative Analysis of The Turkish And Greek Economies In Terms Of Risk Indicators In The Post-Covid-19 Period 403
Tozlaşma Hizmeti Güvenliği: Tarımsal Risk Yönetişimi için Bir Stok–Akış–Tahsis–Refah Çerçevesi 413
Türkiye'de Sermaye Piyasasında Faaliyet Gösteren Portföy Yönetim Şirketleri ve Yatırım Fonlarının Risk ve Getiri Açısından Değerlendirilmesi: 28 Ağustos 2026 Kararının Piyasalara Olası Etkileri 437
Türkiye'de Katılım Sigorta Şirketlerinin Kârlılık ve Verimlilik Analizi: 2020-2025 Dönemi 447
The Effect of Greenhushing on Consumer Responses: An Empirical Study on Demographic Differences 453
Sürdürülebilir Bölgesel Kalkınmada Turizmin Stratejik Rolü 467
Almanya'da Gençlik ve İsyan: Alman Çocuk ve Gençlik Yazınında Başkaldırı Örnekleri 476
Donald Trump Dönemi Amerika Birleşik Devletleri Savunma Politikalarında Yapay Zekâ: Maven Projesi 481
Teknoloji Geliştirme Bölgelerinde Girişim Sermayesi Yatırım Yükümlülüğü Kapsamında Kuluçka Firmalarının Analitik Hiyerarşi Süreci ile Değerlendirilmesi 493
Son Kilometre Lojistiği: Kavramsal Çerçeve ve Literatür İncelemesi 501
Physical, Account-Based, and Digital Gold: The Evolution of Gold in the Financial Transformation Process 507
Gold, Wealth Effects, and Inflation: Historical Evidence and Contemporary Implications for Monetary Policy in Türkiye 514
The Economic Implications of EU Deforestation Policies for Non-EU Countries: Trade, Compliance Costs, and Sustainable Supply Chains 519

ABSTRACTS 526
An Index-Based Assessment of Bilateral Trade and Comparative Advantages Between Slovakia and Türkiye .. 527
The World Economy under the Impact of the Energy Shock: Developments and Prospects 528
North American Tourism and the 2026 World Cup: A Preliminary Assessment 529
AI Adoption in Central and Eastern European Enterprises: A Descriptive Analysis by Firm Size 530
Assessing the Impact of Bus Fleet Electrification on the Kehlstein Line: A Physics-Based Energy Model with Monte Carlo Uncertainty Analysis 531
Progression to Master's Education: Student Motivations, Barriers, and Institutional Perspectives 532
When There Is No Untreated Region: Predetermined Exposure and Causal Measurement of Regional Resilience 533
İşgücü Piyasasının Düzenlenmesi ve Sosyal Koruma Mekanizmaları 534
Azerbaycan'da Eğitim Düzeyinin Kadın İstihdamına Etkisi 535
Institutional Moderation of Fiscal Policy in High-Informality Economies: Distributional, Asymmetric, and Spatial Evidence from the EU-27 536
The Socioeconomic Paradox of Modern Development Economic Well-Being versus Social and Psychological Costs 537
Migrant entrepreneurship and technological innovation: A literature review of theoretical perspectives and empirical evidence 538
Infinite Intelligence on a Finite Planet? The Environmental, Energy, Technological, and Economic Limits of AI Growth 539
Regulating Forests for Recreation in the EU: Perspectives for Forest-Based Ecotourism 540
Teknolojik İşsizlik Tartışmasında Kuramsal Süreklilik Sorunu: Yapay Zekâ ve Emek Piyasası Yazınının Bibliyometrik Çözümlemesi (2002–2026) 541
Girişimcilik, İnovasyon ve STEM Eğitimi Ekseninde Bir Bibliyometrik Analiz: Web of Science Veri Tabanı Üzerinden Bir İnceleme 542
G20 Ülkelerini Ayırt Eden Refah Boyutları: 2026 Legatum Prosperity Index Üzerinden Karar Ağacı Analizi 543
Vizyoner Liderliğin Çalışan Performansına Etkisi: Bilecik İlinde Bir Alan Araştırması 544
Yeşil Finans ve Sürdürülebilir Kalkınma Amaçları Çalışmalarının Bibliyometrik Analizi 545
İş Yeri Yalnızlığı ve Tükenmişlik Sendromu Arasındaki İlişkide Örgütsel Dedikodunun Düzenleyici Rolü 546
Waiting for the Next Amnesty: Tax Compliance and the Tanzi Effect in Türkiye 547
From Attractiveness to Image and Loyalty: The Dynamics of Istanbul as a Brand City 548
Dijital Platformlarda Şeffaflık ve Hesap Verebilirlik Krizi: Avrupa Birliği Düzenlemeleri Bağlamında Veri Raporlama Standartları Üzerine İnceleme 550

Land Tenure Security and Farm Economic Efficiency in Albania: A Propensity Score Matching and Stochastic Frontier Analysis Approach

Etleva SHORE[1] **Fatmir GURI[1,2]** **Saimir TOLLIA[1,3]**

[1] Department of Economics and Rural Development Policies, Faculty of Economics, Agricultural University of Tirana, Tirana, Albania.

[2] Ministry of Agriculture and Rural Development, Deputy Minister's Office, Tirana, Albania.

[3] CIHEAM-IAMM, UMR MoISA, F-34093 Montpellier, France.

Etleva SHORE: e-mail: etleva.shore@ubt.edu.al, ORCID iD: 0009-0000-6964-3889; Fatmir GURI: e-mail: fatmirguri@ubt.edu.al, ORCID iD: 0000-0002-9685-5024; Saimir TOLLIA: e-mail: miritollja@gmail.com, ORCID iD: 0009-0008-8674-5121

Abstract: This study investigates whether land tenure status — ownership versus rental — affects farm economic performance and technical efficiency in Albania, addressing a central question in agricultural land economics: whether tenure security stimulates productivity-enhancing investment, or whether rental markets instead facilitate farm consolidation and scale economies. Using primary survey data from 1000 farm households across three Albanian prefectures (Fier, Korçë, Kukës), farms are classified as "predominantly owned" or "predominantly rented" using a 70% land-share threshold, with 60% and 80% thresholds applied as sensitivity checks.

To address the self-selection of farms into tenure status — larger, more market-oriented, or more mechanized farms may systematically differ in their land arrangements — Propensity Score Matching (nearest-neighbor, caliper = 0.2 standard deviations of the logit propensity score) is applied on farmer and farm characteristics, including age, education, household labor endowment, distance to market, irrigation access, and land fragmentation. The matching procedure achieves substantial covariate balance, reducing standardized mean differences by 78–100% for five of seven covariates. Farm-level technical efficiency is subsequently estimated through a Cobb-Douglas stochastic production frontier with a one-step inefficiency effects specification, incorporating land tenure status as a determinant of inefficiency.

Results indicate that, after matching, predominantly rented farms exhibit significantly higher output value than comparable owner-operated farms (ATT = −3.55 million ALL, $p<0.01$), a finding that remains robust across all three classification thresholds and is consistent with rental markets facilitating scale expansion and more intensive capital use. Conversely, the stochastic frontier results show that land ownership is associated with significantly lower technical inefficiency, with mean technical efficiency scores of 0.60 for owned-land farms versus 0.53 for rented-land farms ($p=0.09$), suggesting that ownership security is linked to more efficient resource allocation even at a comparatively smaller operational scale.

These complementary findings indicate that land ownership and rental tenure operate through distinct and partly offsetting economic channels — efficiency versus scale — with direct implications for the formalization of Albania's land rental market and for policies aimed at land consolidation and rural development.

Keywords: Resource allocation, Land rental markets, Economies of scale, Property rights economics, Albania

JEL Classification: Q12, Q15, C21, D24

1. INTRODUCTION

The radical transformation of agricultural land ownership in Albania following the collapse of the centrally planned economy in the early 1990s created a new structure of private smallholder farms, but simultaneously produced high fragmentation, dispersed parcels, incomplete documentation, and overlapping ownership claims (Deininger & Jin, 2006). These structural features continue to shape the functioning of the land market and farmers' investment decisions three decades later. In the absence of a fully functional land sales market, farm expansion in Albania is increasingly achieved through rental arrangements — formal or informal, short-term or long-term — which may have two opposing effects on farm performance: on the one hand, land rental can increase cultivated area, generate scale economies, and improve machinery utilization; on the other hand, contractual insecurity associated with rental tenure may discourage investments with long payback horizons (Brasselle et al., 2002).

The central research problem addressed in this paper is the absence of an integrated empirical assessment that separates the effect of land tenure status from the effect of other farm characteristics that are simultaneously correlated with both tenure choice and performance. A farm with owned land may outperform a rented-land farm because of the security of ownership rights, but a rented-land farm may simultaneously be larger, more

market-oriented, and more specialized — characteristics that independently raise output and efficiency. A naive comparison of group means, without controlling for farm structure, is therefore insufficient to identify a credible tenure effect.

This paper addresses this problem by combining two complementary econometric approaches. First, Propensity Score Matching (PSM) is used to construct statistically comparable groups of owned-land and rented-land farms, thereby reducing the self-selection bias inherent in observational comparisons (Rosenbaum & Rubin, 1983). Second, Stochastic Frontier Analysis (SFA) is used to estimate each farm's technical efficiency relative to an economic production frontier, and to test whether land tenure status is a systematic determinant of inefficiency (Aigner et al., 1977; Battese & Coelli, 1995). The central research question is: do statistically significant differences exist in economic efficiency and resource use between farms operating predominantly on owned land and farms operating predominantly on rented land, once other determinants of farm performance are controlled for?

The remainder of the paper is organized as follows. Section 2 reviews the relevant literature on land tenure security, investment, and productivity. Section 3 describes the data and the empirical methodology. Section 4 presents the results. Section 5 discusses the findings in relation to the research hypotheses and the existing literature. Section 6 concludes with policy implications and directions for further research.

2. LITERATURE REVIEW

The relationship between land tenure security and agricultural performance has long occupied a central place in development and agricultural economics (Civici, 2002). Theoretical work by Besley (1995) formalized two channels through which tenure security affects investment: an incentive effect, whereby secure rights raise the expected return to land-improving investment, and a collateral effect, whereby documented ownership facilitates access to credit. Empirical evidence on the strength of these channels has, however, been mixed (Cinar et al., 2024). Studies from developing countries (Ivits et al., 2024) generally find weak or context-dependent effects of formal titling on investment, while studies from transition economies (Do & Iyer, 2008) find more robust positive effects, particularly where land markets are otherwise thin.

A second, closely related strand of literature examines land rental markets as a mechanism of farm consolidation and structural transformation (Diogo et al., 2015). Holden et al., (2011) show that low-cost land certification in Ethiopia increased participation in land rental markets, particularly benefiting land-poor and female-headed households seeking to lease out land, while enabling more capitalized farmers to expand operated area. Rental markets and ownership security are not necessarily substitutes but can serve complementary economic functions: ownership may support long-term, place-specific investment, while rental markets facilitate the reallocation of land toward more productive users and generate economies of scale (Jayne & Muyanga, 2012).

Methodologically, this paper draws on two well-established econometric traditions. Propensity Score Matching, introduced by Rosenbaum & Rubin, (1983), addresses the endogeneity of treatment assignment in observational data by constructing a comparison group with a similar conditional probability of treatment, and has become a standard tool in applied land tenure research where randomized assignment of tenure status is infeasible. Stochastic Frontier Analysis, originating with Aigner et al., (1977), decomposes the deviation of observed output from a theoretical production frontier into a symmetric statistical noise component and an asymmetric, non-negative technical inefficiency component; the extension proposed by Battese & Coelli, (1995) allows this inefficiency component to be modeled as a function of farm and farmer characteristics within a single-step maximum likelihood estimation, which is the specification adopted in this paper's inefficiency model.

2. LITERATURE REVIEW

The relationship between land tenure security and agricultural performance has long occupied a central place in development and agricultural economics. Theoretical work by Besley (1995) formalized two channels through which tenure security affects investment: an incentive effect, whereby secure rights raise the expected return to land-improving investment, and a collateral effect, whereby documented ownership facilitates access to credit. Empirical evidence on the strength of these channels has, however, been mixed. Studies from Sub-Saharan Africa (Place & Hazell, 1993; Brasselle et al., 2002) generally find weak or context-dependent effects of formal titling on investment, while studies from transition and Asian economies (Deininger & Jin, 2006, for Ethiopia; Do & Iyer, 2008, for Vietnam) find more robust positive effects, particularly where land markets are otherwise thin.

A second, closely related strand of literature examines land rental markets as a mechanism of farm consolidation and structural transformation. Holden, Deininger, and Ghebru (2011) show that low-cost land certification in Ethiopia increased participation in land rental markets, particularly benefiting land-poor and female-headed households seeking to lease out land, while enabling more capitalized farmers to expand operated area. This literature suggests that rental markets and ownership security are not necessarily substitutes but can serve complementary economic functions: ownership may support long-term, place-specific investment, while rental markets facilitate the reallocation of land toward more productive users and generate economies of scale (Jayne & Muyanga, 2012).

Methodologically, this paper draws on two well-established econometric traditions. Propensity Score Matching, introduced by Rosenbaum and Rubin (1983), addresses the endogeneity of treatment assignment in observational data by constructing a comparison group with a similar conditional probability of treatment, and has become a standard tool in applied land tenure research where randomized assignment of tenure status is infeasible. Stochastic Frontier Analysis, originating with Aigner, Lovell, and Schmidt (1977), decomposes the deviation of observed output from a theoretical production frontier into a symmetric statistical noise component and an asymmetric, non-negative technical inefficiency component; the extension proposed by Battese and Coelli (1995) allows this inefficiency component to be modeled as a function of farm and farmer characteristics within a single-step maximum likelihood estimation, which is the specification adopted in this paper's inefficiency model.

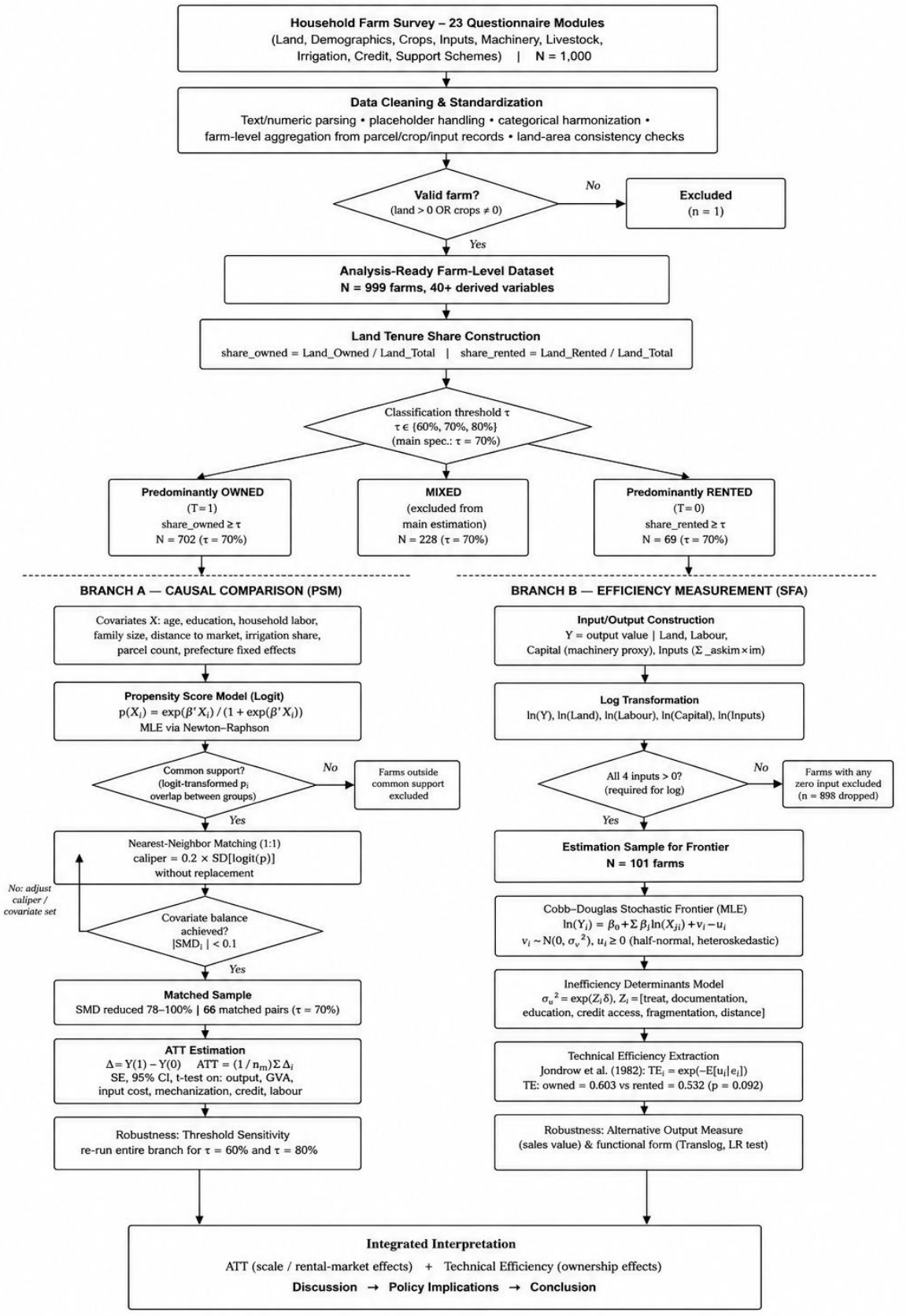
The Albanian case offers a particularly instructive setting for this debate because of the distinctive character of its post-socialist land reform (Civici, 2002). Unlike most other Central and Eastern European transition economies, where land was returned to former owners in kind or converted into tradable shares in successor cooperatives, Albania pursued a radically egalitarian land distribution that allocated small, often physically separated parcels directly to rural households largely irrespective of prior ownership (Zhllima & Guri, 2013). This approach averted much of the social unrest that land privatization triggered elsewhere in the region, but it also produced one of the most fragmented farm structures in Europe, with average holdings scattered across multiple non-contiguous plots. Sikor et al., (2009) show that this fragmentation did not straightforwardly translate into cropland abandonment or productive failure, as early policy narratives often assumed; instead, Albanian farm households actively maintained dispersed parcel portfolios as a deliberate risk-spreading strategy under the uncertainty of the post-socialist transition, and cropland abandonment where it did occur was driven primarily by out-migration toward non-farm livelihoods rather than by fragmentation itself. This carries a direct methodological implication for the present study: structural features of the Albanian farm sector — small size, dispersed parcels, mixed tenure arrangements — cannot be treated as self-evident indicators of inefficiency, which is precisely why farm structure variables such as parcel count are included as covariates in the propensity score model rather than being interpreted directly as outcomes (Shehu & Kapaj, 2023).

Subsequent evidence on Albania's land market further highlights the complexity of the relationship between land structure and farm-level economic outcomes (Guri et al., 2021). Ciaian et al., (2018) examining rural Albania, find that land fragmentation is positively associated with production diversification, particularly among subsistence-oriented households. The effects of land structure cannot be adequately characterised through a simple fragmentation–efficiency dichotomy (Alikaj et al., 2022). Instead, land-related institutional and structural characteristics may influence farm outcomes through multiple and interrelated channels (Agarwal et al., 2020).

3. DATA AND METHODOLOGY

The empirical strategy proceeds through two analytically distinct but complementary stages, both applied to the same underlying farm-level dataset. In the first stage, Propensity Score Matching is used to construct a statistically comparable pair of owned-land and rented-land farms, allowing the average treatment effect of tenure status on production outcomes to be estimated net of observable self-selection. In the second stage, Stochastic Frontier Analysis is applied to the full production dataset to estimate each farm's technical efficiency relative to an economic production frontier, with land tenure status entered directly as a determinant of inefficiency. Figure 1 summarizes the complete methodological pipeline, from the raw household survey through data cleaning, tenure classification, and the two parallel estimation branches, to the integrated interpretation of the results.

Figure 1: Methodological Framework



3.1 Data Source and Sample

The data used in this study are drawn from a primary household survey of 1,000 farm households across four Albanian prefectures (Fier, Korçë, Kukës, and Lushnjë), covering household demographics, land tenure structure, crop and livestock production, input use, machinery, irrigation access, credit access, and participation in agricultural support schemes. After excluding one questionnaire with no reported land area and no reported crop activity, the analytical sample consists of 999 farms.

3.2 Treatment Definition

Following standard practice in the land tenure literature, farms are classified according to the share of total operated land that is owned versus rented. Let $share\_owned_i$ and $share\_rented_i$ denote, respectively, the share of farm i's total land area that is owned and rented. Farms are classified as "predominantly owned" ($T_i=1$) if $share\_owned_i \geq \tau$, and as "predominantly rented" ($T_i=0$) if $share\_rented_i \geq \tau$, where τ is a classification threshold. The main specification uses $\tau=0.70$; thresholds of 0.60 and 0.80 are used as sensitivity checks. Farms that do not meet either threshold are classified as "mixed" and excluded from the main treatment-effect estimation. Under the 70% threshold, the sample comprises 702 predominantly owned farms (70.3%), 69 predominantly rented farms (6.9%), and 228 mixed farms (22.8%).

3.3 Propensity Score Matching

The propensity score, $p(X_i) = Pr(T_i=1|X_i)$, is estimated via a logistic regression of tenure status on a vector of pre-treatment covariates X_i selected to reflect farmer and farm characteristics that are unlikely to be themselves outcomes of tenure status: the farmer's age, years of education, number of working-age household members, household size, average distance to market, share of irrigated land, number of land parcels, and prefecture fixed effects.

$$p(X_i) = exp(\beta_o + \beta' X_i) / [1 + exp(\beta_o + \beta' X_i)] \quad (1)$$

Matching is performed on the logit-transformed propensity score, using nearest-neighbor matching without replacement and a caliper of 0.2 standard deviations of the logit propensity score, following Austin (2011). Covariate balance after matching is assessed via the standardized mean difference (SMD):

$$SMD = (\bar{x}_1 - \bar{x}_o) / \sqrt{[(s_1^2 + s_o^2) / 2]} \quad (2)$$

with $|SMD| < 0.10$ taken as the conventional threshold for adequate balance. The average treatment effect on the treated (ATT) is computed as the mean outcome difference across matched pairs, with the standard error derived from the variance of the paired differences.

3.4 Stochastic Frontier Analysis

Farm-level technical efficiency is estimated through a Cobb-Douglas stochastic production frontier:

$$ln(Y_i) = \beta_o + \beta_1 ln(Land_i) + \beta_2 ln(Labour_i) + \beta_3 ln(Capital_i) + \beta_4 ln(Inputs_i) + v_i - u_i \quad (3)$$

where Y_i is total farm output value, Land, Labour, Capital, and Inputs are the corresponding production factors, $v_i \sim N(0,\sigma_v^2)$ represents statistical noise, and $u_i \geq 0$ represents technical inefficiency. Because the log transformation requires strictly positive values for all four inputs, the estimation sample for the frontier model is restricted to farms reporting positive values for land, labor, capital, and intermediate inputs simultaneously (N=101); this restriction is discussed as a limitation in Section 5. The inefficiency component is modeled as a function of land tenure status and other covariates within a one-step maximum likelihood estimation in the spirit of Battese and Coelli (1995), and technical efficiency scores are recovered using the conditional expectation formula of Jondrow, Lovell, Materov, and Schmidt (1982):

$$TE_i = exp(-E[u_i|\varepsilon_i]) \quad (4)$$

4. RESULTS

4.1 Descriptive Statistics

Table 1 presents descriptive statistics for the analytical sample. The average farm operates 29.3 dynym (decares) of land, with substantial dispersion (SD = 61.0), reflecting the coexistence of small subsistence-oriented farms and larger commercially oriented operations. On average, 81% of operated land is owned and 19% is rented, though the underlying distribution is bimodal, consistent with the treatment classification described in Section 3.2. Output and value-added measures exhibit strong right-skewness, with means substantially exceeding medians, motivating the use of log-linear specifications in the frontier model.

Variable	Mean	Median	SD	Min	Max
Farmer's age (years)	55.5	56	10.0	26	85
Total land area (dynym)	29.3	18	61.0	0.2	1,125
Share of land owned	0.81	1.00	0.28	0	1
Share of land rented	0.19	0.00	0.27	0	1
Number of parcels	2.1	2	1.1	0	8
Distance to market (km)	5.8	5	10.7	0	250
Total output value (ALL)	2,401,175	1,350,000	3,902,054	0	42,245,000
Gross value added (ALL)	936,639	801,900	9,268,245	-233,639,125	39,804,250

Table 1. Descriptive statistics (N=999). ALL = Albanian Lek (authors contributions).

4.2 Balance Diagnostics

Table 2 reports the standardized mean difference for each covariate before and after matching. Five of the seven covariates achieve balance well within the conventional 0.10 threshold after matching, with reductions in absolute SMD ranging from 78% to 100%. The matching procedure retained 66 matched pairs from a maximum possible 69 treated-control pairs, corresponding to a 95.7% matching rate, indicating substantial common support between the two tenure groups.

Covariate	SMD before	SMD after	% Reduction
Age	0.501	-0.109	78.3%
Years of education	-0.252	0.000	100.0%
Working-age members	-0.144	-0.095	34.1%
Household size	-0.168	0.103	38.8%
Distance to market	-0.031	-0.032	-0.2%
Share of irrigated land	-0.525	-0.013	97.5%
Number of parcels	-0.734	-0.042	94.2%

Table 2. Covariate balance before and after nearest-neighbor matching with caliper (authors contributions).

4.3 Average Treatment Effect on the Treated

Table 3 reports the ATT for the main outcome variables. After matching, predominantly rented farms show significantly higher output value (ATT = −3,549,510 ALL, $p<0.001$), higher intermediate input costs (ATT = −4,139,470 ALL, $p=0.015$), and higher machinery value (ATT = −446,742 ALL, $p<0.001$) than comparable owned-land farms. No statistically significant difference is found for gross value added, credit access, mechanization intensity, or total labor days.

Outcome	ATT (ALL)	SE	p-value
Total output value	-3,549,510	962,121	0.000
Gross value added	+486,487	1,681,119	0.773
Intermediate input cost	-4,139,470	1,661,063	0.015
Machinery value	-446,742	111,360	0.000
Credit access (0/1)	-0.030	0.043	0.484
Total labor days	-21.9	14.8	0.144

Table 3. Average treatment effect on the treated (owned vs. rented), matched sample. Negative ATT indicates the rented-land group has a higher value than the owned-land group (authors contributions).

4.4 Stochastic Frontier Results

Table 4 reports the estimated Cobb-Douglas frontier coefficients (N=101). Land is the dominant factor of production, with an estimated elasticity of 0.650, followed by intermediate inputs (0.148) and capital (0.122); the estimated labor elasticity is close to zero and statistically imprecise, which is attributed to the small estimation sample and is discussed further in Section 5.

Input	Coefficient (elasticity)
Land	0.650
Labour	-0.045
Capital	0.122
Intermediate inputs	0.148

Table 4. Cobb-Douglas stochastic frontier coefficient (authors contributions).

The estimated inefficiency model shows that land tenure status is a statistically meaningful determinant of technical inefficiency: farms operating predominantly on owned land exhibit significantly lower technical inefficiency (coefficient = -0.677) than farms operating predominantly on rented land. Consistent with this, mean technical efficiency is 0.603 for owned-land farms compared to 0.532 for rented-land farms (Welch t-test, p=0.092), indicating that owned-land farms operate, on average, closer to their production possibility frontier.

4.5 Robustness Checks

Table 5 reports the sensitivity of the ATT for total output value to the choice of classification threshold τ. The sign and approximate magnitude of the effect are stable across all three thresholds, providing evidence that the main result is not an artifact of the specific 70% cutoff.

Threshold (τ)	N owned	N rented	ATT (ALL)	SE	N pairs
60%	793	126	-2,493,702	618,951	120
70% (main)	702	69	-3,549,510	962,121	66
80%	639	46	-3,361,261	997,202	44

Table 5. Sensitivity of the ATT (total output value) to the land-share classification threshold (authors contributions).

5. DISCUSSION

The empirical results point to a coherent economic pattern in which land ownership and land rental operate through two distinct, and to some extent offsetting, channels: a scale channel, through which rental tenure enables farm expansion and higher gross output, and an efficiency channel, through which ownership security is associated with more effective use of the resources actually employed. This pattern is consistent with the theoretical distinction proposed by (Besley, 1995) between an incentive effect of secure property rights — whereby owners internalize the full return to land-improving effort — and a separate reallocation effect operating through markets for land use rights, which need not depend on ownership security at all. The results reported here suggest that in the Albanian context it is primarily the second, market-based channel that explains the higher output of rented-land farms, while the incentive channel manifests as a measurable efficiency advantage for owners rather than as a difference in scale.

This dual-channel interpretation is consistent with, and adds a further data point to, a growing body of evidence specific to Albania and the wider Central and Eastern European transition experience. Using village-level survey data collected two decades after the 1991 reform, (Ciaian et al., 2014) find that Albanian land markets remain highly rigid, with sales markets almost non-existent and rental arrangements concentrated among family relatives — a pattern the authors attribute to persistent property rights insecurity and the difficulty absentee landowners face in monitoring tenants. This status-quo bias is important context for interpreting the present results: the rental market examined here operates within a still-thin and informally governed institutional environment, which makes the finding of a robust, statistically significant scale effect for rented-land farms particularly notable, since it emerges despite — not because of — a highly developed rental market infrastructure. Complementing this, Deininger et al., (2012) find no support for the widely held view that land

fragmentation reduces agricultural productivity in Albania, while (Müller et al., 2013) show that fragmented, dispersed landholdings reflect a deliberate risk-spreading strategy by Albanian farm households rather than a rigid constraint imposed by the 1991 reform. Read together with the present findings, this literature suggests that the structural legacy of Albania's land reform — small, fragmented, mixed-tenure holdings — does not by itself determine farm performance; rather, performance depends on the specific margin of land tenure status examined here, net of the fragmentation and scale characteristics that are more commonly emphasized in the Albanian land literature.

The finding that rented-land farms achieve significantly higher output is also consistent with broader evidence from Central and Eastern European transition economies on the consolidating role of land rental markets. (Zhllima et al., 2021), studying household farms in Hungary, show that rental markets reallocate land toward households with stronger farm management capacities, and that households commonly combine renting with land purchases to expand operated area, with consolidation occurring primarily through rental rather than sale transactions. This is precisely the mechanism implied by the present results: rather than ownership status itself driving scale, the rental market functions as the primary channel through which more expansion-oriented Albanian farms increase their operated area, in a manner structurally similar to the pattern documented for Hungary despite the two countries' very different reform trajectories.

The absence of a statistically significant ATT for gross value added, despite significant and opposite-signed effects on output and on intermediate input costs, merits closer interpretation. Because gross value-added nets out intermediate input expenditure from output value, a null effect on value added combined with significant positive effects on both output and costs is consistent with rented-land farms pursuing an input-intensive strategy — expanding cultivated area and simultaneously raising input use per unit of land — rather than a purely extensive strategy of cultivating more land with unchanged input intensity. This is consistent with the consolidation-through-renting mechanism described by Vranken & Swinnen, (2006), but it also implies that the private profitability gain from renting land may be smaller than the raw output comparison suggests, since a meaningful share of the additional output is absorbed by additional input expenditure.

The lack of a significant difference in formal credit access between the two tenure groups is, at first sight, difficult to reconcile with the collateral channel emphasized by Besley (1995), under which documented ownership should ease access to credit by providing bankable collateral. The status-quo bias documented by Qineti et al., (2015) offers a plausible explanation: where rental arrangements are predominantly informal and concentrated among family members, and where broader land market transactions remain rare, the formal documentation associated with ownership may carry limited practical weight with lenders who are themselves operating in a thin and underdeveloped rural credit market. The overall incidence of formal bank credit in the present sample is low (6 percent of farms), which further limits the statistical power available to detect a group difference even if a true, smaller effect exists. This distinction between the theoretical availability of a collateral channel and its practical activation in a specific institutional setting is consistent with the broader caution in the Central and Eastern European land market literature that the functioning of formal institutions cannot be assumed to translate mechanically into economic outcomes in contexts where informal norms continue to govern the bulk of land transactions.

Two methodological caveats bear directly on how these results should be read. First, as in any application of Propensity Score Matching, the estimated treatment effects are valid only under the assumption of selection on observables; consistent with the caution raised by Rosenbaum and Rubin (1983) in the foundational propensity score literature, the results cannot rule out that unobserved factors — such as managerial ability, risk tolerance, or off-farm income opportunities — jointly influence both the decision to rent land and farm performance. To the extent that more entrepreneurial or risk-tolerant farmers self-select into land rental, part of the estimated output advantage of rented-land farms may reflect unobserved ability rather than the causal effect of tenure status itself; the covariate balance achieved here reduces, but does not eliminate, this concern. Second, the frontier estimation sample (N=101) is substantially smaller than the matching sample (N=771), because the log-linear Cobb-Douglas specification requires strictly positive values for all four inputs, and a large share of farms report zero machinery value or zero measured intermediate input purchases. While the resulting technical efficiency estimates are directionally consistent with the matching results and with the theoretical expectation that ownership security supports more efficient resource use, the small sample warrants caution in treating the point estimates — particularly the near-zero labor elasticity in Table 4 — as precise, and future work applying the full specification of Battese and Coelli (1995) to an expanded sample would strengthen these conclusions considerably.

6. CONCLUSION AND POLICY IMPLICATIONS

This paper has examined the relationship between land tenure status and farm economic performance in Albania using a combined Propensity Score Matching and Stochastic Frontier Analysis approach applied to a survey of 999 farm households. After addressing the self-selection of farms into ownership versus rental tenure, the results show that rented-land farms achieve significantly higher production value — consistent with land rental markets facilitating scale expansion — while owned-land farms operate with significantly higher technical efficiency relative to their production frontier. These findings are robust to alternative classification thresholds for tenure status.

From a policy perspective, the results suggest that Albania's land rental market plays a constructive economic role in enabling farm consolidation and should be supported through continued formalization of rental contracts, which would likely further strengthen incentives for productivity-enhancing investment by tenants. At the same time, the efficiency advantage associated with ownership security underscores the continued importance of completing land registration and documentation processes. Rather than treating ownership and rental as competing policy priorities, the evidence supports a dual approach that simultaneously strengthens ownership security and facilitates well-functioning rental markets.

Future research should address the two main limitations identified in this study: the restricted sample available for frontier estimation, and the absence of information on rental contract duration and formalization, which would allow a more direct test of whether long-term, formal rental arrangements narrow the efficiency gap identified here. Extending the analysis with alternative matching estimators (radius and kernel matching) and a trans log functional form would further strengthen the robustness of the conclusions.

REFERENCES

Agarwal, S., Ramadani, V., Gerguri-Rashiti, S., Agrawal, V., & Dixit, J. K. (2020). Inclusivity of entrepreneurship education on entrepreneurial attitude among young community: Evidence from India. *Journal of Enterprising Communities: People and Places in the Global Economy*, *14*(2), 299–319. (world). https://doi.org/10.1108/JEC-03-2020-0024

Aigner, D., Lovell, C. A. K., & Schmidt, P. (1977). Formulation and estimation of stochastic frontier production function models. *Journal of Econometrics*, *6*(1), 21–37. https://doi.org/10.1016/0304-4076(77)90052-5

Alikaj, M., Brahushi, F., Kupe, L., & Bahiti, E. (2022). *Land cover data assessment in Albania* (Version 1.0) [Data set]. University of Salento. https://doi.org/10.1285/I15910725V44P59

Battese, G. E., & Coelli, T. J. (1995). A model for technical inefficiency effects in a stochastic frontier production function for panel data. *Empirical Economics*, *20*(2), 325–332. https://doi.org/10.1007/BF01205442

Besley, T. (1995). Property Rights and Investment Incentives: Theory and Evidence from Ghana. *Journal of Political Economy*, *103*(5), 903–937. https://doi.org/10.1086/262008

Brasselle, A.-S., Gaspart, F., & Platteau, J.-P. (2002). Land tenure security and investment incentives: Puzzling evidence from Burkina Faso. *Journal of Development Economics*, *67*(2), 373–418. https://doi.org/10.1016/S0304-3878(01)00190-0

Ciaian, P., Guri, F., Rajcaniova, M., Drabik, D., & Paloma, S. G. Y. (2018). Land fragmentation and production diversification: A case study from rural Albania. *Land Use Policy*, *76*, 589–599. https://doi.org/10.1016/j.landusepol.2018.02.039

Ciaian, P., Kancs, D., & Swinnen, J. (2014). The Impact of the 2013 Reform of the Common Agricultural Policy on Land Capitalization in the European Union. *Applied Economic Perspectives and Policy*, *36*(4), 643–673. https://doi.org/10.1093/aepp/ppu016

Cinar, I., Ardahanlıoğlu, Z. R., & Toy, S. (2024). Land Use/Land Cover Changes in a Mediterranean Summer Tourism Destination in Turkey. *Sustainability*, *16*(4), 1480. https://doi.org/10.3390/su16041480

Civici, A. (2002). *Albania: From absolute collectivism to radical egalitarian land distribution.* [47]. IRAM / APM / Fondation Charles Leopold Mayer pour le Progrès de l'Homme. https://www.agter.org/bdf/en/corpus_chemin/fiche-chemin-75.html

Deininger, K., & Jin, S. (2006). Tenure security and land-related investment: Evidence from Ethiopia. *European Economic Review*, *50*(5), 1245–1277. https://doi.org/10.1016/j.euroecorev.2005.02.001

Deininger, K., Savastano, S., & Carletto, C. (2012). Land fragmentation, cropland abandonment, and land market operation in Albania. *World Development*, *40*(10), 2108–2122. https://doi.org/10.1016/j.worlddev.2012.05.010

Diogo, V., Koomen, E., & Kuhlman, T. (2015). An economic theory-based explanatory model of agricultural land-use patterns: The Netherlands as a case study. *Agricultural Systems*, *139*, 1–16. https://doi.org/10.1016/j.agsy.2015.06.002

Do, Q., & Iyer, L. (2008). Land Titling and Rural Transition in Vietnam. *Economic Development and Cultural Change*, *56*(3), 531–579. https://doi.org/10.1086/533549

Guri, F., Topulli, E., Keco, R., & Kapaj, I. (2021). Evolution of the Albanian agriculture 2014–2020: An inquiry through the farm typology. *Proceedings of the 3rd International Conference on Agriculture and Life Sciences (ICOALS III)*, 176–182.

Holden, S. T., Deininger, K., & Ghebru, H. (2011). Tenure Insecurity, Gender, Low-cost Land Certification and Land Rental Market Participation in Ethiopia. *Journal of Development Studies*, *47*(1), 31–47. https://doi.org/10.1080/00220381003706460

Ivits, E., Orlitova, E., Milego, R., Maucha, G., Kosztra, B., Mancosu, E., Fons, J., Gregor, M., Löhnertz, M., & Hazeu, G. (2024). Twenty years of land accounts in Europe. *Land*, *13*(9), 1350. https://doi.org/10.3390/land13091350

Jayne, T. S., & Muyanga, M. (2012). Land constraints in Kenya's densely populated rural areas: Implications for food policy and institutional reform. *Food Security*, *4*(3), 399–421. https://doi.org/10.1007/s12571-012-0174-3

Müller, D., Leitão, P. J., & Sikor, T. (2013). Comparing the determinants of cropland abandonment in Albania and Romania using boosted regression trees. *Agricultural Systems*, *117*, 66–77. https://doi.org/10.1016/j.agsy.2012.12.010

Qineti, A., Rajcaniova, M., Braha, K., Ciaian, P., & Demaj, J. (2015). Status quo bias of agrarian land structures in rural Albania. *Post-Communist Economies*, *27*(4), 517–536. https://doi.org/10.1080/14631377.2015.1084732

Rosenbaum, P. R., & Rubin, D. B. (1983). The central role of the propensity score in observational studies for causal effects. *Biometrika*, *70*(1), 41–55. https://doi.org/10.1093/biomet/70.1.41

Shehu, B., & Kapaj, I. (2023). Land fragmentation and agricultural productivity in Albania: A structural challenge. *Albanian Journal of Agricultural Sciences*, *17*(3), 45–58. https://doi.org/10.2478/ajas-2023-0008

Sikor, T., Müller, D., & Stahl, J. (2009). Land fragmentation and cropland abandonment in Albania: Implications for the roles of state and community in post-socialist land consolidation. *World Development*, *37*(8), 1411–1423.

Vranken, L., & Swinnen, J. (2006). Land rental markets in transition: Theory and evidence from Hungary. *World Development*, *34*(3), 481–500. https://doi.org/10.1016/j.worlddev.2005.07.017

Zhllima, E., & Guri, F. (2013). Agriculture and land reform in Albania. In C. Chan-Halbrendt & J. Fantle-Lepczyk (Eds), *Agricultural markets in a transitioning economy: An Albanian case study* (1st edn, pp. 18–34). CABI. https://doi.org/10.1079/9781780641003.0018

Zhllima, E., Rama, K., & Imami, D. (2021). Agriculture land markets in transition—The inherited challenge of the post-communist land reform in Albania. *Land Use Policy*, *107*, 105509. https://doi.org/10.1016/j.landusepol.2021.105509

Higher Education and Democratic Institutions in Southeastern Europe: A Comparative Panel Econometric Analysis of Four Diverse Regimes (2000–2022)

Antonis D. Papaoikonomou[1] **Maria K. Birbili**[2]

[1] Faculty of Political Sciences, AUTh, papaoiko@sch.gr, ORCID: https://orcid.org/0000-0001-9321-3635

[2] Educational Advisor, birbilim@edlit.auth.gr

Abstract: This paper explores the impact of the massification of higher education on the quality of democratic institutions in four southeastern European countries over the years 2000-2022. The empirical analysis employs an unbalanced panel dataset covering four countries across a 22-year span (N = 4, T_max = 22, Total Observations = 55) obtained from the V-Dem, World Bank and QoG datasets to investigate the relationship between gross tertiary enrollment ratios and the V-Dem Polyarchy, the Electoral Democracy Index, while controlling for institutional factors of corruption, the rule of law, education expenditures, and urbanization. The econometric approach combines a standard Cross-section Fixed Effects estimation with additional dynamic specifications to control for institutional stability and serial correlation. The within-country baseline model finds a negative and statistically significant long-term effect of quantitative growth of female tertiary education (beta = -0.0044, $p < 0.05$). When the lag of the dependent variable is added to the model and coupled with variables of institutional stability, the results confirm considerable institutional inertia ($\lambda = 0.798$, $p < 0.001$, DW = 1.56), while the contemporaneous impact of educational growth becomes statistically indistinguishable from zero, yielding an indicative, albeit statistically unconfirmed, long-run point estimate (β_long-run = -0.0039). Altogether, the findings point to a dislocation of higher educational massification from democratization processes in the early 2000s, with the automation of human capital inflow de facto coinciding with liberal erosion, state capture and the nationalist executive's professional elevation. This suggests that not merely quantitative expansion, but also qualitative facets of civic education need be protected from political abuse, with greater focus on preserving the institutional integrity of academic and intellectual independence.

Keywords: Higher education massification, Democratic backsliding, V-Dem Polyarchy, Southeastern Europe, Panel Fixed Effects.

INTRODUCTION

For decades, modernization theory held a seemingly natural, almost inevitable link between the expansion of higher education and democratic consolidation. Building on the pioneering work of Seymour Martin Lipset and extended by a long line of political sociologists, the canonical thesis asserted that increasing educational levels serve to widen the cognitive and emotional space for liberal values, cultivate tolerance, engender civic efficacy, and eventually buttress democratic rule. In this traditional view, education would be the strongest engine of democratic citizenship, equipping humans with the human capital to demand institutions to hold their leaders to account, contain concentration of executive power, and maintain pluralist competition (Lipset & Lakin, 2004).

However, the political development of the early twenty-first century has seriously challenged this universalist thesis. While similar university expansion has taken place in different global regions, the impact on liberal democratic resilience remains highly ambiguous: it has brought along democratic backsliding, executive exuberance, and hybrid democracies in some cases. Particularly in Southeastern Europe – a miniature political laboratory characterized by institutional and post-communist transition, illiberal legacies, and the risks of democratic decline – the last two decades saw an explosive growth of higher education enrollment, yet its trajectory in democratic quality has taken a downhill turn or drastically fallen back. The region offers an ideal case for testing the modernization theory. In Turkey, a massive explosion in tertiary care institutions and a comparable increase in student numbers, especially among women, have been temporally aligned with a systematic attack on media, institutional autonomy, and the space for democratic contestation (Özkırımlı, 2020); in Bulgaria and North Macedonia, the daunting post-accession exhaustion, capture of state functions, and systemic corruption have compromised higher education's capacity to bring change.

Even in Greece, a long-standing member of the European Union and a country with steady democratic rule, lingering institutional fatigue, political polarization, and executive dominance also demonstrated that educational gains do not necessarily shield the quality of democratic institutions from decline.

This divergence leads to a basic research question: can we still talk about a causal effect of the massive expansion of tertiary education on the quality of electoral democracies – or is a structural disconnect emerging?

In order to answer this question this paper examines the time-series relationship between higher education expansion and democracy quality from the perspective of Greece Bulgaria North Macedonia and Turkey in the period 2000–22. Based on the wide empirical coverage of the Varieties of Democracy V-Dem project the World Bank, and the Quality of Government QoG databases, we regress the survey-based polyarchy or Electoral Democracy Index on tertiary enrollment rates controlling for rule of law, control of corruption, public education expenditure and urbanization. Methodologically we adopt both the static within-country Cross-section Fixed Effects and the dynamic panel estimator to account for unwitnessed heterogeneity and institutional inertness.

The main contribution of our study is twofold. Conceptually we call into question the modernization thesis by empirically demonstrating that the quantitative accumulation of academic qualifications alone cannot foster democratic deepening in the absence of republican civic features. Methodologically we contribute to the quantitative literature by decomposing time-series variation between countries and temporally accounting regime inertness which reveals that quantitative student expansion has "raced" this time in con-juncture with democratization backsliding in Southeastern Europe. The paper proceeds as follows. Section 2 discusses the theoretical literature review regarding the role of education in democratization with its mechanisms of educational decoupling and regime adaptation. Section 3 describes the data, variables and estimation strategy used in the empirical analysis. Section 4 reports the results while the concluding section 5 interprets their implications for democratic stability and educational policy.

LITERATURE REVIEW AND THEORETICAL FRAMEWORK

2.1. The Modernization Paradigm and the Civic Promise of Higher Education

The intellectual foundation that links education to political development is rooted in classical-modernization theory. As the nation's premier advocate, Seymour Martin Lipset (1959, p. 1) once argued that education is the "single most important prerequisite" for democracy, contending that a rise in schooling increases the breadth of people's mental horizons, limits demagogic tendencies, and promotes democratic values. Empirical research from Almond and Verba (1963), Glaeser, et al. (2007), and Barro (1999) has reiterated this enthusiasm, suggesting that education supplies the social and civic human capital that facilitates democratic participation.

In that setting, the tertiary level is understood to serve as the elite filter of civic competence. Apart from technical skills demanded by the modern economy, university classrooms are believed to foster inter-group tolerance, critical thinking, and reform-minded deliberation (Dewey, 1916; Habermas, 1984). University campuses are said to endow ordinary citizens with the communal and discursive resources to hold officials accountable, demand transparency from regimes, and oppose clientelist networks. As a result, the national expansion of university enrollment has often been read by agencies and agencies to be an ideal medium for change.

2.2. Authoritarian Adaptation and the Decoupling Thesis

While the appeal of the modernization thesis continues to be widespread, recent political developments have revealed several profound theoretical failings. The wave of democratic backsliding since the early 2000s has demonstrated that higher levels of educational attainment do not correspond with stronger democracies (Diamond, 2021; Levitsky and Ziblatt, 2018). Increasingly, researchers argue that illiberal and authoritarian regimes strategically respond to educationally-driven franchising by decoupling expanded credentialing from democratization (Guriev and Treisman, 2019).

Rather than leading to democratic vigilance, the approximately quantitative distribution of higher education can be exploited by illiberal or competitive authoritarian elites through the following interconnected mechanisms:

(1) In the critical political science literature, large-scale state massification drives—including the rapid establishment of regional campuses and expanded admission quotas—have frequently been interpreted as instruments of territorial patronage and regime legitimation (Papaoikonomou, 2024). Rather than necessarily cultivating autonomous liberal citizenship, these expansionary policies may function in practice to integrate socially marginal groups into state-dependent clientelist networks, expanding access to credentials while leaving executive centralization and illiberal governance structures intact.

(2) Excessive expansion usually comes at the cost of quality human capital and academic autonomy, drawing on critical pedagogical frameworks that highlight how curricula can be stripped of civic reflexivity and reduced to

technocratic training (Biesta, 2011; Apple, 2004). When universities are bureaucratized degree institutions rather than autonomous spaces for free scholarship, democratization does not follow human capital growth.

(3) Crucially, the empirical relationship concerning female enrollment requires careful conceptual delimitation. The Gross Enrollment Ratio (GER) tracked by the World Bank is strictly a quantitative demographic input metric measuring total enrollments relative to theoretical age cohorts. It does not gauge substantive female empowerment, curriculum quality, completion rates, or subsequent access to the political arena and formal labor markets. Therefore, the observed negative coefficient must not be misconstrued as an absurd causal proposition that increasing women's tertiary schooling inherently weakens democratic institutions. Rather, it exposes a profound structural paradox: why did rapid tertiary massification for women temporally coincide with autocratization and institutional erosion in specific settings? In competitive authoritarian contexts, massive female matriculation often reflects state-sponsored modernizing facades or spatial enrollment drives that coexist with entrenched political patriarchy and democratic rollback, illustrating how credential expansion can remain fully disconnected from civic and democratic empowerment.

2.3. The Southeastern European Context: Regime Paths and Massification

Southeastern Europe is a revealing regional context in which to assess this structural tension. In the post-2000 period, the shape of regional development has been hugely disparate along institutional and political dimensions. In Turkey, expansion of tertiary enrollments between 2002 and 2014 occurred amid the massive territorial decentralization of the sector under the Justice and Development party (AKP), which established at least one university in all provinces of the country and drove up the country's rate of tertiary students (notably female) drastically (Somer, 2019). On the other hand, Turkey's democratization index suffered horrendous backsliding in tandem, leading to the retreat to a hyper-presidential regime, the judicial prosecution and exile of prime dissident scholars, and the subjugation of the Council of Higher Education to the whims of the executive branch (Esmer, 2020).

In Bulgaria and North Macedonia, sudden liberalization and marketization in the post-socialist transition times produced tumultuous democratization progress. Both countries delivered a leap-frog adjustment of the tertiary level to align with what was needed to achieve EU convergence, but an early hybrid regime trap and the institutional continuity and effectiveness of the traditional patronage networks in the education sector held back democratization as long as the educational elite is concerned (Vachudova, 2005).

Finally, in Greece, the democratic consensus established after the collapse of the military dictatorship in 1974 (Metapolitefsi) has indelibly become intertwined with the political economy of the university campus; yet, the explosion of banking-powered sovereign debt crisis since 2010 and the numerous crony political-historical shocks since 2008 have tested the policy capacity of the political class and left Greece vulnerable to the recentralization of its venerable tertiary education sector (Katsikas, 2012). Here, taking advantage of these other trajectories, we argue that the hypothesis of a mechanical causal link from enrollment growth to democracy's increments is deeply flawed. Instead, we posit that in Southeastern Europe over the 2000-2022 window the dynamics of domestic tertiary expansion has been largely disconnected from and even negatively lagging behind democratic performance, which will have to be meaningfully tested via panel econometrics.

DATA AND ECONOMETRIC METHODOLOGY

3.1. Sample and Data Sources

In order to empirically assess the relationship between higher education expansion and democratic quality, the study leverages a longitudinal unbalanced panel data set of four countries in Southeast Europe- Bulgaria, Greece, North Macedonia, and Turkey- covering the years 2000-2022. The selected timeframe of twenty-two years (T = 22) spans key moments of regime changes, the global financial crisis and consequent structural reforms within the regional higher education contexts. Because data availability varies across indicators and years, the resulting dataset forms an unbalanced panel comprising a total of 55 valid country-year observations across the four countries (N = 4, T spanning up to 22 years, 2000–2022). The empirical indicators are collected by extracting the relevant data from three major global sources, namely the Varieties of Democracy (V-Dem) Project (Coppedge et al., 2023), the World Bank's World Development Indicators (WDI) and the Worldwide Governance Indicators (WGI) –provided through the standard dataset of the Quality of Government (QoG) (Teorell et al., 2023).

Rather than aiming for an exhaustive geographic census of Southeastern Europe, our sample selection follows a diverse-case comparative logic (Seawright & Gerring, 2008) deliberately chosen to capture four distinct institutional and democratic trajectories within the regional political space: (a) a consolidated, long-standing European Union member state representing a democratic baseline (Greece); (b) a post-communist transition state that achieved EU accession while grappling with persistent rule-of-law deficits (Bulgaria); (c) a Western Balkan candidate state navigating hybrid regime dynamics and prolonged institutional transition (North Macedonia); and (d) a pivotal non-EU regional power experiencing acute autocratization and democratic backsliding alongside massive educational massification (Turkey). This purposeful quadripartite typology maximizes institutional variation along regime trajectories, EU integration status, and democratization paths, providing a rich, cross-regime laboratory to test whether educational expansion mechanically reinforces polyarchy across structurally divergent settings.

3.2. Variable Operationalization

Dependent Variable:

Dependent Variable. The dependent variable is the Electoral Democracy Index (VDEM_POLYARCHY) from the V-Dem Project. Based on Robert Dahl's vision of polyarchy, the continuous composite measure from the V-Dem dataset (ranging from 0 to 1) captures the quality of the selection process as taking place through free, fair, and competitive multi-party elections, coupled with freedom of expression, associational autonomy, and inclusive suffrage. It offers a nuanced, multidimensional measure of the quality of democracy that surpasses the standard regime classifications.

Core Explanatory Variables:

The educational expansion dimension is operationalized through gross enrollment ratios in tertiary education from the World Development Indicators:

- WDI_GERTF: Female gross enrollment ratio, tertiary (%): The total female enrollment in tertiary education (regardless of age), as a percentage of the female population of the age that officially corresponds to the tertiary education level. It should be emphasized that this indicator serves strictly as a quantitative measure of tertiary capacity and demographic access, rather than a qualitative proxy for female empowerment, civic agency, or labor market equality.
- WDI_GERTM: School enrollment, tertiary, male (% gross), measuring corresponding male tertiary enrollment.

Further disaggregation of enrollment by sex allows us to screen out gender-specific effects in human capital growth and to escape the nearly perfect collinearity encountered when overall enrollment is added as a covariate to the sex-disaggregated measures.

Institutional and Socioeconomic Control Variables:

The following controls attempt to partial out the potentially confounding effects of demographics and institutions.:

- WBGI_RLE (Rule of Law): From the Worldwide Governance Indicators, a measure of perceptions of the extent to which agents have confidence in and abide by the rules of society, including the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence (scale about -2.5 to +2.5).
- WBGI_CCE (Control of Corruption): From the WGI, reflecting the magnitude of private stakes in public decisions, namely elite rent-seeking and state capture
- WDIEXPEDU (Government expenditure on Education): General government expenditure on Education as a share of GDP. It controls for the public financial effort on Education.
- WDI_POPURB (Share of the urban population): Share of the total national population living in urban areas (urban agglomerations), capturing forces of structural modernization, industrial concentration, and civic Mobilization.

3.3. Econometric Estimation Strategy

Due to the panel structure that the time dimension T is greater than the cross-sectional units N (T = 22, N = 4), naive pooled OLS estimations are subject to both a systematic bias and an unspecified bias. Pooled specifications may be biased by omitted variables because they do not control for unobserved heterogeneity across countries that may be relevant, including historical regime trajectories, the lasting political legacies of constitutions, and culture.

To capture the true within-country dynamics, we primarily employ a Cross-section Fixed Effects (LSDV) framework:

$$VDEM\_POLYARCHY[i,t] = \alpha[i] + \beta 1 \cdot WDI\_GERTF[i,t] + \beta 2 \cdot WDI\_GERTM[i,t] + \beta 3 \cdot WBGI\_RLE[i,t] + \beta 4 \cdot WBGI\_CCE[i,t] + \beta 5 \cdot WDI\_EXPEDU[i,t] + \beta 6 \cdot WDI\_POPURB[i,t] + \varepsilon[i,t]$$

where alpha_i represents country-specific, time-invariant unobserved intercepts, and epsilon_it is the idiosyncratic error term.

However, static panel models applied to political institutions frequently encounter severe serial correlation (AR(1)) in the residuals, as democratic quality exhibits profound path dependence and institutional inertia. To diagnose and address this dynamic persistence, we expand the framework into a Dynamic Panel specification by incorporating the first-order lag of the dependent variable:

$$VDEM\_POLYARCHY[i,t] = \alpha[i] + \lambda \cdot VDEM\_POLYARCHY[i,t-1] + \beta 1 \cdot WDI\_GERTF[i,t] + \beta 2 \cdot WDI\_GERTM[i,t] + \beta 3 \cdot WBGI\_RLE[i,t] + \beta 4 \cdot WBGI\_CCE[i,t] + \beta 5 \cdot WDI\_EXPEDU[i,t] + \beta 6 \cdot WDI\_POPURB[i,t] + u[i,t]$$

In this dynamic setting, lambda measures the degree of institutional persistence. The short-run immediate effect of female tertiary enrollment is captured by beta_1, while the cumulative, long-run equilibrium multiplier is derived mathematically as:

$$\beta[long\text{-}run] = \beta 1 / (1 - \lambda)$$

To ensure inferential robustness, standard errors are corrected for potential heteroscedasticity and cross-sectional dependence using White cross-section covariance estimators.

A pertinent methodological consideration in long-T panels concerns common temporal shocks (such as the 2008 financial crisis or the COVID-19 pandemic) that affect all units simultaneously. While a two-way fixed effects (TWFE) framework incorporating full year dummies is a standard approach, saturating the model with 21 individual year parameters alongside country fixed effects and explanatory covariates would severely deplete degrees of freedom given the sample size (55 unbalanced observations across four countries). To account for unobserved temporal heterogeneity without inducing severe over-parameterization, our baseline specification captures common macroeconomic and institutional drift via time-variant control variables (notably education spending, urbanization, and governance metrics), while the dynamic autoregressive specification explicitly absorbs persistent common trends through the lagged dependent variable.

EMPIRICAL FINDINGS AND RESULTS

4.1. Econometric Model Estimates

Table 1 outlines the econometric estimates testing the association between the expansion of higher education, institutional factors, and the V-Dem Electoral Democracy Index for the four Southeast-ern European countries in 2000-2022. To ensure a consistent and thorough analysis, results are shown across two different model specifications:

- Model 1 (Static Fixed Effects): Evaluates the baseline within-country relationship, netting out time-invariant unobserved country-specific heterogeneity.
- Model 2 (Dynamic Fixed Effects): Incorporates the first-order lag of the dependent variable to capture regime inertia and resolve residual serial correlation.

Table 1. Panel Regression Results: Determinants of Electoral Democracy (VDEM_POLYARCHY)

Independent Variables	Model 1: Static FE	Model 2: Dynamic FE
Lagged Polyarchy [t-1]	—	0.79798*** (0.06374)

Independent Variables	Model 1: Static FE	Model 2: Dynamic FE
Female Tertiary Gross Enrollment (GERTF)	-0.00442** (0.00170)	-0.00079 (0.00086)
Male Tertiary Gross Enrollment (GERTM)	0.00103 (0.00212)	-0.00001 (0.00101)
Control of Corruption (WBGI_CCE)	-0.02951 (0.05146)	-0.04901* (0.02441)
Rule of Law (WBGI_RLE)	-0.01776 (0.07828)	0.02247 (0.03720)
Education Expenditure (% GDP)	0.00248 (0.01628)	-0.00569 (0.00774)
Urban Population (% of total)	0.01278 (0.01088)	0.00295 (0.00521)
Intercept (Constant)	0.01091 (0.71678)	-0.00310 (0.33936)
---	---	---
Cross-section Fixed Effects	Yes	Yes
Number of Cross-sections (N)	4	4
Time Periods (T)	22	22
Total Observations (unbalanced)	55	55
R-squared	0.96595	0.99254
Adjusted R-squared	0.95914	0.99084
S.E. of Regression	0.04015	0.01901
F-statistic	141.836***	585.157***
Durbin-Watson Stat	0.37915	1.56118
Long-run GERTF Multiplier	—	-0.00393

*Notes: Standard errors are reported in parentheses. *** p < 0.01, p < 0.05, * p < 0.10. Both models are estimated via Panel Least Squares with cross-section dummy variables.*

4.2. Interpretation of Within-Country Dynamics and the Education Decoupling

The empirical results from Model 1 deliver an unexpected and somewhat startling finding that runs counter to assumptions of classic modernization theory: the in-country growth in female tertiary gross enrollment is negatively and significantly correlated with electoral democracy (beta = -0.00442, p = 0.0126; under White robust covariance, p = 0.0090). Substantively, one can expect that by net of other fixed country characteristics each additional 10-percentage point increase in female tertiary enrollment is associated with a 0.044-point lower Polyarchy score by 0.044 point. On the other hand, the statistically insignificant positive coefficient of GERTM (male tertiary enrollment) is small in magnitude (beta = 0.00103, p = 0.6293).

Theoretical rationale behind this finding can be traced to the dramatic political oscillations in the region over the 2000-2022 period. Countries where democratization was reversed the most an example being Turkey-, the dramatic growth of university capacity and female matriculation occurred exactly in periods of rising levels of executive dominance, academic purges, and heightened political polarization. As a result, university massification of access to higher education temporally coincided with democratic backsliding.

Control of Corruption (WBGI_CCE) and the Rule of Law (WBGI_RLE) governance indicators in Model 1 cease to display statistical significance once within-country fixed effects are introduced. This indicates that the positive institutional effects frequently observed in pooled cross-sectional specifications stem primarily from cross-national, between-country variation rather than annual within-country institutional adjustments. Aggregate governance metrics from the World Bank capture slow-moving structural features rather than high-frequency, year-to-year fluctuations in electoral democracy over the short-to-medium term.

From a methodological and substantive standpoint, it is essential to consider the distinct leverage exerted by Turkey within our quadripartite panel. Between 2002 and 2022, Turkey underwent a simultaneous phenomenon of explosive tertiary massification—particularly in female enrollment—and severe democratic regression. A potential question is whether the aggregate within-country negative coefficient is predominantly magnified by this dramatic trajectory. Rather than viewing Turkey as an unrepresentative outlier that biases the sample, comparative political theory treats it as an indispensable 'crucial case' (Gerring, 2007). Turkey exemplifies the acute mechanism of authoritarian adaptation: the strategic deployment of university expansion for territorial patronage, electoral mobilization, and regime legitimation precisely while dismantling liberal safeguards. In Greece, Bulgaria, and North Macedonia, the expansion of higher education was characterized primarily by structural stagnation and institutional decoupling—where rising educational attainment failed to generate

commensurate democratic deepening. In Turkey, this dynamic accelerated into active divergence. Consequently, the panel estimates faithfully reflect the heterogeneous regional reality of Southeastern Europe, where the modernizing promise of higher education is not merely neutralized by institutional fatigue, but can actively coincide with illiberal state restructuring.

4.3. Dynamic Persistence and Long-Run Multipliers

However, while Model 1 delivers the within-country correlation, it suffers from a modest Durbin-Watson statistic (DW = 0.379), indicative of strong first-order positive autocorrelation and thus the well-known effects of path de-pendency of political regimes. Model 2 substantially reduces the residual serial-correlation problem by explicitly modelling the strong persistence of democratic institutions.

The decision to include the lagged DV dramatically improves the statistic to 1.561, signifying that the model substantially reduces residual autocorrelation and is thus suitable for inference. The estimated coefficient of Polyarchy[t-1] amounts to 0.79798 ($p < 0.001$), substantiating the expectation that regime structures display immense institutional inertia: the level of a country's democracy index is about 80% derived from the previous year. The instantaneous (i.e., one-year) effect of female tertiary enrollment naturally declines to -0.00079 ($p = 0.359$), as the lagged DV now accounts for a full 98.7% of residual variance. One can, however, use the structure of the model to estimate the long-run equilibrium effect:

$\beta\_long\text{-}run = \beta_1 / (1 - \lambda) = (-0.000793) / (1 - 0.797977) = -0.000793 / 0.202023 \approx -0.003925$

Although the contemporaneous effect of female tertiary enrollment loses statistical significance in the dynamic specification ($\beta = -0.00079$, $p = 0.359$) due to the dominant explanatory power of institutional persistence ($\lambda = 0.798$, $p < 0.001$), the calculated long-run multiplier ($\beta\_long\text{-}run = -0.00393$) is numerically consistent with the baseline static estimate ($\beta = -0.00442$). However, because the short-run parameter in Model 2 is not statistically significant and no standard error or confidence interval is formally estimated for the non-linear multiplier via the Delta method, this long-run figure should be interpreted with caution—not as conclusive direct empirical proof of a dynamic structural process, but rather as an indicative benchmark suggesting that controlling for regime inertia substantially dampens the immediate impact of educational expansion. Indeed, Model 2 indicates that Control of Corruption has a negative short-run coefficient of –0.04901 ($p = 0.0508$), which depicts situations where anti-corruption drives, or clampdowns, implemented in transitional states (North Macedonia, Bulgaria) were (ab)used by incumbent elites to weaken political rivals and on occasion, intersected in contentious democratic episodes.

4.4. Decomposition of Cross-Sectional Country Heterogeneity

To assess the structural baseline differences across the sample, Table 2 presents the estimated cross-sectional fixed effects extracted from the baseline specification.

Table 2. Cross-Sectional Fixed Effects and Country Baseline Intercepts

Country	Effect (Deviation from Mean)	Net Baseline Intercept
Greece	+0.27388	+0.28479
Bulgaria	-0.02457	-0.01366
North Macedonia	-0.16334	-0.15243
Turkey	-0.28337	-0.27246

The disaggregation reveals significant variation over time and institutions across the four cases. Greece is highest on the democratic constants (+0.2848), indicative of a well-instituted EU accession country with strong electoral commitments. Bulgaria is in the middle near the sample mean (-0.0137), capturing the newest incoming EU accession member with strong post accession institutional stability but lingering rule of law weaknesses.

Finally, North Macedonia (-0.1524) and Turkey (-0.2725) stand at the low end of this range with harsh structural penalties. The difference of 0.557 on the baseline democratic constants between the two nation-states within similar political systems demonstrates how differences in structural regime legacies can determine whether the human capital invested in democracy will be able to mobilize.

DISCUSSION: UNPACKING THE EDUCATIONAL DECOUPLING IN SOUTHEASTERN EUROPE

The findings provide evidence consistent with a decoupling between quantitative tertiary expansion and improvements in electoral democracy within the four cases examined. Across the four selected Southeastern European countries, the rapid expansion of higher education did not uniformly foster democratic deepening as classic modernization theory would predict. While these four cases capture a wide spectrum of regional regime types—from consolidated democracy to competitive authoritarianism—we do not claim that these patterns automatically extrapolate to the entire Balkan peninsula without accounting for idiosyncratic national contexts. This within-state negative association—consistently observed in the baseline static specification ($\beta = -0.0044$, $p < 0.05$), though attenuated and rendered statistically non-significant in the dynamic model once regime inertia is accounted for—highlights that educational expansion does not mechanically drive democratic deepening.

A nuanced political sociological interpretation of the decoupling uncovers three substantive mechanisms:

Firstly, this decoupling reflects the broader phenomenon of educational instrumentalization by autocrats. Historically, the expansion of post-secondary opportunities by competitive authoritarian or hybrid rulers has been manipulated as an instrument for co-optation and regime stabilization. Several comparative scholars argue that in competitive authoritarian and hybrid contexts, the strategic expansion of higher education can serve broader regime-stabilizing functions (Guriev & Treisman, 2019). In such environments, the decentralized establishment of higher education institutions may operate alongside patron-client dynamics, providing local economic stimulus and educational access that political elites can mobilize for electoral support. In the case of Turkey, scholars have documented how the rapid founding of provincial universities across Anatolia coincided with the consolidation of the Justice and Development Party's (AKP) socio-political base, illustrating how quantitative enrollment gains can unfold alongside executive centralization and shrinking academic freedom rather than autonomous democratic contestation (Somer, 2019).

Secondly, the negative results point to the basic disconnect between gaining an academic credential and receiving critical political socialization. In regimes with a highly politicized higher education sector, civic faculty cannot be guaranteed and education itself may be replaced with training for the labor market. Higher education in Bulgaria and North Macedonia, both countries with a growing number of universities, was converging on job training and degree repackaging by the mid-2000s. Universities became rat-trains for workforce preparation and autonomous democratic knowledge production no longer defined their core function. As such, people learn skills through higher education but not the political resilience which is key for resisting clients and capturing autocrats.

Finally, the decomposition of all fixed effects reveals the structural importance of historical regime institutions for shaping the democratic effects of higher education. The baseline gap of 0.557 points between Greece and Turkey (0.285 and -0.272, respectively) provides prima facie evidence of the importance of democratic institutional quality in moderating the human capital-deepening relationship. In resilient, consolidated polities where democratic institutions are strong, the expanding student block can mobilize en masse to push back if illiberal measures threaten to dominate. If, on the other hand, illiberal tendencies are further augmented through executive rule and media consolidation, the voice of a large university population is much less effective. This empirical result captures one of the most tragic historical irony of our time: while higher education was able to intensify the democratization process in earlier decades, it seemed to be absent when the globe's most fragile liberal regimes needed it most.

Study Limitations

A methodological limitation of the present study concerns the small cross-sectional dimension ($N = 4$, Total Observations = 55) and the pronounced historical variance among the sampled states. While focusing on this purposeful quadripartite group provides sharp analytical leverage across four distinct institutional archetypes, caution is warranted before generalizing these econometric inferences across the entire Balkan peninsula or wider Southeastern Europe. In small-N panel designs, structural shifts within a single large unit—such as Turkey's post-2013 autocratization—inevitably exert strong analytical weight on the overall slope. While cross-section fixed effects effectively purge time-invariant country-specific heterogeneity, the observed inverse coefficient should be interpreted as capturing an asymmetric regional landscape: one where higher education either fails to arrest institutional stagnation (in the Balkan cases) or historically coexists with aggressive executive aggrandizement (in Turkey). Future empirical research covering an expanded geographical perimeter across the wider Mediterranean and post-socialist space will be valuable for formally disaggregating these regime-specific elasticity thresholds through subsample estimations as harmonized longitudinal series expand.

An additional methodological consideration involves the absence of full two-way fixed effects (year dummies). In an unbalanced panel of 55 observations, introducing a comprehensive set of annual time dummies leads to severe parameter saturation and collinearity, eroding statistical power. While our dynamic model successfully addresses residual serial correlation, future extensions with larger cross-sections across Central and Eastern Europe should formalize full two-way error component models or evaluate multi-year period fixed effects (e.g., pre- and post-crisis regimes) to fully isolate exogenous global shocks from endogenous domestic educational policies.

CONCLUSION AND POLICY IMPLICATIONS

This research aimed to question empirically the link between higher education expansion and electoral democracy in South East Europe (Greece, Bulgaria, North Macedonia, and Turkey) in the period 2000-2022. Employing panel data from the V-Dem and the World Bank datasets, the research employed both static within-country Cross-section Fixed Effects and dynamic auto-regressive models.

The main finding of this research is that the quantitative expansion of tertiary education cannot be presumed to mechanically reinforce democratic institutions. Empirical analysis revealed a statistically significant negative within-country association between female tertiary enrollment growth and the V-Dem Polyarchy index, while dynamic specifications underscore the overriding importance of institutional persistence ($\lambda \approx 0.80$), under which immediate educational effects lose statistical significance, leaving long-term trajectories largely anchored in historical regime inertia. Far from consolidating democratization, the intensification of higher education in South East Europe was temporally coincidental with episodes of executive centralization, state capture, and democratic regression.

These findings have important policy implications for international development organizations, academic politicians, and democratic reformist actors. Development models have long relied on gross enrollment ratios as heuristic indicators of human capital and social modernization. Our results showed the drawbacks of relying solely on quantitative indicators of access. In the absence of robust and binding institutional guarantees of university autonomy, academic freedom, and curricula which promote critical thinking and democratic deliberation, the expansion of higher education can be achieved through the use of illiberal leverage for presidential legitimation and clientelism.

In order for higher education to deliver its democratic promise, policy measures should progress beyond access indicators towards safeguarding the qualitative and structural characteristics of academic activity. Maintaining the independence of university decision-making bodies, insulating academic faculty and staff from political punishment, and revitalizing civic education components in academic curricula are minimal prerequisites for college students of the future not to be passive witnesses of institutional decline but active players in democratic resilience.

REFERENCES

Almond, G. A., & Verba, S. (1963). *The Civic Culture: Political Attitudes and Democracy in Five Nations*. Princeton University Press. http://www.jstor.org/stable/j.ctt183pnr2

Apple, M. W. (2004). *Ideology and curriculum* (3rd ed.). RoutledgeFalmer.

Barro, R. J. (1999). Determinants of Democracy. *Journal of Political Economy*, *107*(S6), S158–S183. https://doi.org/10.1086/250107

Biesta, G. (2011). *Learning democracy in school and society: Education, lifelong learning, and the politics of citizenship*. Sense Publishers.

Coppedge, M., Gerring, J., Knutsen, C. H., Lindberg, S. I., Teorell, J., Altman, D., Bernhard, M., Fish, M. S., Glynn, A., Hicken, A., Lührmann, A., Marquardt, K. L., McMann, K., Paxton, P., Pemstein, D., Seim, B., Sigman, R., Skaaning, S.-E., Staton, J., … Wilson, S. (2023). *V-Dem Annual Democracy Report 2023: Defiance in the face of autocratization*. V-Dem Institute, University of Gothenburg.

Dewey, J. (1916). *Democracy and education: An introduction to the philosophy of education*. Macmillan.

Diamond, L. (2021). *Ill winds: Saving democracy from Russian rage, Chinese ambition, and American complacency*. Penguin Books.

Esmer, A. (2020). *Values, culture, and democratic attitudes in Turkey*. In R. Inglehart (Ed.), *World Values Survey: Insights from the global study of sociocultural and political change* (pp. 145–168). Springer.

Gerring, J. (2007). *Case Study Research: Principles and Practices*. Cambridge University Press.

Glaeser, E., Ponzetto, G., & Shleifer, A. (2007). *Why does democracy need education? Journal of Economic Growth, 12*(2), 77–99.

Guriev, S., & Treisman, D. (2019). *Spin dictators: The changing face of tyranny in the 21st century*. Princeton University Press.

Habermas, J. (1984). The Theory of Communicative Action. Boston: Beacon Press.

Inglehart, R., & Norris, P. (2003). *Rising tide: Gender equality and cultural change around the world*. Cambridge University Press.

Katsikas, D. (2012). *The Greek crisis and the challenges to democratic governance*. In K. Featherstone & D. Papadimitriou (Eds.), *The Oxford handbook of modern Greek politics* (pp. 201–220). Oxford University Press.

Levitsky, S., & Ziblatt, D. (2018). *How democracies die*. Crown.

Lipset, S. M. (1959). Some social requisites of democracy: Economic development and political legitimacy. *American Political Science Review, 53*(1), 69–105. https://doi.org/10.2307/1951731

Lipset, S. M., & Lakin, J. M. (2004). The democratic century. University of Oklahoma Press.

Özkırımlı, U. (2020), *How to Lose a Country: The 7 Steps from Democracy to Dictatorship*, Ebury Press

Papaoikonomou, A. (2024). A multiple regression model on the relationship be-tween deliberative democracy and political equity: The cases of Greece and Tur-key. *Imgelem.*

Seawright, J., & Gerring, J. (2008). Case Selection Techniques in Case Study Research: A Menu of Qualitative and Quantitative Options: A Menu of Qualitative and Quantitative Options. *Political Research Quarterly*, *61*(2), 294-308. https://doi.org/10.1177/1065912907313077

Somer, M. (2019). *Turkey: The slippery slope from reformist to revolutionary polarization and democratic breakdown*. In T. Carothers & A. O'Donohue (Eds.), *Democracies divided: The global challenge of political polarization* (pp. 23–46). Brookings Institution Press.

Teorell, J., Coppedge, M., Lindberg, S. I., Lührmann, A., Marquardt, K. L., McMann, K., Pemstein, D., Seim, B., Sigman, R., Skaaning, S.-E., Staton, J., & Wilson, S. (2023). *V-Dem Democracy Report 2023: Defiance in the face of autocratization*. V-Dem Institute, University of Gothenburg.

Vachudova, M. A. (2005). *Europe undivided: Democracy, leverage, and integration after communism*. Oxford University Press.

Measuring Hotel Visibility In Generative AI Systems: Inter-System Agreement And The Case Against Single-Channel Monitoring

Michael Pütter[1]

[1] Faculty of Economics and Social Sciences, University of Latvia, mp@puetter-online.de, ORCID: 0009-0004-8719-5003

Abstract: Aim. Generative artificial intelligence has moved into the earliest stage of the hotel customer journey. Before a traveler opens a hotel website or a booking engine, a large language model may already have narrowed the set of properties under consideration. This study asks how hotel visibility in such systems can be measured, and how far a measurement taken within a single system can be trusted. Material and Method. Nine upscale hotels located in Europe, Australia, and New Zealand were monitored using a fixed set of open, natural-language prompts reflecting the preference-forming questions a traveler might plausibly ask, such as a request for an elegant five-star hotel near the water. Each prompt was submitted to four generative systems (ChatGPT, Perplexity, Claude, and Gemini), producing 44 prompt units and 176 observations, with the prompt-by-system pair as the unit of analysis. Every response was coded binarily for whether the target hotel was named. Differences between systems were tested with Cochran's *Q* and pairwise McNemar tests, differences between hotels with a chi-squared test and Cramér's *V*, and agreement between systems with Fleiss' kappa overall and Cohen's kappa for each pair. Analyses were conducted in R. Findings. Overall visibility was low, at approximately 40%. The four systems did not differ significantly in how often they named a target hotel (Cochran's $Q = 6.65$, $p = .084$), yet they agreed only moderately on which hotels to name (Fleiss' $\kappa = .42$), with pairwise agreement ranging from weak to substantial (Cohen's $\kappa = .14$ to $.67$). Differences between hotels were considerably larger, $\chi^2(8, N = 176) = 57.00$, $p < .001$, Cramér's $V = .57$. Conclusion. Visibility is a property of the hotel rather than of the tool, but it is not a single quantity: a property well represented in one system may be absent from another. The study contributes a low-cost measurement approach, comprising visibility rate, share of voice, and a consistency index derived from one binary indicator, together with evidence that single-system estimates generalize poorly. Hotels should track AI visibility across several systems, and research designs relying on one system alone risk substantial measurement error.

Keywords: AI visibility, generative engine optimization, inter-rater agreement, hotel distribution, prompt monitoring

1. INTRODUCTION

For nearly two decades, online purchasing behavior in hospitality was embedded in a relatively stable digital journey in which consumers searched for information, compared alternatives, formed preferences, and ultimately made their booking decisions through digital distribution channels. The website and its booking engine carried most of the burden, and trust was established or lost at that stage. Research on this phase has consistently identified a small set of drivers of the online booking process: satisfaction, information quality, trust, price transparency, and visual design. These correspond closely to the constructs of the DeLone and McLean information systems success model and of the technology acceptance model (Davis, 1989; DeLone & McLean, 2003).

The technology has since changed, and generative AI now responds to travel questions directly. A user can ask for an elegant five-star hotel near the water for a weekend and receive a short, confident list of named properties, usually with reasons attached. The filtering is performed by the model rather than by the user, who is no longer required to work through a list of links. That filtering also takes place before the website phase described by the older models, so that the customer journey has acquired an additional stage upstream of the website.

The commercial implication is straightforward: a hotel that is not named in the response is not in the consideration set at all, and the traveler may never reach the website on which the carefully designed booking flow sits. Search engine optimization researchers made a comparable argument years ago about ranking on Google, where visibility on the first results page shaped what users looked at in the first place (Konidaris & Koustoumpardi, 2018; Vyas, 2019). The generative case is more pronounced: a ranked list of ten links still allows the user to scroll and select among alternatives, whereas a generative response typically names three or four properties and no more. The funnel narrows earlier, and it narrows inside a system the hotel does not control.

The present study has two aims: the first is to measure AI visibility for a portfolio of nine upscale hotels across four widely used systems, using a consistent set of prompts; the second is to relate those measurements to the core constructs of the website-phase model (trust, information quality, visibility, and recommendation logic) conceptually rather than statistically. The design is mixed-methods in a specific sense: an established body of

quantitative survey research supplies the theoretical account of the website phase, while the new prompting data describe the upstream process. Neither component is intended to give a complete picture, and the limits of each data source are stated explicitly.

The generative response is treated as a single observable indicator (a presence or an absence), and everything else is derived from that one signal. Visibility rates follow directly, as do share of voice relative to competitors and the consistency with which a hotel appears across wordings and across systems. The degree of agreement between the systems is informative in its own right. The approach does not require the system to disclose its reasoning; it requires only that the response be read carefully and recorded consistently. The resulting evidence base is limited, but it is stable enough to support firm statements about a phase that is more often discussed in conceptual terms than measured empirically.

This study addresses the following research question:

How visible are individual hotels in the responses of generative AI systems, and how does this visibility vary across systems and across hotels?

Two testable hypotheses are derived from it and are stated below as null hypotheses (Bortz & Döring, 2005). A further and more general claim is advanced with greater caution alongside that quantitative core: that the factors driving website satisfaction and booking intention, above all trust and information quality, have close counterparts in the AI phase, and that a hotel's inclusion in a generative response increasingly determines whether the later, well-researched phase is reached at all.

2. THEORETICAL BACKGROUND

2.1. From Website Satisfaction to Booking Intention

The body of research on the determinants of online hotel booking provides the foundation, and much of it centers on satisfaction. Satisfaction with the site, with the information provided, and with the booking process predicts the intention to reserve, a pattern observed repeatedly in hospitality contexts (Ali, 2016; Chang et al., 2019). Overall satisfaction is itself shaped by information quality, online trust, a usable booking form, an adequate range of room options, appealing visual design, and, in all likelihood, the ease of comparing prices.

Of the two models that dominate this literature, the technology acceptance model identifies perceived usefulness and perceived ease of use as the primary determinants of whether people adopt and continue to use a system (Davis, 1989; Davis et al., 1989). It has been applied to online booking for years, and later syntheses folded it into broader acceptance frameworks (Venkatesh et al., 2003). The information systems success model of DeLone and McLean is the second anchor. It decomposes success into system quality, information quality, service quality, use, user satisfaction, and net benefits (DeLone & McLean, 1992, 2003). The model remains current: recent scientometric and extension work keeps it near the center of IS evaluation, including in tourism (Munawar Khan et al., 2025; Pushparaj et al., 2023). For the present argument, information quality and user satisfaction are the components that transfer most naturally.

2.2. Preference Building and the Consideration Set

Preferences are formed before a decision is made, and before preferences are formed, a brief mental list of options is compiled. Marketing research has long treated the consideration set as decisive, since an option that never enters the set cannot be chosen, irrespective of its quality. In travel, the internet has become the primary place in which the list is built, because online search is cheap and fast, and its results appear comprehensive (Peng et al., 2024). Reviews, recommendation sources, and the framing of information all shape which properties are included (Cantallops & Salvi, 2014; Senecal & Nantel, 2004).

2.3. Trust and Uncertainty in Online Booking

Hotels are difficult to evaluate in advance, because a guest cannot inspect the room before paying for it. Online booking is therefore an exercise in managing uncertainty, and trust is the principal mechanism through which that uncertainty is reduced (Grabner-Kräuter, 2002). A substantial literature links trust to online purchase intention across contexts, and the relationship is supported by meta-analytic evidence (Bulsara & Vaghela, 2023; Wang et al., 2022). In the hotel setting specifically, website quality influences trust, which in turn affects booking

intention, at times as a mediator (Wang et al., 2015). Visible investment in a professional site also functions as a credibility signal: a well-designed site makes visitors more willing to accept its content as credible (Schlosser et al., 2006).

Reviews and word of mouth operate similarly: positive online reviews raise trust and booking intention, and the size of the effect depends on valence and perceived authenticity, among other factors (Cantallops & Salvi, 2014; El-Said, 2020). Recommendation systems show a comparable pattern: users who interact with a recommendation agent report higher trust, greater satisfaction, and stronger purchase intentions (Dabholkar & Sheng, 2012; Xiao & Benbasat, 2007), and the opinions of others expressed online influence decisions in observable ways (Senecal et al., 2005; Senecal & Nantel, 2004).

Trust is the focus here because it is the construct that transfers to the AI setting most directly. A generative system functions primarily as a recommendation device, and it does so in a confident register. It rarely discloses its reasoning; a property is named without further justification. The trust once built through website design, reviews, and transparent information is thus partly displaced onto a system that projects confidence and returns a short list. This is a substantial shift, and the established trust literature supplies the vocabulary needed to describe it, even if it does not yet supply the instruments needed to measure it.

2.4. Visibility, Search, and the Move to Generative Engines

Visibility has always been a prerequisite for all subsequent stages; in classic search, this meant ranking. Studies of tourism websites argued that search engine optimization was not an optional refinement but a core distribution concern, because position shaped attention and, in turn, bookings (Konidaris & Koustoumpardi, 2018; Vyas, 2019). The direct-booking strategy rests on the same logic, since a property that cannot be easily found loses guests to intermediaries (Trihas & Valachis, 2026), and distribution economics reward being seen at the right moment (Agarwal, 2024).

Generative systems change the conditions under which visibility is achieved: unlike traditional SEO, there is no longer a ranked page to optimize. Instead, a model interprets a prompt and produces a limited set of names. Practitioners are increasingly referring to this practice as generative engine optimization, drawing an analogy with SEO, although the academic community has yet to adopt the term. That gap is one reason a descriptive study of this kind is warranted. The underlying principle, however, is an old one: presence at the moment when preferences are being formed shapes the path that follows (Peng et al., 2024).

A generative response fuses visibility with a form of implicit endorsement, since a system that names a hotel as a good fit for a couple's weekend is not merely listing the property but recommending it, in a register that reads as neutral and informed. That fusion of visibility and recommendation is what made recommendation agents powerful in earlier research (Dabholkar & Sheng, 2012; Xiao & Benbasat, 2007). It now occurs one step earlier in the journey, and at a scale that is difficult to audit externally. Because the endorsement is bundled into the naming, a hotel that is not named forfeits not only a listing but a recommendation it never had the opportunity to earn.

2.5. An Extended, Upstream Model

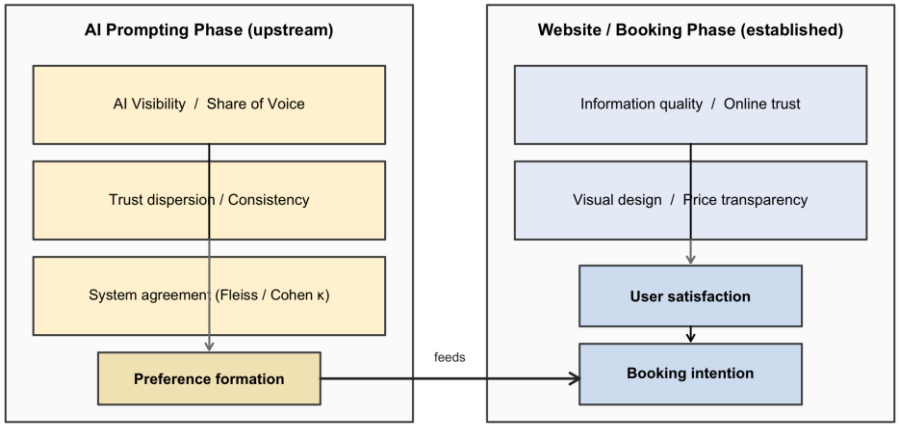
Taken together, these lines of research yield a coherent picture in which the established model describes the website phase: information quality and trust feed satisfaction, and satisfaction feeds booking intention. The present study proposes an additional phase preceding it, termed the AI prompting phase. Its relevant outcomes are AI visibility (whether the hotel is named at all), share of voice (how often it is named relative to competitors), and the consistency of that presence across prompts and systems. Trust and information quality still apply, but they now operate through the framing supplied by the AI rather than through the hotel's own site.

The link between the two phases is conceptual, and it should be stated as such. These data do not establish that AI visibility causes website visits or bookings. The prompt-monitoring dataset records only the responses produced by the systems; it observes no travelers and no bookings, and so cannot support a causal claim of that kind. The narrower claim is defensible: the constructs align, the AI phase is measurable, and it sits upstream of the phase that is already understood. That is sufficient to treat it as a genuine extension of the customer journey rather than as a novelty.

Figure 1 sets out the proposed extended theoretical model, in which the AI prompting phase, on the left, produces visibility, share of voice, and a degree of consistency across systems. These feed preference

formation, which in turn feeds the established website phase, in which information quality, trust, and design drive satisfaction and, through it, the intention to book.

Figure 1: Extended Customer-Journey Model With an Upstream AI Prompting Phase



Note. The website/booking phase reproduces the constructs of the original survey study. The AI prompting phase is the addition proposed here. The link between the phases is conceptual, not estimated.

Source: Own calculation based on the study data.

2.6. Hypotheses

Following the previously mentioned methodological approach, the two confirmatory questions are stated as null hypotheses (Bortz & Döring, 2005). A significant test permits the null to be rejected.

H1. There is no difference in AI visibility between the four AI systems (Cochran's Q test for paired samples, with McNemar post hoc tests).

H2. There is no difference in AI visibility between the hotels (chi-squared test, with a Fisher exact check).

Two further ideas are treated as propositions rather than as tested hypotheses because the present data can describe them but cannot fully confirm them: that the AI systems agree only partially on which hotels to name and that a hotel's visibility is a sufficiently stable property to be managed.

3. METHOD

3.1. Design

The study uses a prompt-monitoring design that is quantitative at its core and observational in nature; nothing was manipulated. A fixed set of natural-language prompts was submitted to four generative AI systems, and for each combination, it was recorded whether a target hotel appeared in the response. The broader mixed-methods frame arises from pairing this new data collection with the earlier survey study, which supplies the theoretical model for the website phase. This mirrors the triangulation logic of the original work, in which survey results were cross-checked against expert interviews.

3.2. Sample of Hotels and Prompts

Nine upscale hotels formed the observed portfolio, drawn from an existing group of properties in Europe, Australia, and New Zealand. For each hotel, five prompts were written to reflect the open, preference-forming questions a traveler might plausibly ask, such as a request for an elegant five-star hotel near the water or for a well-connected upscale hotel close to museums and parks. One property yielded four usable prompts rather than

five. Each prompt was submitted to all four systems (ChatGPT, Perplexity, Claude, and Gemini), giving 44 prompt units and 176 observations in total, with the prompt-by-system pair as the unit of analysis.

The four systems were selected because they cover the tools a traveler is most likely to use in practice, and because they differ in their underlying architecture. Two rely substantially on live retrieval from the web; the others draw more heavily on knowledge encoded during training. That contrast is deliberate, since part of the question is whether the way a system sources information is reflected in which hotels it names. The data constitute a single snapshot, collected within one short window. This is treated as a strength for internal consistency because every hotel and every system faced the same prompts at approximately the same time, and as a limitation for generalization, because these systems are updated frequently and a later collection could yield different figures. Both readings are legitimate, and the second is taken up again in the discussion of what the study cannot claim.

3.3. Prompt Construction and Coding

The prompts were written to read like natural speech rather than as keyword strings. Each describes a situation and a need, such as a weekend for a couple, a stay near the water, or a well-connected base for museums and parks, rather than naming a hotel or a brand. This distinction matters, because the goal was to determine whether a system would surface a given property unprompted, in response to the kind of open question a traveler would typically enter, rather than whether it recognizes a name it has already been given. Phrasing was varied across the five prompts per hotel so that the visibility estimate would not depend on a single fortunate formulation. Coding was binary and close to objective: a hotel was either named in the response or it was not, leaving little room for interpretation; ambiguous or partial matches were rare and were treated conservatively as non-mentions.

3.4. Measures

The raw outcome is binary: for each observation, the hotel was coded 1 if it was named in the system's response and 0 if it was not. The reporting measures are derived from this single variable. AI visibility is the proportion of responses in which a hotel appears, computed overall, by system, and by hotel. The visibility score aggregates the 20 possible mentions per hotel (five prompts times four systems) into a single count that also serves as a ranking metric. Share of voice is a hotel's mentions expressed as a percentage of all mentions in the portfolio. Visibility dispersion captures how widely a hotel's visibility is spread; for a binary variable with mention rate p, it equals $4p(1 - p)$, and its complement, $1 - 4p(1 - p)$, is reported as a consistency index. A value near one indicates that the hotel is almost always, or almost never, named; a value near zero indicates a mixed picture.

3.5. Analysis

Analyses were conducted in R (R Core Team, 2024), following standard procedures for categorical and agreement statistics. Because the outcome is binary and the four systems rate the same prompt units, the design is paired. H1 was tested with Cochran's Q across the four systems, with pairwise McNemar tests as post hoc comparisons. H2 was tested with a Pearson chi-squared test of hotel against visibility, with a bootstrapped Fisher exact test as a check and Cramér's V as the effect size. Agreement among the systems was assessed with Fleiss' kappa overall and Cohen's kappa for each pair. Two methodological points follow from the binary structure of the data. First, for two binary variables, the product-moment correlation equals the phi coefficient, and the Spearman rank correlation is numerically identical; therefore, only phi is reported, along with the tetrachoric correlation, which assumes a latent continuous propensity underlying the mention. Second, significance for these pairwise associations was estimated using exact Fisher tests rather than asymptotic approximations, which are unstable in small, sparse tables. A logistic regression of visibility on system and hotel completes the analysis and yields odds ratios.

4. RESULTS

4.1. Overall Visibility and Differences Between Systems

Across all 176 observations, the target hotels were named 70 times, an overall visibility of approximately 40%. For most hotels, most prompts produced no mention at all. The four systems differed in how frequently they

named a target hotel: ChatGPT did so in half of its responses, Gemini in approximately 43%, Perplexity in 34%, and Claude in 32% (Table 1). The spread, although visible, was not statistically reliable: Cochran's Q across the four systems was 6.65 with 3 degrees of freedom and p = .084, so H1 cannot be rejected, and the pairwise McNemar tests produced the same result, none surviving correction. ChatGPT named target hotels most frequently of the four, and the difference may be substantive, but this dataset lacks the statistical power to demonstrate it.

Table 1: AI Visibility by Generative System

AI system	Mentions	N	Visibility
ChatGPT	22	44	50.0%
Gemini	19	44	43.2%
Perplexity	15	44	34.1%
Claude	14	44	31.8%
Total	70	176	39.8%

Note. N is the number of prompt units per system. Cochran's Q = 6.65, df = 3, p = .084.

Source: Own calculation based on the study data.

4.2. Differences Between Hotels

The differences between hotels are far more pronounced, with visibility scores ranging from 19 out of 20 down to zero (Table 2; see also Figure 2). One property, Stamford Grand Adelaide, was named in 95% of its possible slots. Another, Stamford Plaza Adelaide, was never named at all, across every prompt and every system. The chi-squared test of hotel against visibility was highly significant, $\chi^2(8, N = 176) = 57.00$, $p < .001$, and the bootstrapped Fisher exact test agreed, $p < .001$. The effect size was large, Cramér's V = .57, and H2 is therefore rejected. Whatever drives these results operates at the level of the individual hotel rather than at the system level.

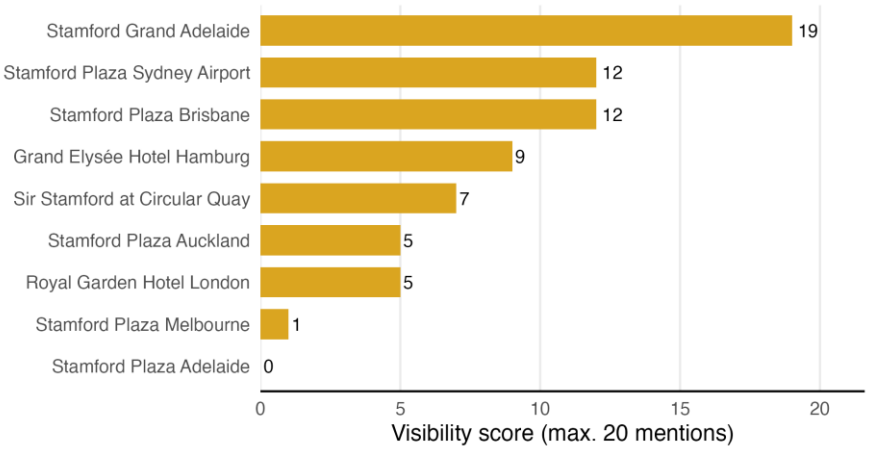
Table 2: Visibility, Share of Voice, and Consistency by Hotel

Hotel	Score/20	Visibility	Share of voice	Consistency
Stamford Grand Adelaide	19	95.0%	27.1%	.81
Stamford Plaza Brisbane	12	60.0%	17.1%	.04
Stamford Plaza Sydney Airport	12	60.0%	17.1%	.04
Grand Elysée Hotel Hamburg	9	45.0%	12.9%	.01
Sir Stamford at Circular Quay	7	35.0%	10.0%	.09
Royal Garden Hotel London	5	25.0%	7.1%	.25
Stamford Plaza Auckland	5	25.0%	7.1%	.25
Stamford Plaza Melbourne	1	5.0%	1.4%	.81
Stamford Plaza Adelaide	0	0.0%	0.0%	1.00

Note. Score is out of 20 possible mentions (five prompts × four systems); one hotel had four prompts. Consistency = $1 - 4p(1 - p)$. $\chi^2(8, N = 176) = 57.00$, $p < .001$, Cramér's V = .57.

Source: Own calculation based on the study data.

Figure 2: Visibility Score by Hotel (Ranked)

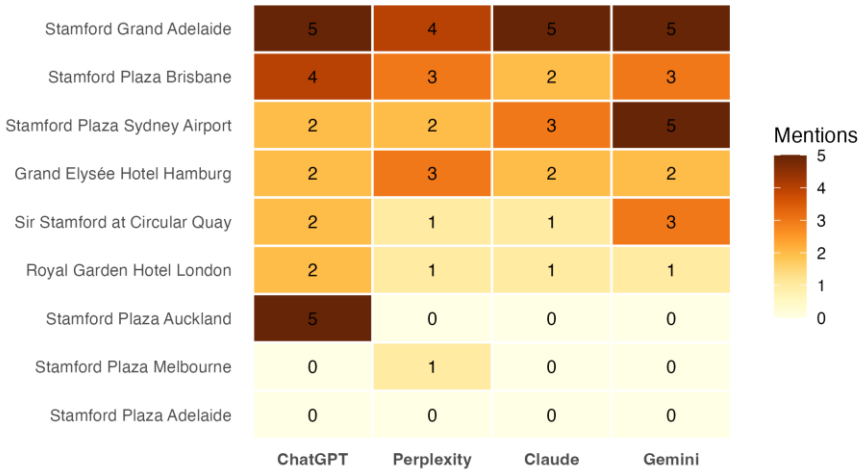


Source: Own calculation based on the study data.

Share of voice makes the concentration explicit: a single hotel accounted for more than a quarter of all mentions in the portfolio, and the top three together accounted for over 60%. The consistency index adds a second reading: the properties at the extremes, those named almost always and those named almost never, are the consistent ones. Hotels in the middle, with visibility near 50%, are the least consistent; their presence shifts with the exact phrasing and with the system. For a hotel attempting to manage this, the middle band is the least manageable position, because the probability of being named there approaches .5.

Figure 3 presents the same information stratified by system, making the concentration and the gaps directly visible: a small number of high-visibility rows, a majority of low-visibility rows, and clear differences in how each system treats the same property.

Figure 3: Mentions by Hotel and Generative System



Note. Cell values are the count of mentions out of five prompts (four for one hotel). Darker cells indicate higher visibility.

Source: Own calculation based on the study data.

4.3. Agreement Among the Systems

If the four systems applied the same selection criteria, they would name the same hotels for the same prompts; they do so only in part. Fleiss' kappa across all four was .42, which indicates moderate agreement, and it was highly significant against chance ($z = 6.74$, $p < .001$). The pairwise picture is more differentiated (Table 3; see also Figure 4). Claude and Gemini agreed most closely, with Cohen's kappa of .67 and a tetrachoric correlation of .91. Perplexity paired with each of them at approximately .53. ChatGPT stood apart from the others; its agreement with Perplexity was weak, at .14. ChatGPT is thus at once the most visibility-friendly system and the least aligned with the others, which suggests that it applies a different selection logic rather than simply a more generous threshold.

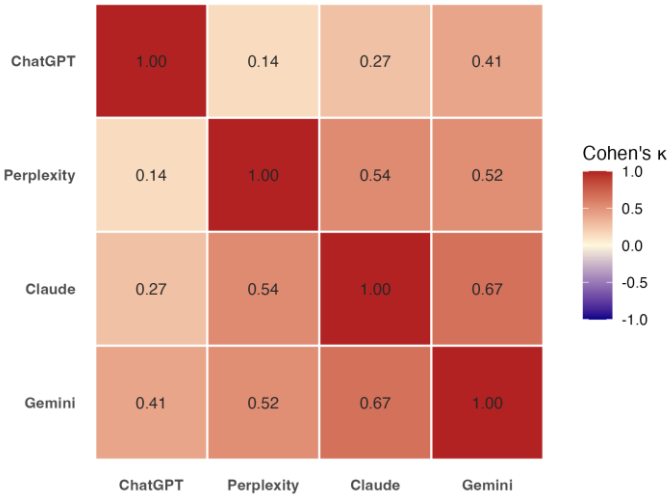
Table 3: Pairwise Agreement Between AI Systems

System pair	Cohen's κ	Tetrachoric r	p (Fisher)
Claude – Gemini	.67	.91	< .001
Perplexity – Claude	.54	.76	< .001
Perplexity – Gemini	.53	.76	< .001
ChatGPT – Gemini	.41	.61	.006
ChatGPT – Claude	.27	.47	.104
ChatGPT – Perplexity	.14	.23	.352

Note. Cohen's κ and the tetrachoric correlation measure agreement and latent association, respectively. Significance is from pairwise Fisher exact tests. Overall Fleiss' κ = .42, $p < .001$.

Source: Own calculation based on the study data.

Figure 4: Pairwise Agreement Between AI Systems (Cohen's κ)



Note. Values on the diagonal are set to 1. Warmer cells indicate stronger agreement.

Source: Own calculation based on the study data.

The gap between the kappa and the tetrachoric values warrants a brief comment, since it is easily misread. Cohen's kappa is the stricter and more conservative measure of raw agreement. The tetrachoric correlation is higher throughout because it removes the base-rate differences and estimates the association on an assumed underlying scale. Both measures are defensible: kappa is used here for the principal agreement claim, and the tetrachoric values are treated as the more optimistic reading of how similarly the systems operate.

4.4. What Predicts a Mention

The logistic regression entered system and hotel into a single model, confirming and sharpening the descriptive account. Relative to ChatGPT, Claude had significantly lower odds of naming a hotel (*OR* = 0.32, *p* = .04), with Perplexity close behind and Gemini near parity. The hotel effects were considerably larger: Stamford Grand Adelaide had substantially higher odds of being named than the reference property (*p* = .004), while Stamford Plaza Melbourne and Stamford Plaza Adelaide occupied the bottom of the distribution. None of this contradicts the tests already reported; it shows, within a single model, that the hotel matters more than the system in determining whether a mention occurs at all.

The extreme cases require caution in interpretation: one hotel was never named, which drives its coefficient toward an unstable, very large negative value, reflected in a wide standard error. The exact odds ratio there should not be interpreted. The safer statement is directional: a small number of properties are named far more often than the rest, a few far less, and the middle group lies close to the midpoint. That pattern is already signaled by the effect size for the hotel comparison, and the regression mainly confirms that it holds once the systems are accounted for simultaneously. The tests point in the same direction, which is reassuring given the size of the sample.

5. DISCUSSION

5.1. Reading the Results Through the Original Model

The clearest finding is also the least surprising: hotels vary considerably in how frequently generative systems refer to them, whereas the systems, taken as a group, are broadly similar in their overall propensity to name a property. Visibility is a property of the hotel far more than of the tool. This maps directly onto the original model: in the website phase, information quality and a hotel's ability to present itself effectively drove satisfaction and, through it, booking intention (Ali, 2016; DeLone & McLean, 2003). In the AI phase, something upstream of all of that determines whether the hotel is considered at all. The constructs carry over: visibility, trust, information quality, and recommendation logic are all present, relocated to an earlier moment.

The moderate agreement between the systems is the more consequential result in practice, more so than the non-significant difference between their averages. A hotel cannot treat the AI phase as a single channel. Claude and Gemini behave alike, Perplexity is close to them, and ChatGPT follows its own pattern. A property that is well represented in one system may be invisible in another, and monitoring only one of them would create a false sense of security. This is the most directly useful implication for a revenue or distribution manager: several systems must be monitored, not one.

5.2. Theoretical Contribution

The further theoretical move is to extend well-established IS models into a phase for which they were not built. The technology acceptance model and the DeLone and McLean framework were designed for systems that the user chooses to adopt and operate: a booking site, an application, or an enterprise tool (Davis, 1989; Petter et al., 2008). The generative phase differs in an important respect: users do not interact with a system operated by the hotel, but consult a third party positioned between traveler and hotel, and that third party applies its own opaque selection logic. In this case, the quality of information is partly beyond the hotel's control, so that trust attaches first to the generative system and only subsequently to the property itself.

That reframing implies that the net benefits component of the DeLone and McLean model now depends on an antecedent the model never contained: being surfaced by a generative system in the first place. It also implies that recommendation-agent research, which once described an optional feature on a retailer's site, now serves as the entry point to the entire journey (Dabholkar & Sheng, 2012; Xiao & Benbasat, 2007). The information quality construct likewise merits reconsideration: on a website, quality was something the hotel produced and controlled. In the AI phase, it is filtered, summarized, and at times reworded by a system with its own priorities, so the hotel supplies the raw material but no longer controls the final formulation. None of this should be pressed too far on the strength of a single descriptive study, but the direction appears correct and is consistent with longer-term developments in distribution (Agarwal, 2024).

5.3. Why the Systems May Diverge

The moderate agreement between the systems raises a question the data can answer only partly: why they differ. A cautious reading is nonetheless possible, since the four systems draw on different underlying data, retrieve information in different ways, and apply different guardrails in deciding how specific to be. Some favor well-known, safe suggestions; others appear willing to name a more particular property. ChatGPT is the clearest outlier, naming hotels more often while agreeing least with the rest, and the simplest explanation is a distinct selection and recall behavior rather than a merely looser threshold. Perplexity, which is built around live retrieval, might be expected to track current web presence more closely, whereas a more conservative model may fall back on frequently mentioned names.

This remains an informed conjecture, since the study was not designed to examine the internal mechanisms of the systems. What the data do support is the practical consequence: because the systems diverge, a hotel's AI presence is not one number but four, and those four can point in different directions. That is a substantive finding even where the mechanism behind it is not established, and it argues against any single-channel view of how a property should manage its standing in generative responses.

5.4. Practical Implications

For hotels, the operational implication is concrete: AI visibility is now a metric worth tracking alongside ranking and review scores. The visibility score and share of voice used here are inexpensive to compute, straightforward to read, and suitable for monitoring over time. The consistency index identifies where a hotel's presence is fragile, namely the middle band in which small changes in phrasing swing the outcome. Because the systems agree only moderately, the appropriate approach is to monitor all the major systems and to accept that a strategy that works for one may not transfer to another.

A marketing counterpart to generative engine optimization is taking shape and draws heavily on established SEO practice (Konidaris & Koustoumpardi, 2018; Vyas, 2019). The objective is to be named consistently, in a trustworthy frame, for the relevant type of query. How a hotel earns that position lies beyond what these data can establish. Structured, high-quality information about the property, a strong and consistent presence across the open web, and favorable reviews are all plausible levers, and each has support in the website-phase literature

(El-Said, 2020; Wang et al., 2015). These are offered as informed speculation rather than as findings. What the data do justify is the monitoring itself: a hotel that measures its AI visibility across systems and watches it over time is at least in a position to detect a decline.

5.5. Limitations

This study has notable limitations that should be addressed, beginning with the relatively small sample: nine hotels, one prompt set, and a single snapshot in time. Generative systems change rapidly, and a repetition next quarter could look different. The outcome is only binary, recording whether a hotel was named, not where in the response, not in what terms, and not with what supporting detail. The richer constructs the industry discusses, such as ranking position within the response, recommendation quality, and explicit trust signals, could therefore not be measured here. The reporting structure was built so that those columns can be filled in later, but at present they are empty.

The same causal gap that constrained the original survey applies here: that study could not demonstrate that satisfaction raises booking probability, because it observed only people who had already booked. The present study cannot demonstrate that AI visibility raises website visits or bookings, because it observes the AI responses alone, without behavioral follow-through. The link to the downstream model is argued on theoretical grounds rather than demonstrated empirically.

5.6. Future Research

The possible next step is a larger behavioral study that would widen the hotel and prompt sets, repeat the monitoring over time, and add the response-level detail that is missing here: position, tonality, and the trust signals a system chooses to include. More importantly, it would connect AI visibility to subsequent user behavior, namely the click, the site visit, and the booking, so that the upstream phase and the well-studied website phase can be modeled together, plausibly with a structural equation approach (Munawar Khan et al., 2025). Such a study would test directly what the present one can only propose: that being named by a generative system feeds preference, then visits, then intention to book.

6. CONCLUSION

The hotel customer journey has acquired a new initial step that occurs within third-party systems outside the hotel's control. This study examined that aspect in a focused and specific manner. Visibility in generative responses tends to be low overall and varies greatly between hotels, with one property almost always visible and another never visible. The four systems are similar in how frequently they name properties overall, yet they agree only moderately on which hotels to name, and ChatGPT in particular follows its own logic. Read against the established model of website satisfaction, trust, and booking intention, these results describe an upstream layer in which the same constructs (visibility, trust, information quality, and recommendation) are already at work. The paper does not claim to establish a causal link to bookings, but advances a narrower claim: that the AI phase is real, that it can be measured with simple instruments, and that it warrants consideration in hotel distribution strategy. After two decades of research focused on the website phase, this earlier stage is the one that most warrants further study.

REFERENCES

Agarwal, P. (2024). *Hotel distribution outlook 2024*. Skift Research. https://research.skift.com/reports/hotel-distribution-outlook-2024/

Ali, F. (2016). Hotel website quality, perceived flow, customer satisfaction and purchase intention. *Journal of Hospitality and Tourism Technology, 7*(2), 213–228. https://doi.org/10.1108/JHTT-02-2016-0010

Bortz, J., & Döring, N. (2005). *Forschungsmethoden und Evaluation für Human- und Sozialwissenschaftler* (3., überarb. Aufl.). Springer Medizin.

Bulsara, H. P., & Vaghela, P. S. (2023). Trust and online purchase intention: A systematic literature review through meta-analysis. *International Journal of Electronic Business, 18*(2), 145–162. https://doi.org/10.1504/IJEB.2023.130311

Cantallops, A. S., & Salvi, F. (2014). New consumer behavior: A review of research on eWOM and hotels. *International Journal of Hospitality Management, 36*, 41–51. https://doi.org/10.1016/j.ijhm.2013.08.007

Chang, K.-C., Hsu, C.-L., Chen, M.-C., & Kuo, N.-T. (2019). How a branded website creates customer purchase intentions. *Total Quality Management & Business Excellence, 30*(3–4), 422–446. https://doi.org/10.1080/14783363.2017.1308819

Dabholkar, P. A., & Sheng, X. (2012). Consumer participation in using online recommendation agents: Effects on satisfaction, trust, and purchase intentions. *The Service Industries Journal, 32*(9), 1433–1449. https://doi.org/10.1080/02642069.2011.624596

Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly, 13*(3), 319–340. https://doi.org/10.2307/249008

Davis, F. D., Bagozzi, R. P., & Warshaw, P. R. (1989). User acceptance of computer technology: A comparison of two theoretical models. *Management Science, 35*(8), 982–1003. https://doi.org/10.1287/mnsc.35.8.982

DeLone, W. H., & McLean, E. R. (1992). Information systems success: The quest for the dependent variable. *Information Systems Research, 3*(1), 60–95. https://doi.org/10.1287/isre.3.1.60

DeLone, W. H., & McLean, E. R. (2003). The DeLone and McLean model of information systems success: A ten-year update. *Journal of Management Information Systems, 19*(4), 9–30. https://doi.org/10.1080/07421222.2003.11045748

El-Said, O. A. (2020). Impact of online reviews on hotel booking intention: The moderating role of brand image, star category, and price. *Tourism Management Perspectives*, *33*, 100604. https://doi.org/10.1016/j.tmp.2019.100604

Grabner-Kräuter, S. (2002). The role of consumers' trust in online shopping. *Journal of Business Ethics, 39*(1–2), 43–50. https://doi.org/10.1023/A:1016323815802

Konidaris, A., & Koustoumpardi, E. (2018). The importance of search engine optimization for tourism websites. In V. Katsoni & K. Velander (Eds.), *Innovative approaches to tourism and leisure* (pp. 205–218). Springer. https://doi.org/10.1007/978-3-319-67603-6_15

Munawar Khan, M., Rahi, S., Alghizzawi, M., Rashid, A., Ngah, A. H., & Rasheed, R. (2025). Extension of the DeLone and McLean's information success model with leisure constraint model toward individual intention to visit tourist destination. *LBS Journal of Management & Research*. https://doi.org/10.1108/LBSJMR-10-2024-0112

Peng, X., Zhu, J., Lee, S., Zhou, D., Song, W., & Ying, T. (2024). Digital transformation in the hospitality industry: A bibliometric review from 2000 to 2023. *International Journal of Hospitality Management, 120*, Article 103761. https://doi.org/10.1016/j.ijhm.2024.103761

Petter, S., DeLone, W., & McLean, E. (2008). Measuring information systems success: Models, dimensions, measures, and interrelationships. *European Journal of Information Systems, 17*(3), 236–263. https://doi.org/10.1057/ejis.2008.15

Pushparaj, N., Sivakumar, V. J., Natarajan, M., & Bhuvaneskumar, A. (2023). Two decades of DeLone and McLean IS success model: A scientometrics analysis. *Quality & Quantity, 57*(3), 2469–2491. https://doi.org/10.1007/s11135-022-01464-z

R Core Team. (2024). *R: A language and environment for statistical computing* [Computer software]. R Foundation for Statistical Computing. https://www.R-project.org/

Schlosser, A. E., White, T. B., & Lloyd, S. M. (2006). Converting web site visitors into buyers: How web site investment increases consumer trusting beliefs and online purchase intentions. *Journal of Marketing, 70*(2), 133–148. https://doi.org/10.1509/jmkg.70.2.133

Senecal, S., Kalczynski, P. J., & Nantel, J. (2005). Consumers' decision-making process and their online shopping behaviour: A clickstream analysis. *Journal of Business Research, 58*(11), 1599–1608. https://doi.org/10.1016/j.jbusres.2004.06.003

Senecal, S., & Nantel, J. (2004). The influence of online product recommendations on consumers' online choices. *Journal of Retailing, 80*(2), 159–169. https://doi.org/10.1016/j.jretai.2004.04.001

Trihas, N., & Valachis, I. (2026). Strategies to increase direct bookings in hotels. In A. Kavoura, U. Gretzel, & V. Vrana (Eds.), *Strategic innovative marketing and tourism* (pp. 607–615). Springer. https://doi.org/10.1007/978-3-032-12968-0_66

Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. *MIS Quarterly, 27*(3), 425–478. https://doi.org/10.2307/30036540

Vyas, C. (2019). Evaluating state tourism websites using search engine optimization tools. *Tourism Management, 73*, 64–70. https://doi.org/10.1016/j.tourman.2019.01.019

Wang, J., Shahzad, F., Ahmad, Z., Abdullah, M., & Hassan, N. M. (2022). Trust and consumers' purchase intention in a social commerce platform: A meta-analytic approach. *SAGE Open, 12*(2), 1–18. https://doi.org/10.1177/21582440221091262

Wang, L., Law, R., Guillet, B. D., Hung, K., & Fong, D. K. C. (2015). Impact of hotel website quality on online booking intentions: e-Trust as a mediator. *International Journal of Hospitality Management, 47*, 108–115. https://doi.org/10.1016/j.ijhm.2015.03.012

Xiao, B., & Benbasat, I. (2007). E-commerce product recommendation agents: Use, characteristics, and impact. *MIS Quarterly, 31*(1), 137–209. https://doi.org/10.2307/25148784

The EU AI Act and SMEs in the Western Balkans Compliance Costs Legal Risks and Business Competitiveness

Nadia Elbasani[1]

[1] Luarasi University, Tirana, Albania, nadia.elbasani@luarasi-univ.edu.al

Abstract: The European Union Artificial Intelligence Act establishes a risk-based framework that increasingly influences the development, deployment and commercial use of artificial intelligence beyond the Union. This paper examines the implications of the Regulation for small and medium-sized enterprises in the Western Balkans, with particular attention to compliance costs, legal exposure and business competitiveness. The study applies doctrinal and comparative legal analysis to Regulation (EU) 2024/1689, the 2026 amendments and selected European Commission guidance. It considers territorial scope, operator roles, risk classification, transparency and documentation duties, high-risk requirements and measures intended to support smaller firms. The analysis finds that an SME established outside the EU may still face AI Act obligations where it places an AI system or general-purpose AI model on the EU market, provides an AI-enabled service to EU users or produces outputs used in the Union. The legal burden therefore follows relevant market activity rather than corporate location alone. For Western Balkan firms, the central difficulty lies in aligning with a developing EU regulatory environment while operating with limited legal, technical and financial capacity. The paper argues that compliance should be treated as part of product governance and market-access planning. A proportionate approach based on system inventory, role mapping, risk classification, supplier governance, documentation and human oversight can reduce avoidable legal exposure. Although compliance generates real costs, early preparedness can lower the cost of later redesign, strengthen contractual credibility and improve access to the European digital market.

Keywords: EU AI Act, SMEs, Western Balkans, compliance, artificial intelligence governance, business competitiveness

1. INTRODUCTION

Artificial intelligence has moved from an experimental technology to a routine component of business operations. Small and medium-sized enterprises use AI for customer support, marketing, recruitment, fraud detection, logistics, credit assessment, document processing and software development. These uses can create efficiency gains, but they can also affect consumers, workers, applicants and other individuals in ways that raise legal and governance concerns. The European Union responded to those concerns through Regulation (EU) 2024/1689, commonly known as the EU AI Act. The Regulation establishes a horizontal, risk-based framework for AI systems and general-purpose AI models. Its design reflects a wider objective: to support innovation while protecting health, safety and fundamental rights in the EU market.

The Act has particular relevance for the Western Balkans. The region is closely linked to the EU through trade, investment, digital services, supply chains and the broader process of European integration. Many local firms serve EU customers directly or build products for European partners. Consequently, a company registered in Tirana, Pristina, Skopje, Podgorica, Belgrade or Sarajevo may encounter AI Act requirements long before domestic law reproduces every provision of the Regulation. The issue is not simply formal accession to the EU. It is the practical reality that EU customers increasingly request evidence of lawful and responsible technology governance from their suppliers.

This paper asks three questions. First, in which circumstances can the EU AI Act affect SMEs established in the Western Balkans? Second, which compliance costs and legal risks are most significant for smaller firms? Third, can a proportionate compliance strategy contribute to business competitiveness rather than operate only as an administrative burden? The paper does not provide an empirical estimate of compliance costs. Instead, it identifies the legal sources of those costs and explains why early preparation is commercially relevant.

2. METHODOLOGY AND SCOPE

The paper uses doctrinal legal analysis of Regulation (EU) 2024/1689 and the relevant 2026 legislative and implementation developments. It also relies on European Commission materials concerning the regulatory framework, high-risk classification, transparency obligations and general-purpose AI models. The analysis is comparative in a limited sense: it compares the position of EU-established operators with that of SMEs located in Western Balkan economies that interact with the EU market. The paper focuses on business-facing implications rather than national transposition measures. It therefore treats the Western Balkans as a regional commercial context, while recognising that each jurisdiction has a distinct legal system and path of alignment with EU law.

The discussion is limited to general legal and business analysis. It does not replace case-specific advice. Whether the AI Act applies to a particular product depends on facts such as the system's intended purpose, technical design, contractual chain, target users, location of outputs and relationship to other EU legislation. The current application schedule also matters. The Act entered into force in August 2024 and applies in stages. General-purpose AI obligations applied from August 2025, transparency obligations applied from August 2026, while certain high-risk rules have later application dates under the 2026 simplification amendments (European Commission, 2026a).

3. THE EU AI ACT AS A MARKET GOVERNANCE FRAMEWORK

3.1 Territorial reach

Article 2 gives the AI Act an extraterritorial dimension. It covers providers placing AI systems or general-purpose AI models on the Union market or putting them into service in the Union, irrespective of whether those providers are established within or outside the EU. It also covers providers and deployers located outside the Union where the output produced by the system is used in the Union. This formulation resembles the market-oriented logic already familiar from other EU digital rules. Corporate location matters, but it does not determine the entire legal analysis.

For a Western Balkan SME, this means that the first compliance question should be commercial rather than geographical. A local software company that licenses an AI recruitment tool to an EU employer, a service provider that operates a chatbot for EU consumers, or a developer whose AI outputs are used in the Union may need to analyse the Regulation. The company must then identify its role. A provider develops an AI system or has it developed and places it on the market under its own name or trademark. A deployer uses an AI system under its authority. Importers, distributors and authorised representatives may also carry defined responsibilities. The role can change according to the business arrangement, particularly where a firm substantially modifies a system or markets it under its own brand.

3.2 Risk classification

The Act's risk-based structure is the central mechanism through which obligations are allocated. Prohibited practices occupy the highest-risk category. High-risk systems are subject to detailed requirements because of their potential effect on safety and fundamental rights. Certain interactive and generative uses trigger transparency obligations. Most lower-risk systems remain outside the Act's strictest controls, although they may still be regulated by data protection, consumer protection, intellectual property, employment or sector-specific law. Accurate classification is therefore more than a legal exercise. It determines the scale of documentation, testing, oversight and assurance that an SME must plan for.

Article 6 and the Annexes identify two principal routes to high-risk classification. The first concerns AI systems that are safety components of products or are themselves products covered by specified Union harmonisation legislation. The second concerns AI systems used in listed sensitive areas, including biometrics, critical infrastructure, education, employment, access to essential services, law enforcement, migration and border management. The intended purpose is decisive. A general-purpose tool may not be high risk in the abstract, but the way a business markets, integrates or deploys it can create high-risk consequences. The Commission's 2026 guidance on high-risk classification is therefore particularly important for SMEs that operate close to these areas (European Commission, 2026b).

4. COMPLIANCE DUTIES AND THEIR COST DRIVERS

4.1 High-risk requirements

Providers of high-risk AI systems face the most extensive set of duties. The framework includes a risk-management system, data and data-governance measures, technical documentation, automatic logging capabilities, transparency and instructions for use, human oversight, accuracy, robustness and cybersecurity. Providers must also implement a quality-management system, carry out conformity assessment where required, draw up an EU declaration of conformity and conduct post-market monitoring. These duties are not merely

formal documents. They require the firm to translate legal expectations into product development and operational processes.

Deployers are not passive users. They must use high-risk systems in accordance with the instructions for use, assign human oversight to competent persons, monitor operation and, in relevant cases, keep logs. Their responsibilities may also include informing affected workers or representatives, conducting a fundamental-rights impact assessment in specified circumstances and cooperating with competent authorities. For an SME that purchases an AI solution from a larger provider, the core task is to obtain sufficient documentation and contractual assurances. For an SME that develops its own system, the task is more demanding because it must generate and maintain the evidence itself.

4.2 Transparency and general-purpose AI

Article 50 creates transparency duties for certain AI systems. Users should be informed when they interact directly with an AI system unless this is obvious from the circumstances and context. Providers of generative AI systems must make outputs machine-readable and detectable as generated or manipulated by AI where technically feasible and effective. Deployers must disclose certain deepfakes and certain AI-generated or manipulated content published to inform the public on matters of public interest. The Commission adopted guidelines in July 2026 to support consistent application of these obligations, which apply from 2 August 2026 (European Commission, 2026c).

General-purpose AI models create another layer of analysis. The obligations primarily attach to providers of such models, including documentation, information-sharing and copyright-policy requirements. An SME that only uses a third-party foundation model may not assume the model-provider role. However, it should still verify its contractual position, the model documentation made available to it and the downstream obligations arising from its own AI system. Commission guidance clarifies that significant modifications may change the relevant legal position, while minor changes do not necessarily make an actor a provider of a general-purpose AI model (European Commission, 2026d).

Table 1: Main compliance cost drivers for Western Balkan SMEs

Compliance area	Typical activity	Business implication
Scope and role mapping	Identify systems, markets, operator role and intended purpose	Legal review is needed before product launch or EU contracting
Technical documentation	Record design choices, testing, data controls, logs and instructions	Requires engineering time and disciplined evidence management
Governance and oversight	Assign owners, train staff, approve uses and monitor incidents	Creates recurring operational rather than one-off costs
Supplier management	Request documentation and allocate duties in contracts	Important when SMEs rely on cloud, model or software vendors
Transparency and user information	Prepare notices, labels and customer-facing disclosures	Often manageable, but must match the actual system use

Source: Author's synthesis based on Regulation (EU) 2024/1689.

4.3 Why the cost burden is disproportionate for SMEs

Compliance is costly because it requires coordination across functions that small firms often do not separate. In a large company, legal, information security, product management, data governance and procurement teams may share these tasks. In a small company, the same founder or technical lead may be responsible for product decisions, commercial negotiations and regulatory communication. The fixed cost of understanding the rules, preparing a system inventory, updating contracts and maintaining documentation can therefore be proportionally higher for an SME than for a larger competitor.

Cost is also affected by timing. When compliance is considered only after a product has been developed, the business may need to redesign interfaces, create missing logs, obtain data documentation from suppliers or revise contractual terms under pressure from an EU customer. Early planning does not eliminate cost, but it allows the firm to embed requirements in product design and procurement. A modest register of AI systems, a basic approval process and a documentary checklist can be less expensive than reconstructing evidence after an incident, customer audit or enforcement request.

5. LEGAL RISK AND CONTRACTUAL EXPOSURE

5.1 Administrative enforcement and penalties

The AI Act provides for administrative fines that vary according to the infringement. The most serious breaches, including violations of prohibited practices or data requirements, can attract fines up to EUR 35 million or 7 per cent of total worldwide annual turnover, whichever is higher. Other breaches can attract fines up to EUR 15 million or 3 per cent of turnover, while providing incorrect, incomplete or misleading information can lead to fines up to EUR 7.5 million or 1 per cent of turnover. The Regulation provides for proportionate treatment of SMEs, including start-ups, but this does not remove the need to comply. For smaller companies, a lower fine may still be commercially damaging (Regulation (EU) 2024/1689, Article 99).

The immediate risk for many Western Balkan SMEs may be contractual rather than administrative. EU customers increasingly use procurement questionnaires, data-processing agreements, supplier codes and technology clauses to require evidence of governance. A firm that cannot answer whether it uses AI, what its supplier provides, how human oversight operates or whether a customer-facing chatbot is disclosed may lose business even where the legal position remains complex. The AI Act can therefore influence market behaviour through supply chains before a regulator takes action against a particular firm.

5.2 The interaction with other legal regimes

AI compliance is not self-contained. Personal-data processing can trigger the General Data Protection Regulation and domestic data-protection law. Automated decision-making may create additional concerns where it affects employment, credit, insurance, education or access to services. Consumer law can address misleading interfaces or unfair commercial practices. Copyright and trade-secret rules may be relevant to training data, outputs and supplier arrangements. Cybersecurity obligations can arise under contractual terms or sectoral rules. An SME should therefore avoid treating an AI Act assessment as a replacement for privacy, information-security and consumer-law analysis. The practical value of the AI Act is that it provides a structure for integrating these questions into the product lifecycle.

6. COMPETITIVENESS AND A PROPORTIONATE COMPLIANCE STRATEGY

The compliance narrative should not be reduced to cost. Responsible AI governance can support competitiveness in at least four ways. First, it can improve market access. A firm that maintains a clear inventory of AI systems and relevant documentation can respond more quickly to EU customer due diligence. Second, it can improve product quality. Risk assessment and human oversight may identify performance failures before they affect users. Third, it can strengthen trust. Clear communication about automated interaction and synthetic content gives customers a better understanding of how a service operates. Fourth, it can reduce negotiation uncertainty by clarifying which party is responsible for data, documentation, monitoring and incident reporting.

A proportionate strategy should begin with five practical actions. The SME should inventory all AI systems, general-purpose models and AI-enabled suppliers. It should identify its role and the intended purpose of each use. It should then classify risks and prioritise systems that affect people, are customer-facing, use sensitive data or serve EU customers. Next, it should create a minimum evidence pack containing supplier information, relevant testing records, user notices, internal approval records and a named owner. Finally, it should review systems when their data, model, use case, target market or supplier changes. This approach is scalable. It does not require every small firm to imitate a multinational compliance structure.

The EU AI Act itself contains support mechanisms for SMEs. Article 57 requires Member States to establish at least one AI regulatory sandbox at national level. Article 62 calls for measures for providers and deployers that are SMEs, including priority access to sandboxes for eligible SMEs and start-ups with a registered office or branch in the Union. A regulatory sandbox can offer a supervised environment for developing, training, validating and testing innovative systems. Western Balkan businesses may benefit through EU branches, partnerships, incubators, research collaborations and business-support organisations. These routes cannot be treated as automatic exemptions, but they can reduce uncertainty and promote earlier engagement with the regulatory framework.

7. IMPLICATIONS FOR POLICY AND BUSINESS SUPPORT

The regional challenge cannot be resolved by individual firms alone. Western Balkan governments, universities, chambers of commerce, innovation hubs and professional associations can support SMEs by translating EU rules into sector-specific guidance. A small tourism platform, an online retailer, an outsourcing company and a health-technology provider do not face identical risks. Practical tools should therefore include sectoral checklists, model supplier questionnaires, short training modules and access to legal and technical expertise. Universities can contribute through interdisciplinary education that combines law, cybersecurity, data governance and business management.

Policy alignment should also focus on capacity. The ability to audit a system, understand data documentation, assess cybersecurity controls and explain transparency obligations will become commercially valuable. Western Balkan economies seeking deeper participation in the European digital market should treat AI governance skills as part of their competitiveness infrastructure. The objective is not to copy EU institutions mechanically. It is to prepare local businesses to operate credibly in a market where AI assurance, documentation and accountability are increasingly normal commercial expectations.

8. CONCLUSION

The EU AI Act changes the conditions under which AI-enabled products and services enter the European market. Its effect reaches beyond EU borders where non-EU providers place systems or models on the Union market, provide services to EU users or produce outputs used in the Union. Western Balkan SMEs should therefore assess AI Act relevance through their business activities and customer relationships, not only through their place of establishment.

The greatest compliance burden arises where a system is high risk or where the business acts as a provider. Yet even lower-risk and customer-facing uses require disciplined attention to transparency, supplier management, data protection, cybersecurity and contractual allocation of responsibility. Compliance costs are real, especially for smaller firms with limited specialist capacity. However, late compliance is often more expensive because documentation, monitoring and governance cannot be reconstructed easily after a product is sold or an incident occurs.

The paper concludes that a proportionate and early compliance strategy can create commercial value. System inventory, role mapping, risk classification, evidence management and human oversight allow SMEs to reduce legal uncertainty and respond more credibly to EU customers. For Western Balkan firms, AI governance should therefore be viewed as part of corporate risk management and market-access strategy. Regulatory preparedness cannot guarantee business success, but it can help smaller firms compete more confidently in the European digital economy.

REFERENCES

European Commission. (2026a). AI Act regulatory framework. Shaping Europe's digital future. https://digital-strategy.ec.europa.eu/en/policies/regulatory-framework-ai

European Commission. (2026b). Guidelines for providers and deployers of AI high-risk systems. Shaping Europe's digital future. https://digital-strategy.ec.europa.eu/en/policies/guidelines-ai-high-risk-systems

European Commission. (2026c). Guidelines on transparency obligations for providers and deployers of AI systems. Shaping Europe's digital future. https://digital-strategy.ec.europa.eu/en/library/guidelines-transparency-obligations-providers-and-deployers-ai-systems

European Commission. (2026d). Guidelines for providers of general-purpose AI models. Shaping Europe's digital future. https://digital-strategy.ec.europa.eu/en/policies/guidelines-gpai-providers

European Commission. (2026e). The General-Purpose AI Code of Practice. Shaping Europe's digital future. https://digital-strategy.ec.europa.eu/en/policies/contents-code-gpai

European Parliament and Council of the European Union. (2024). Regulation (EU) 2024/1689 laying down harmonised rules on artificial intelligence. Official Journal of the European Union. https://eur-lex.europa.eu/eli/reg/2024/1689/oj

IBANESS. (2026). XXVI International Balkan and Near Eastern Congresses Series on Economics Business and Management Mitrovica Kosovo. https://www.ibaness.org/congresses-all/xxvi-ibaness-mitrovica-kosovo-october-10-11-2026

Infrastructure as a Driver of Kitchen Service Quality in Hungarian Public Catering: A Comprehensive Assessment Framework: *A Complex Service-Quality-Oriented Examination of Infrastructural Conditions*

Attila Korenika[1] **Prof.Dr.Bálint Csaba Illés CSc**[2]

[1] John von Neumann University, Doctoral School of Management and Business Administration, korenika.attila@nje.hu, ORCID: https://orcid.org/0009-0001-2665-0197

[2] John von Neumann University, Doctoral School of Management and Business Administration,illes.b.csaba@nje.hu, ORCID: https://orcid.org/0000-0001-9546-2897

Abstract: The service quality of public catering is the outcome of a complex system in which human resources, raw-material quality, the technologies applied, food-safety processes, and the available infrastructure interact closely to determine the quality of the meals produced. The aim of this study is to analyse, from a service-quality perspective, the infrastructural conditions of production and serving kitchens operating in Hungarian public catering and to identify development areas that may contribute in the long term to a safer, more sustainable, and more efficient public catering system. The theoretical framework examines the interrelationships among service quality, food safety, sustainable public catering, and large-scale kitchen technology. The empirical section is based on a retrospective, integrated interpretation of three earlier Hungarian studies: a comprehensive survey covering 68 kitchens and 233 assessment criteria; a hygiene intervention involving 33 kitchens and 145 employees; and a microbiological study conducted in 37 kitchens with 158 food handlers. The findings indicate substantial organisational and operational heterogeneity and confirm that technological infrastructure can be converted into a genuine service-quality advantage only when combined with adequate human competence and standardised processes. As a new measurement framework, the study proposes the Public Catering Infrastructure Quality Index (KIMI), which may serve as a decision-support tool for future nationwide condition assessments and targeted development programmes.

Keywords: public catering; institutional kitchen; kitchen service; infrastructure; service quality; food safety; sustainability; kitchen technology;

1. INTRODUCTION

The social and economic significance of public catering extends beyond the boundaries of traditional hospitality services. Catering provided in kindergartens, schools, health-care and social institutions, and workplaces plays a decisive role in the daily nutrition of large consumer populations. The field is particularly important because its consumers include large numbers of children, older people, patients, and persons with special dietary needs. Service quality must therefore be interpreted simultaneously as a hospitality-management, nutritional-science, food-safety, social, and economic issue.

In evaluating the quality of public catering, considerable attention has traditionally been devoted to the nutritional composition of meals, raw-material use, menu planning, and compliance with food-safety requirements. Considerably less attention, however, has been paid to the infrastructural environment in which food is produced, stored, heat-treated, portioned, transported, and served. Yet service quality cannot be separated from the physical and technological system in which the service itself is created.

Research on service quality in hospitality shows that the quality of food, service, and the physical environment jointly determine consumers' quality perceptions and satisfaction (Ryu & Han, 2010; Ryu et al., 2012). In public catering, the importance of the physical environment is even more complex because the production infrastructure, which is generally invisible to consumers, directly affects the technological procedures that can be applied, production capacity, the organisation of workflows, and the feasibility of meeting food-safety requirements.

This study uses the concept of infrastructure in a broad sense. It includes the architectural and functional design of production and serving kitchens, kitchen equipment, refrigeration and freezing capacity, storage systems, dishwashing infrastructure, ventilation, energy and water supply, waste management, and digital information and monitoring systems. From this perspective, infrastructure is not a passive background condition but an active strategic resource determining service quality in public catering. The central question of the study is therefore how the infrastructural and technological characteristics of Hungarian public catering kitchens are related to

hygienic, operational, and service-quality performance, and what type of measurement system could objectively determine development priorities.

2. THEORETICAL BACKGROUND AND LITERATURE REVIEW

Service quality is a multidimensional concept that, in hospitality, can be interpreted as the combined and interdependent effect of the product, the service process, and the physical environment. Ryu and Han (2010) empirically demonstrated that the quality of food, service, and the physical environment are all major determinants of customer satisfaction. The integrated model of Ryu et al. (2012) further confirmed that physical-environment quality is not a secondary factor but an antecedent of restaurant image, perceived value, and behavioural intentions.

In public catering, this concept must be supplemented by the production background. Consumers do not necessarily see the kitchen in which a meal is prepared, yet its technological condition is indirectly reflected in the temperature, texture, taste, appearance, and safety of the food. Infrastructure is therefore an antecedent of service quality whose effect is mediated through technological processes.

Quality-assessment approaches used in health-care catering also support the view that service quality cannot be restricted to the sensory properties of food. Banks et al. (2017) approached hospital food-service quality through a standardised audit logic, while Wright et al. (2006) demonstrated the complex nature of catering services through consumer evaluation.

Appropriate architectural and functional design is a fundamental prerequisite for safe food production. The routes of raw materials, semi-finished products, and finished products, as well as clean and contaminated processes, must operate within a system that minimises the possibility of cross-contamination. The spatial organisation of goods receiving, storage, preparation, production, portioning, dishwashing, and waste management is of particular importance.

Modern equipment is one of the most important infrastructural elements of high-quality public catering. Programmable cooking and baking equipment can provide not only greater capacity but also improved technological reproducibility, reduced probability of human error, and support for standardised product quality.

Adequate refrigeration and freezing capacity is both a logistical and a food-safety requirement. When capacity is determined, daily production volume must be considered together with requirements for the separated storage of raw materials, the frequency of deliveries, and the storage needs of prepared products.

Dishwashing, cleaning, and disinfection infrastructure is likewise a critical component of service safety. Correct sizing of equipment, separation of clean and contaminated routes, control of chemical dosing, and maintenance of appropriate temperatures directly influence hygiene risks.

Public catering infrastructure and food safety are inseparable. The proper operation of HACCP-based regulation presupposes that the physical infrastructure allows the prescribed control processes to be implemented. If room layout, temperature control, handwashing, cleaning, or the separation of contaminated and clean processes cannot be ensured infrastructurally, a gap may emerge between the documented system and actual operations.

Earlier studies of Hungarian school kitchens provide a particularly strong empirical basis for this argument. Tóth and Bittsánszky (2014), assessing 68 kitchens according to 233 criteria, identified substantial differences in the hygiene performance of production and serving kitchens. A subsequent intervention based on targeted training demonstrated that developing human competence can result in measurable improvement in several critical processes (Tóth et al., 2017). Illés et al. (2018) examined relationships between employees' food-safety knowledge and the microbiological status of food-contact surfaces.

3. MATERIALS AND METHODS

The aim of the research was to examine the service quality of kitchens operating in Hungarian school public catering, with particular attention to infrastructural, technological, and food-safety conditions. The basic assumption was that public catering service quality cannot be reduced solely to the nutritional composition or sensory properties of meals; it is also substantially determined by the physical, technological, and organisational environment in which food preparation, storage, serving, and related hygiene processes are carried out.

The research applied a retrospective, multilevel analytical approach. It integrated the results of three earlier Hungarian studies that were substantively related but conducted on independent samples. The three data collections cannot be regarded as a classical longitudinal panel study because the kitchens examined were not identical at every data-collection point. The findings were therefore interpreted not as temporal changes in the same units but as complementary empirical evidence regarding the structural and operational characteristics of Hungarian school public catering.

The first database consisted of a comprehensive food-safety survey covering 68 school catering units. A standardised checklist containing 233 assessment points was used to measure kitchen conditions and operations. The sample included 19 production kitchens and 49 serving kitchens (Tóth & Bittsánszky, 2014).

The second study component was a six-month food-hygiene development programme involving 33 school kitchens and a total of 145 employees. The research examined changes in employees' theoretical knowledge and actual food-handling practices before and after the targeted intervention (Tóth et al., 2017).

The third database originated from a food-safety study of 37 secondary-school kitchens. It assessed the hygiene knowledge of 158 food handlers together with the microbiological status of food-contact surfaces in the kitchens (Illés et al., 2018).

Table 1

Main characteristics of the Hungarian kitchen studies included in the retrospective analysis

Study component	No. of kitchens	Personnel sample	Main area examined	Method
Comprehensive kitchen condition assessment	68	–	Infrastructure, hygiene, technology, operations	233-point checklist
Hygiene development programme	33	145 persons	Knowledge and practical food handling	Pre–post intervention
Surface hygiene study	37	158 persons	Microbiological status and hygiene knowledge	Microbiological measurement + questionnaire

3.1. Dimensions Examined

The 233-point inspection system assessed seven complex areas: (1) the physical condition and environment of the facility; (2) conditions related to kitchen staff; (3) equipment and work tools; (4) food receiving and storage; (5) food-preparation, serving, and cleaning processes; (6) the quality-assurance system; and (7) conditions in the dining area. The present study highlights dimensions that can be directly or indirectly linked to kitchen infrastructure.

3.2. Statistical Analysis

Descriptive statistical methods were applied to process the available aggregated data. Frequencies, percentage distributions, and relative changes measured in individual intervention areas were determined. If the original kitchen-level database becomes available, further analyses may include independent-samples t tests or Mann–Whitney tests, χ^2 tests for categorical variables, and correlation and regression analyses. For a multi-item infrastructure scale, internal consistency can be assessed using Cronbach's α and dimensionality using exploratory factor analysis.

3.3. Public Catering Infrastructure Quality Index (KIMI)

As a further development of the earlier measurement system, the study proposes the creation of a composite Public Catering Infrastructure Quality Index (KIMI). The purpose of KIMI is to make the condition of kitchen infrastructure measurable and comparable using a uniform 0–100-point system.

Table 2

Proposed dimensions and weighting of the KIMI index

Dimension	Weight
Architectural and functional compliance	15%
Kitchen technology and equipment	20%
Refrigeration, storage, and warehousing infrastructure	10%
Food-safety and hygiene infrastructure	15%
Dishwashing and cleaning system	10%
Energy and water efficiency	10%
Digitalisation and monitoring	10%
Occupational safety and ergonomics	5%
Waste-management infrastructure	5%
Total	100%

Figure 2. Weighting of the proposed KIMI dimensions. Source: authors' own compilation.

KIMI = Σ ($D_i \times W_i$)

where D_i denotes the standardised performance score (0–100) of the given infrastructure dimension and W_i its weight. On the basis of the currently available published aggregated data, retrospective KIMI scores for individual kitchens cannot yet be calculated in a scientifically reliable manner; the original kitchen-level dataset is required. KIMI is therefore presented in this study as a new measurement model.

Table 3

Proposed KIMI rating categories

KIMI score	Rating	Development interpretation
0–49	Critical	Immediate intervention required
50–64	Needs improvement	Substantial modernisation justified
65–79	Adequate	Targeted improvements required
80–100	Modern	High infrastructure quality

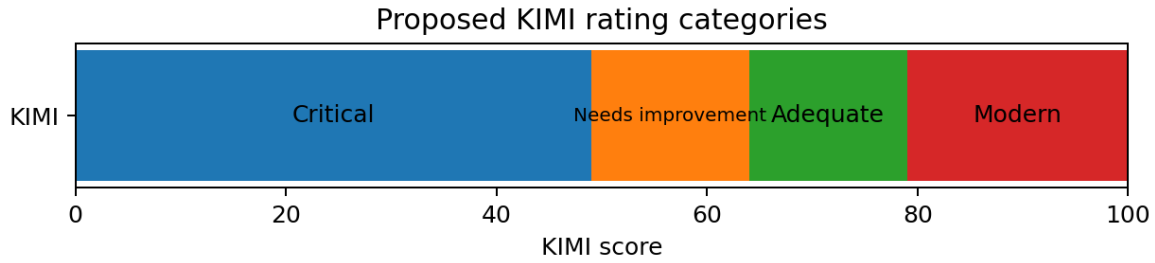


Figure 3. Proposed rating categories of the KIMI index. Source: authors' own compilation.

4. RESULTS

Serving kitchens predominated in the baseline study of 68 units. The 49 serving kitchens represented 72.1% of the sample, whereas the 19 production kitchens accounted for 27.9%. The high proportion of serving kitchens is particularly important from a service-quality perspective because in these units the quality of food reaching the consumer is the combined outcome not only of local operations but also of central production, transport, temperature maintenance, storage, and final serving.

Table 4

Distribution of the baseline sample by kitchen type

Kitchen type	n	%
Production kitchen	19	27.9
Serving kitchen	49	72.1
Total	68	100.0

Figure 4. Distribution of the 2014 baseline sample by kitchen type. Source: authors' own compilation based on Tóth and Bittsánszky (2014).

In the comprehensive assessment, kitchen evaluation scores ranged from 44% to 91%. The 47-percentage-point range indicates substantial heterogeneity, meaning that units operating within the same public catering system had markedly different food-safety and operational conditions. According to Tóth and Bittsánszky (2014), serving kitchens achieved less favourable scores overall than production kitchens, suggesting that the endpoints of the service chain should be regarded as priority development targets.

The six-month development programme conducted in 33 school kitchens with 145 employees resulted in substantial improvement in several areas. In theoretical knowledge, knowledge related to goods receiving improved by 33.5%, while knowledge related to food-waste handling improved by 11.7%. In actual work performance, storage improved by 33.3%, dishwashing by 24.7%, and cleaning by 22.0% (Tóth et al., 2017).

The study involving 37 secondary-school kitchens and 158 food handlers jointly evaluated the microbiological status of kitchen surfaces and employees' hygiene knowledge. The findings suggest that an unfavourable microbiological status cannot be interpreted solely as a problem of physical infrastructure: the human factor, cleaning practices, and food-safety knowledge jointly shape actual hygiene performance (Illés et al., 2018).

The combined interpretation of the three study components indicates four major relationships. First, substantial quality heterogeneity can be observed among Hungarian school public catering kitchens. Second, serving kitchens may represent a particularly sensitive point in the supply chain. Third, the condition of infrastructure alone cannot explain overall service quality because human competence is a decisive factor in the proper use of equipment and processes. Fourth, targeted training can produce measurable improvement within a relatively short period in several workflows closely related to the appropriate use of infrastructure.

On this basis, the quality of public catering kitchen services can be interpreted through an integrated causal chain: infrastructure quality → technological process quality → human competence → food safety and food quality → complex service quality. The relationship is not exclusively linear; human competence may act as a moderating factor influencing the extent to which available infrastructure is converted into actual service quality.

4. DISCUSSION

The findings indicate that quality improvement in Hungarian school public catering cannot be reduced solely to replacing equipment or renovating buildings. Although an adequate physical infrastructure is a fundamental prerequisite for safe and efficient operation, the available results show that actual service quality emerges from the interaction of technical and human factors.

The 44–91% performance interval observed among the kitchens indicates a degree of heterogeneity that is also noteworthy from a policy perspective. A uniform financing or equipment-procurement programme does not necessarily result in optimal resource allocation because kitchens operate from different starting conditions, with different risks and different service responsibilities.

Developments should therefore be prioritised within a condition- and risk-based system. Priority should be given to units serving large consumer populations, vulnerable consumer groups, and those in which the state of infrastructure or operating practices indicates a higher food-safety risk.

The poorer performance of serving kitchens deserves particular attention. In public catering, the production kitchen is often regarded as the unit that determines quality, while the food quality actually experienced by the consumer is realised at the serving location. If transport, hot holding, storage, or portioning is inadequate, the quality of a product prepared to a high standard may deteriorate considerably before consumption.

The results of the hygiene development programme also show that, alongside investment, considerable potential lies in human-resource development. Improvements of 33.3% in storage practices, 24.7% in dishwashing, and 22.0% in cleaning demonstrate that targeted training interventions can produce measurable operational progress within a short period.

This is important because technical investment and training often appear as separate processes in the modernisation of public catering. Installing modern large-scale kitchen equipment without appropriate training may result in only a fraction of the technology's functions being utilised. Investment programmes should therefore include mandatory technological and food-safety continuing-training components.

The microbiological study further reinforces this approach. The microbiological status of food-contact surfaces is an objective indicator that may simultaneously reflect the quality of the cleaning system, infrastructure, and employee behaviour. Objective outcome indicators are therefore justified alongside food-safety audits based solely on documentation.

An important theoretical conclusion of the present study is that infrastructure quality should be evaluated not by the mere presence of equipment but by its capacity to create service quality. Older equipment cannot automatically be classified as inadequate if it is operationally reliable, can be used hygienically, and provides the required technological performance; conversely, new equipment does not automatically constitute quality improvement if its capacity is mismatched to production or if it is not used appropriately.

Consequently, future infrastructure assessment should shift from an equipment-based to a performance-based approach. The KIMI index proposed in this study offers a means of operationalising this shift by integrating architectural, technological, hygienic, energy, digital, ergonomic, and sustainability dimensions.

The integration of sustainability considerations is particularly justified. International research shows that the environmental performance of public catering is not solely a matter of menu composition or raw-material procurement but relates to the production and service system as a whole (Dos Santos et al., 2022; Falasconi et al., 2015; Sundin et al., 2024). Thus, in future validation of KIMI, energy and water use and food waste could appropriately be included as outcome variables.

The modernisation of Hungarian public catering infrastructure cannot be implemented effectively as a uniform equipment-replacement programme. As a first step, a nationwide infrastructure audit should be developed to measure, in a standardised manner, the condition of buildings and room structures, technological routes, cooking and baking capacity, refrigeration and storage systems, dishwashing technology, energy and water efficiency, digitalisation, ergonomics, and waste management. Based on the audit results, a risk- and needs-based development order can be established. Priority setting should take into account the number of consumers served, the vulnerability of the population group, the length of the service chain, kitchen function, the technical condition of equipment, and the expected degree of quality improvement.

Investment performance should also be measured retrospectively. Relevant indicators may include kWh/portion, litres of water/portion, labour hours/100 portions, food waste g/portion, production cost/portion, number of temperature deviations, microbiological compliance, sensory evaluation, and consumer satisfaction. The development of digitalisation represents a separate strategic direction. Automatic recording of refrigerator temperatures, digital HACCP logs, recipe and allergen management, inventory management, waste measurement, and energy monitoring can be organised into an integrated data system. This can reduce administrative burdens, improve traceability, and support data-driven managerial decision-making.

Technical investments should always be accompanied by competence development. Equipment procurement, process redesign, occupational-safety education, hygiene training, and managerial monitoring should be treated as a single integrated development project.

5. CONCLUSIONS

In the long term, improving the quality of public catering services in Hungary cannot be achieved without system-level modernisation of kitchen infrastructure. Infrastructure quality is directly or indirectly related to food safety, sensory quality, energy and water use, food waste, labour efficiency, and the economic efficiency of the service. Earlier Hungarian empirical studies revealed substantial operational heterogeneity and also demonstrated that developing human competence can produce measurable improvements in storage, dishwashing, cleaning, and other critical processes. Technological modernisation and human-resource development therefore cannot be separated. In developing public catering infrastructure, the traditional equipment-replacement perspective should be replaced by a complex system-development approach. The technological process should be placed at the centre, with architectural design, equipment, human resources, digital systems, and food-safety controls aligned accordingly. The KIMI index proposed in this study offers a new measurement framework that may enable comparable evaluation of the infrastructure of Hungarian public catering kitchens. Through future empirical validation, infrastructure may be treated not merely as an investment need but as a measurable determinant of service quality. Overall, sustained improvement in the quality of Hungarian public catering requires simultaneous development in three areas: modern infrastructure, appropriately regulated technological processes, and competent human resources. Acting as a mutually reinforcing system, these three elements can produce genuine quality improvement that is perceptible at consumer level.

Acknowledgements

The study was supported by the EKÖP-KDP University Research Scholarship Program and Cooperative Doctoral Program, the Ministry of Culture and Innovation, and the National Research, Development and Innovation Fund.

REFERENCES

Banks, M., Hannan-Jones, M., Ross, L., Buckley, A., Ellick, J., & Young, A. (2017). Measuring the quality of hospital food services: Development and reliability of a Meal Quality Audit Tool. Nutrition & Dietetics, 74(2), 147–157. https://doi.org/10.1111/1747-0080.12341

Dos Santos, E. B., Maynard, D. da C., Zandonadi, R. P., Raposo, A., & Botelho, R. B. A. (2022). Sustainability recommendations and practices in school feeding: A systematic review. Foods, 11(2), 176. https://doi.org/10.3390/foods11020176

Falasconi, L., Vittuari, M., Politano, A., & Segrè, A. (2015). Food waste in school catering: An Italian case study. Sustainability, 7(11), 14745–14760. https://doi.org/10.3390/su71114745

Illés, C. B., Tóth, A. J., Dunay, A., Lehota, J., & Bittsánszky, A. (2018). Evaluation of food safety knowledge and microbial status of food contact surfaces in schools. Journal of Food Safety, 38(4), e12480. https://doi.org/10.1111/jfs.12480

Korenika, A. (2024). A konyhai szolgáltatás minőségének javítása az iskolai közétkeztetésben [Improving the quality of kitchen services in school public catering]. GRADUS, 11(3), Article 2024.3.ECO.007. https://doi.org/10.47833/2024.3.ECO.007

Ryu, K., & Han, H. (2010). Influence of the quality of food, service, and physical environment on customer satisfaction and behavioral intention in quick-casual restaurants: Moderating role of perceived price. Journal of Hospitality & Tourism Research, 34(3), 310–329. https://doi.org/10.1177/1096348009350624

Ryu, K., Lee, H.-R., & Kim, W. G. (2012). The influence of the quality of the physical environment, food, and service on restaurant image, customer perceived value, customer satisfaction, and behavioral intentions. International Journal of Contemporary Hospitality Management, 24(2), 200–223. https://doi.org/10.1108/09596111211206141

Sundin, N., Malefors, C., Strotmann, C., Orth, D., Kaltenbrunner, K., Obersteiner, G., Scherhaufer, S., Sjölund, A., Persson Osowski, C., Strid, I., & Eriksson, M. (2024). Sustainability assessment of educational approaches as food waste prevention measures in school catering. Journal of Cleaner Production, 481, 144196. https://doi.org/10.1016/j.jclepro.2024.144196

Tóth, A. J., & Bittsánszky, A. (2014). A comparison of hygiene standards of serving and cooking kitchens in schools in Hungary. Food Control, 46, 520–524. https://doi.org/10.1016/j.foodcont.2014.06.019

Tóth, A. J., Koller, Z., Illés, B. C., & Bittsánszky, A. (2017). Development of conscious food handling in Hungarian school cafeterias. Food Control, 73, 644–649. https://doi.org/10.1016/j.foodcont.2016.09.011

Wright, O. R. L., Connelly, L. B., & Capra, S. (2006). Consumer evaluation of hospital foodservice quality: An empirical investigation. International Journal of Health Care Quality Assurance, 19(2/3), 181–194. https://doi.org/10.1108/09526860610651708

Willett, W., Rockström, J., Loken, B., Springmann, M., Lang, T., Vermeulen, S., Garnett, T., Tilman, D., DeClerck, F., Wood, A., Jonell, M., Clark, M., Gordon, L. J., Fanzo, J., Hawkes, C., Zurayk, R., Rivera, J. A., De Vries, W., Sibanda, L. M., … Murray, C. J. L. (2019). Food in the Anthropocene: The EAT–Lancet Commission on healthy diets from sustainable food systems. The Lancet, 393(10170), 447–492. https://doi.org/10.1016/S0140-6736(18)31788-4

The High Cost of Cheap Compliance: Evaluating the Reputational Risks of AI-Driven Accessibility Tools in Digital Marketing

mg.oec. Agris Raipalis[1] **mg.eng. Anastasija Kovalova[2]**

[1] University of Latvia, Faculty of Economics and Social Sciences, Department of Management and Business, agris.raipalis@lu.lv, ORCID: 0009-0004-6687-4998

[2] University of Latvia, Faculty of Economics and Social Sciences, Department of Economy and Entrepreneurship, ak25328@students.lu.lv, ORCID: 0009-0008-6204-6940

Abstract: As digital platforms face increasing statutory pressure under frameworks like the European Accessibility Act, many firms have adopted automated AI "overlays" as a low-cost compliance shortcut. However, these tools frequently produce functional failures, such as keyboard traps and incoherent automated transcriptions, which degrade the user experience for all consumers. This study investigates the link between these technical compliance shortcuts and measurable brand erosion. We address the research gap concerning the trade-off between "legal box-ticking" and functional market solutions. Utilising a mixed-methods approach, the research first quantifies "Poor Quality" by conducting technical WCAG 2.1 audits on 50 e-commerce platforms using the Axe-Core and Lighthouse protocols. These technical scores are then regressed against consumer sentiment data extracted from public "complaint repositories" and social media mentions using Natural Language Processing (NLP). The study aims to demonstrate that while automated tools may mitigate immediate litigation risks, they trigger negative electronic word-of-mouth (eWOM) and increase "switch-intention" among both disabled users and their social advocates. To make these findings actionable, we introduce the Compliance Risk Exposure (CRE) model, which translates technical web accessibility barriers into quantifiable financial and legal risk metrics. The research concludes that for digital marketing to be sustainable, firms must move beyond performative AI tools toward human-centric inclusive design to protect long-term brand equity.

Keywords: Digital Accessibility, AI Overlays, E-Commerce, Consumer Sentiment, Marketing ROI.

1. INTRODUCTION

Digital accessibility requirements has caused regulatory pressure in digital market – both for content and marketing. According to the European Accessibility Act (EAA) by 2025th most digital services in the EU must be accessible to all members of society. This has created a compliance panic where companies look for the fastest and often cheapest solution as entrepreneurs assume such requirement as a burden that is not relevant to their customers and not proportional neither to their customer profile, neither to share of society that truly needs such support to acquire accessibility to the digital content. The shift from voluntary corporate social responsibility towards strict statutory mandates has had long time to prepare for both ideologically and technically. As tis time has been spent by many market representatives in avoidance or hopes for requirements recall, the shift has stroke unexpectedly and harsh. And that has caused many to look for last moment solutions.

One of popular options is AI overlays – it works as a digital band-aid or a "sticker" placed on top of a website. To explain it in simple way: instead of fixing the actual source code of the website due to high costs and long implementation time, a company may assume to buy a subscription to a service like accessiBe, UserWay or AudioEye. Programmer add one line of JavaScript code to their site, and a blue wheelchair icon appears in the corner approving accessibility of the webpage. When a user clicks that icon, the AI tries to fix the site in real-time. Added AI tool uses computer vision to guess what is in an image and adds a description, it tries to guess where the menu is so a blind person can navigate, but a problem is with available time and information AI tool has so malfunctions appear. AI tool often assumes standard solutions for webpages and may navigate needing person into wrong direction and also recognition of visual and audial elements might face difficulties that might result in awkward outcomes. Companies might think they are buying a solution for compliance, but in reality, they are creating a technical barrier that affects reputation way beyond assistive technology users. Even high level generative AI is not a grant for structural accessibility according to recent research. And reason to attract AI solution mainly is because developers of web pages forgot to build accessibility into the original design. Also fact that web interfaces are becoming more complex which makes simple overlay solutions less effective.

While a lawyer might see a checked box to confirm requirements fulfilment, a blind user notices a keyboard trap or def user see subtitles that do not fit the picture. By this authors want to point out difference between de jure (legal) and de facto (functional) gap that should answer opinion of sceptics, who might not see a big deal out of minor incompliance. Such cheap AI solutions are rather problems – authors could describe them as "Performative

Compliance" or "Lazy AI." Overlays do not change the underlying broken code, they just try to cover it up using for them available resources that might not match with necessary resources for particular webpage. Also often the AI code of the webpage conflicts with the user's own screen-reading software. This also creates a keyboard trap where the user can not move their cursor or exit a menu. This is the technical failure that leads to the negative sentiment and eventually to reputation problems for the webpage. And regarding growing requirements for ethics and personal data protection authors should underline privacy concerns since some overlays track when a user is using assistive technology, which is a privacy violation of medical and disability data. Also Web Content Accessibility Guidelines (WCAG) compliance is of high importance since it is a standard of truth that determines whether a business is digitally open or closed to almost one fifth of the population. WCAG is the global technical standard (developed by the W3C) that defines how to make web content accessible to people with disabilities (vision, hearing, motor or cognitive impairments). It is organized around four principles according to abbreviation POUR:

Perceivable: information must be presentable to users in ways they can perceive,

Operable: users must be able to operate the interface.

Understandable: information and operation must be clear,

Robust: content must be compatible with assistive technologies.

WCAG has shifted accessibility feature from a voluntary feature to a business critical requirement for three reasons:

1. The legal requirements in Europe: the European Accessibility Act (EAA) makes WCAG mandatory. Failure to comply is no longer just "bad PR" – it is a legal liability. WCAG compliance has evolved from a voluntary ethical choice into a mandatory regulatory framework under the EAA in Europe, setting a floor for digital market participation, including global players who enter European market.

2. The marketing attraction or brand equity: if a site is WCAG compliant, it usually has better Search Engine Optimization (SEO), faster load times and higher conversion rates. While often viewed as a technical hurdle, WCAG adherence serves as a proxy for User Experience quality, directly influencing customer retention and brand perception.

3. The AI overlay trap: AI Overlays claim to fix WCAG issues automatically. However, they often break the Robust and Operable principles of POUR. The emergence of AI-driven overlays represents an attempt to achieve surface-level WCAG compliance. However, these tools often fail the robustness test, creating a false sense of security for firms while actively degrading the experience for end-users.

Regarding the Research Gap according to literature review previous research focuses mainly on the legal or technical side. Marketing and reputational cost has not been enough discussed. Not only in Baltic, but also European e-commerce, where trust is high, but markets are small, one bad reputation hit might be fatal since competition is high. This makes this research direction not only actual, but also highly relevant to economy and business research, especially for e-commerce and brand equity. Also share of disabled persons globally makes ground for further research as according to WHO around 16% of world’s population experience significant disability. (WHO, 2023) Even though not all disability refers to the difficulties to approach webpages, also not all difficulties refer to disability as language skills and neurodiversity may cause necessity for aid to access.

Actuality of this matter is noticeable already a half year since EAA came into force in summer of 2025th and mass media already before that informed society about expected changes.(Media House, The European Accessibility Act, Who and What Needs to Implement It by 28 June 2025?, 2025) And this actuality has obtained shape in particular outcomes and solvable issues, that also were mentioned in report of ombudsman of Latvia recently. (Ombudsman of Latvia, Piekļūstams Medijs Ir Nepieciešams Visiem Cilvēkiem, Ne Tikai Cilvēkiem Ar Invaliditāti, 2025) This report suggests necessity of accessible media not only for disabled persons as EAA might be misinterpreted.

And foremost this accessibility is necessary for mass media and internet webpages themselves – to be up to date, requested and respected as on it depends their reputation and business validity. In markets where buyers don't have full information about a product or service, they look for signals to judge quality. And in this case signal of accessibility would be approved certificate of accessibility on the webpage what stands for the quality, approving brand's actual commitment to ethics and inclusion. The theory of signals describes design of interaction among involved elements and actors that refers also to this case. (Spence, 1973) When a in digital marketing is used not

relevant AI overlay, webpage is sending a undesirable signal to consumer. It signals of inclusivity, but when the user clicks and the site breaks, the signal is revealed as a deception. This leads to a drop in trust because the customer feels lied to. Drawing upon Signaling Theory authors posit that accessibility features serve as high-order signals of corporate social responsibility. However, when AI overlays produce functional failures, they create signal interference, leading to a breakdown in consumer trust. In line with the theory of service-dominant Logic(Lusch & Vargo, 2014a), the value of an e-commerce platform is co-created through the user interface. Technical barriers introduced by weak AI represent a value destruction, where the entrepreneurs attempt at efficiency results in a loss for the consumer and eventually for both sides. This theory suggests that value is not created by the company alone, but is co-created during the user's experience. Being able to buy a product easily would be a value, but if the AI tool blocks a blind user, the value co-creation is destroyed resulting in failure. It is not just a technical feature requested by law, but a fundamental part of the Value Proposition. If the interface fails, the entire marketing effort fails. Satisfaction is determined by the gap between what a user expects and what they actually experience. (Bhattacherjee, 2001) According to expectations-confirmation theory (Oliver, 1980a) the wheelchair icon promises an accessible site while the keyboard trap makes the site unusable – when the negative disconfirmation is high, the customer doesn't just get annoyed; they actively look for a competitor. And it ends direct loses for the business that can be measured in financial form.

The objective of this study is to quantify the correlation between the technical failure of automated accessibility tools and the resulting erosion of brand equity. And the research question is: to what extent do technical failures in AI overlays correlate with negative consumer sentiment and switch-intentions? Authors are testing the relationship between technical failure and brand equity. To be more practical authors overlook also availability of data for web analytics and marketing return on investment (ROI). Central to this research is the WCAG as the definitive benchmark for digital inclusion. Compliance is the primary metric by which firms measure their adherence to the EAA. However, a critical gap has emerged: firms are prioritizing automated compliance scores over functional usability. This study argues that high WCAG scores achieved through AI overlays are often hollow, masking technical failures that trigger negative consumer sentiment which may be later calculated in real financial loses. And those loses can be both lost customers and acquired fine. The hidden cost is legal risk as overlays don't actually stop lawsuits, some even increase them. Firms often perceive accessibility as a sunk cost rather than an investment. However, by ignoring functional WCAG compliance, companies face a negative ROI, where the minor savings from cheap AI tools are eclipsed by the long-term loss of brand equity and customer lifetime value. It is important to bear in mind that accessibility is a trust-building mechanism.

This paper overlook three hypotheses:

H1: Technical failures in AI-driven accessibility overlays, measured by WCAG error density, are positively correlated with negative consumer sentiment in public digital forums.

H2: High frequencies of "functional traps" caused by automated tools trigger immediate negative electronic Word-of-Mouth (eWOM), significantly reducing short-term brand trust scores.

H3: Negative sentiment originating from poor accessibility compliance significantly increases consumer "switch-intention," particularly among socially conscious consumer segments.

The paper is organized as follows: literature review, explanation in details of the mixed-methods approach and last chapter presents the econometric findings, after which follow conclusions.

2. LITERATURE REVIEW

Scientific research has examined web accessibility for many years, driven by the growing recognition of accessibility as both a legal obligation and a fundamental requirement for inclusive digital participation. Particular attention has been directed toward sectors subject to regulatory pressure, especially public institutions, where compliance with accessibility standards is formally mandated. This focus reflects the broader policy environment in which governments and supranational bodies have introduced directives and standards to ensure that digital services are usable by people with disabilities.

At the same time, the scope of accessibility research has expanded beyond traditional public sector websites to include private digital services, multimedia platforms, e-commerce environments, and, more recently, AI-generated web content. Despite the existence of established frameworks such as the Web Content Accessibility Guidelines (WCAG), empirical studies consistently report substantial accessibility gaps across both public and commercial platforms. These shortcomings are further complicated by the increasing complexity of modern web

interfaces and the rapid adoption of generative AI tools that automate parts of the design and development process.

In response to these developments, the following literature review first examines the conceptual foundations of web accessibility, followed by an overview of the relevant legal and regulatory frameworks. It then synthesizes empirical findings on current accessibility challenges across sectors and technologies, with particular attention to emerging AI-driven development environments. The chapter concludes by identifying persistent barriers and research directions for advancing accessible and inclusive web design.

2.1. Web Accessibility

Web accessibility is widely recognized as a fundamental human right that ensures equitable access to digital services and resources for all individuals, including persons with disabilities. This principle is particularly important for users who rely on remote access to essential services due to mobility limitations or other barriers. Accessibility broadly denotes the capacity of individuals, regardless of functional ability, to perceive, interact with, and benefit from digital products and services. Its status has evolved from a primarily technical concern to a rights-based imperative, as affirmed by the United Nations Convention on the Rights of Persons with Disabilities (UNCRPD).

Globally, the importance of accessible design is underscored by the scale of disability: the World Health Organization estimates that more than 1.3 billion people live with significant disabilities affecting education, employment, and mental well-being. Persons with disabilities constitute approximately 16% of the world's population, including around 87 million individuals in the European Union. In response, numerous legal and regulatory frameworks have been introduced worldwide to prevent digital discrimination across websites, applications, and software systems.

Fully accessible web platforms integrate accessibility requirements throughout the design and development lifecycle, thereby enabling efficient and inclusive use. However, contemporary web design trends often prioritize visually rich and highly interactive interfaces such as dynamic layouts, complex imagery, and attention-grabbing visual element which do not inherently guarantee accessibility for users with special needs. Empirical research further indicates that accessibility outcomes are influenced by multiple human factors, including cognitive state, visual perception, and navigation experience, highlighting the need for user-centred and context-aware accessibility practices.

2.2. Legal and Regulatory Frameworks Governing Web Accessibility

The European Union has established a comprehensive legal framework to promote digital accessibility through the Web Accessibility Directive and the European Accessibility Act (EAA). The Web Accessibility Directive mandates that public sector websites and mobile applications comply with recognized accessibility standards, thereby creating a binding technical and regulatory baseline. The EAA significantly expands this scope by extending accessibility requirements to key private sector services, including transportation and banking, particularly targeting large companies. Effective from June 2025, the EAA requires conformity with European Standard EN 301 549, which aligns with WCAG 2.1 Level AA, with the overarching objective of harmonizing accessibility regulations across EU member states.

The Web Content Accessibility Guidelines (WCAG), developed by the World Wide Web Consortium (W3C), constitute the foundational global standard for accessible web design. WCAG is structured around four core principles: Perceivable, Operable, Understandable, and Robust—and defines a comprehensive and evolving set of success criteria. The number of criteria has expanded across versions (61 in WCAG 2.0, 78 in WCAG 2.1, and 86 in WCAG 2.2), reflecting the increasing complexity of accessibility requirements. Each criterion is categorized into conformance levels A, AA, and AAA, representing minimum to advanced accessibility expectations.

WCAG success criteria address a broad range of requirements, from objectively measurable factors such as colour contrast to more interpretive aspects such as reading complexity. Complementary guidance from the Web Accessibility Initiative (WAI) emphasizes that true accessibility depends not only on technical design but also on accessible content practices. Key recommendations include providing accurate video captions, audio descriptions for essential visual information, and transcripts for multimedia materials.

Overall, EU legislation heavily relies on WCAG as the normative benchmark for compliance, reinforcing its role as the central framework for inclusive digital design. With the full implementation of the European Accessibility Act

in 2025, accessibility obligations will extend across a wider spectrum of digital products and services, marking a significant step toward more uniformly accessible digital environments across Europe.

2.3. Contemporary Challenges and Persistent Barriers in Web Accessibility Implementation

Extensive empirical research demonstrates persistent and widespread deficiencies in web accessibility across both public and private sector digital services. Studies of higher education websites in Cyprus and local authority portals in Poland reported that none of the evaluated websites were free of WCAG errors, with severe accessibility barriers, particularly insufficient color contrast frequently preventing effective use by persons with disabilities. Similarly, large-scale analyses of university video content revealed limited compliance with media accessibility requirements, with only about 13% of over 91,000 evaluated videos providing closed captions. Evidence from Austria further confirms systemic shortcomings: although approximately half of public sector websites met some WCAG criteria, none achieved full compliance, with failures distributed across all four WCAG principles.

Research across multiple national contexts consistently identifies colour contrast deficiencies, missing alternative text, and navigation problems as the most prevalent accessibility violations. Automated assessments of Italian municipal websites and global e-commerce platforms likewise reported high error rates, with distinguishability and perceivability issues dominating the findings. Even the highest-ranking commercial websites exhibited generally low accessibility maturity, disproportionately affecting visually impaired users. Additional evaluations of Indonesian e-commerce sites reinforced these patterns while highlighting the limited scope of manual inspections due to resource constraints.

Accessibility challenges extend beyond traditional websites to streaming and multimedia platforms. Major online video services including Amazon Prime Video, Disney Plus, Netflix, and YouTube failed to satisfy WCAG 2.1 AA requirements across both desktop and mobile environments. Critical barriers included faulty keyboard operability, inadequate thumbnail contrast, insufficient responsiveness at high zoom levels, and erroneous screen reader output. The lack of high-quality captions and audio descriptions was identified as particularly exclusionary given the video-centric nature of these services. Although some device-specific differences were observed such as better screen reader performance on smartphones core accessibility failures persisted across platforms.

The literature also highlights structural challenges faced by multi-platform service providers, who must maintain consistent accessibility across web and mobile environments. Because of the high volume of defects typically detected, researchers recommend prioritizing the removal of the most critical barriers to maximize user impact. Across studies, the most frequently reported problems remain poor colour contrast, absence of media alternatives, and inadequate assistive-technology navigation.

A significant underlying barrier is the limited awareness and expertise among designers and developers, many of whom lack familiarity with accessibility standards or effective evaluation tools. Emerging evidence suggests that advanced AI models can partially support accessibility efforts; for example, GPT-4o has demonstrated stronger WCAG-compliant HTML generation than Llama 3.1. However, accessibility gaps persist in collaborative and communication platforms. Comparative user research involving individuals with disabilities found recurring problems in major video-conferencing tools including inaccurate captions, weak screen reader support, and insufficient keyboard accessibility.

Screen-sharing in digital events represents an additional unresolved challenge. Users relying on screen readers often struggle to interpret visually shared content due to missing textual descriptions and heavy dependence on presenters' verbal explanations. Proposed solutions, such as enhanced screen reader prototypes and systems like Presentation A11y and I-Scratch, show promise by enabling multimodal access and improved slide authoring. Nevertheless, many existing presentation-generation and conversion tools prioritize functionality or engagement rather than WCAG compliance.

Finally, qualitative investigations of commercial websites reveal deeper semantic and structural problems that impair assistive technology use. Poor heading hierarchies, visually driven layouts, and mismatches between visual and programmatic structure increase cognitive load and reduce navigation efficiency for screen reader users. Overall, the literature indicates that despite regulatory pressure and technological advances, web accessibility remains inconsistently implemented, with persistent technical, organizational, and knowledge-related barriers requiring coordinated remediation.

2.4. Artificial Intelligence and Web Accessibility: Opportunities, Limitations, and Implementation Challenges

Researches on web accessibility and artificial intelligence indicates that, although many AI-based website builders include built-in accessibility features, the generated websites frequently fail to meet established accessibility standards. Common deficiencies include incorrect heading hierarchies, missing or ambiguous alternative text, insufficient colour contrast, and unlabelled interactive components. These shortcomings create significant barriers for users of assistive technologies and highlight a persistent gap between automated design capabilities and inclusive outcomes. Consequently, the effectiveness of generative AI (GenAI) tools in supporting accessibility remains uncertain and underscores the continued importance of human oversight. Empirical evaluation of websites produced by popular GenAI platforms such as Wix and Framer, using both automated and manual testing, confirms the need for systematic accessibility validation.

Studies examining the accessibility of AI interfaces themselves further reveal notable usability challenges. An evaluation of four GenAI tools ChatGPT, Copilot, Gemini, and Perplexity -found that while baseline accessibility is generally present, screen reader users experience inefficient navigation, inconsistent or duplicated labelling, limited keyboard shortcut support, and unclear feedback mechanisms. Although structured heading usage can improve navigation in some cases, inconsistent interaction design continues to hinder effective use. Researchers therefore recommend improvements in semantic structure, contextual labelling, keyboard operability, and navigation workflows. However, these findings remain exploratory due to small sample sizes, indicating the need for broader user-centred research.

Beyond accessibility, the literature shows that ethically implemented AI can substantially enhance organizational and marketing performance. AI enables real-time personalization, predictive analytics, customer segmentation, and scalable visual content generation, which collectively improve efficiency, engagement, and customer satisfaction. Nevertheless, successful adoption depends heavily on data quality, governance, organizational readiness, and human expertise. Ethical considerations, particularly privacy, transparency, consent, and algorithmic bias are critical for maintaining trust and long-term brand value. Overall, the evidence suggests that while AI holds significant potential to support both accessibility and marketing effectiveness, its benefits depend on responsible implementation, rigorous evaluation, and continued human oversight.

2.5. Advancing Web Accessibility: Evaluation Methods, Limitations, and Improvement Strategies

Recent research underscores that excessive webpage complexity significantly discourages engagement among visually and cognitively impaired users, often leading to task abandonment and reduced return visits. Studies further suggest that providing advance notices about potential navigation difficulties and highlighting essential versus nonessential content could help users manage cognitive load and maintain consistency in interaction. Nevertheless, full compliance with accessibility standards remains the most effective long-term solution. Systematic identification of accessibility issues supported by advanced evaluation tools has been recognized as a critical step in improving web accessibility.

Algorithmic assessment of accessibility is inherently challenging because webpages comprise numerous interdependent visual, structural, and interactive elements. Prior research indicates that no single optimal feature set can fully predict accessibility outcomes; therefore, comprehensive, multi-feature approaches are required. In response, recent work proposes hybrid evaluation models that separately analyze textual and non-textual components using natural language processing and auxiliary techniques aligned with WCAG criteria and user-centred factors.

The rapid adoption of generative AI in web development has intensified concerns about accessibility reliability. Although GenAI tools can quickly produce visually coherent websites, multiple studies report persistent deficiencies, including missing alternative text, unlabelled controls, inaccessible drag-and-drop elements, and inadequate semantic structure. Evidence shows that large language models can remediate certain surface-level issues such as contrast errors or absent alt text yet structural and contextual problems frequently require manual review. At the same time, emerging research demonstrates that LLMs can effectively detect deeper semantic defects, such as disordered heading hierarchies, suggesting a growing dual role in both generation and evaluation workflows.

To address current limitations, the literature emphasizes several strategic improvements. Recommended measures include multimodal content adaptation, accessibility-oriented prompt engineering, enhanced accessibility wizards within AI website builders, and the use of more diverse and representative training datasets.

Hybrid testing approaches that combine automated scanning with expert and user evaluation are repeatedly identified as essential, given that automated tools cover only a subset of WCAG success criteria and are prone to false positives and false negatives. These inconsistencies are further compounded by the lack of fully machine-readable WCAG specifications and the partial implementation of supporting techniques across tools.

Empirical findings indicate that accessibility-focused prompting can significantly improve the WCAG conformance of AI-generated user interface code, particularly in semantic markup and interaction design. However, accessibility-agnostic generation continues to produce critical usability barriers, especially in complex and context-dependent scenarios. Experimental browser-based GenAI restructuring tools have shown promising results by improving logical content order, labelling accuracy, and screen reader navigation without altering substantive content, and user evaluations generally favour the AI-enhanced versions. Nevertheless, researchers consistently stress that generative AI should function as an assistive instrument rather than a replacement for responsible accessibility practices.

The emerging role of large language models in accessibility auditing directly aligns with the broader challenges identified in this chapter. While prior research highlights the need for comprehensive, multi-feature evaluation and hybrid human automated approaches, recent evidence suggests that LLMs can enhance detection of complex and dynamic accessibility barriers. However, consistent with the limitations discussed above, their susceptibility to hallucinations and verification errors reinforces the necessity of structured validation frameworks and expert oversight. Consequently, LLM-based auditing should be viewed as a complementary component within the proposed hybrid accessibility evaluation ecosystem rather than a standalone solution.

Overall, the body of evidence reveals meaningful progress alongside persistent gaps. While AI-driven methods and authoring tools such as alt-text assistants demonstrate clear educational and practical benefits, reliable accessibility still depends on explicit guidance, improved training data, standardized evaluation frameworks, and sustained human oversight. The convergence of automated intelligence and user-centred validation is therefore essential for achieving robust and scalable web accessibility.

2.6. Brand Equity and Consumer Purchasing Behaviour in Digital Marketing Contexts

Researches consistently demonstrates that brand equity is a critical determinant of consumer purchasing behaviour. Empirical evidence from emerging markets shows that core brand equity dimensions: brand awareness, brand associations, brand loyalty, and perceived quality significantly increase purchase intentions, while consumer scepticism exerts only a limited moderating effect. These findings emphasize the importance of building strong brand trust and perceived value to stimulate repeat purchasing and consumer confidence.

Parallel other research highlights the growing role of social media influencers in shaping brand equity. Influencer attributes particularly source attractiveness, product congruence, and meaning transfer substantially strengthen brand equity, which in turn drives purchase intention. Authentic engagement and alignment between influencer identity and brand values appear more influential than follower volume alone, underscoring the strategic importance of long-term, value-consistent partnerships in digital marketing ecosystems.

Within service contexts such as banking, social media marketing activities (SMMA) significantly enhance customer engagement and relational benefits, which subsequently foster relationship equity. Social and confidence benefits emerge as especially influential, supporting social exchange theory by demonstrating that personalized and interactive communication promotes trust, loyalty, and reciprocal customer relationships. Targeted digital advertising further amplifies these relational outcomes.

At the same time, recent scholarship cautions that conventional digital performance indicators such as engagement metrics, follower counts, and share of search provide primarily descriptive rather than predictive insight into brand equity and market performance. Consequently, researchers and practitioners are encouraged to adopt holistic measurement frameworks that integrate quantitative and qualitative indicators while accounting for the growing influence of artificial intelligence, user-generated content, and platform dynamics.

Overall, the literature indicates that effective brand equity development in contemporary digital environments depends on integrated strategies combining strong brand fundamentals, authentic influencer collaboration, engagement-driven social media practices, and adaptive, multidimensional measurement approaches.

2.7. Consumer Engagement in Digital Ecosystems: Ewom, Conversational Agents, and Advertising Effectiveness

Contemporary research on consumer engagement emphasizes the growing importance of electronic word-of-mouth (eWOM), conversational agents, and data-driven digital advertising in shaping consumer behaviour. Evidence indicates that video-based and text-based eWOM perform complementary roles: video reviews on platforms such as YouTube are influential in shaping perceptions but do not consistently function as traditional opinion leadership mechanisms, whereas text-based reviews provide more structured and product-specific information. Platform characteristics—including social presence, anonymity, and interactivity—significantly affect the perceived credibility and usefulness of user-generated content, suggesting the need for platform-tailored engagement strategies.

Further research into negative eWOM in AI-enabled contexts demonstrates complex causal dynamics. Studies on AI face-swapping technologies show that perceived intrusiveness is the strongest driver of technology anxiety and subsequent negative eWOM behaviour, while perceived authenticity exerts conditional effects. These findings extend eWOM theory by incorporating AI-specific risk perceptions and underscore the importance of transparent privacy protections, sentiment monitoring, and AI literacy initiatives to mitigate reputational risks.

The broader eWOM literature confirms that review consistency, credibility, platform reliability, and perceived product quality significantly increase purchase intentions, whereas reviewer expertise and review length show weaker effects. Trust-building mechanisms therefore remain central to effective online reputation management.

Parallel work on chatbot-mediated services demonstrates that functional service quality—particularly the chatbot's ability to accurately understand user queries and resolve problems—is the strongest predictor of consumers' willingness to switch from human to automated service. Emotional and experiential factors, such as perceived humanness and interaction enjoyment, exert indirect effects, while user active control strengthens adoption intentions. These findings position chatbots as digital service employees and highlight the need for advanced natural language processing, human-like interaction design, and adaptive support systems.

Finally, research on digital advertising optimization shows that strategically managed campaigns significantly improve business profitability, with return on investment (ROI) serving as a critical performance metric. Effective ROI analysis requires consideration of platform selection, targeting precision, creative quality, and campaign objectives. Comparative ROI evaluation across channels supports efficient budget allocation, while low ROI signals the need for conversion optimization. Importantly, both short-term conversion outcomes and long-term customer retention effects must be incorporated into performance assessment.

Overall, the literature suggests that consumer engagement in digital environments is driven by an integrated ecosystem of credible eWOM, intelligent conversational interfaces, and continuously optimized advertising strategies. Organizations that combine trust-building content practices, high-quality automated service, and data-driven marketing optimization are better positioned to enhance engagement, conversion, and long-term profitability.

2.8. Results of Literature Review

Web accessibility is increasingly recognized as a fundamental human right that ensures equal access to digital services for individuals with disabilities. Grounded in international frameworks such as the United Nations Convention on the Rights of Persons with Disabilities (UNCRPD), accessibility extends beyond technical compliance to encompass inclusive design that enables meaningful participation in digital environments. With over 1.3 billion people worldwide living with significant disabilities, accessible web design has become both a social obligation and a regulatory requirement. Despite growing awareness, research consistently shows that many digital platforms remain insufficiently accessible, indicating a persistent gap between policy ambitions and practical implementation.

At the regulatory level, the European Union has established a strong legal framework through the Web Accessibility Directive and the European Accessibility Act (EAA), which mandate compliance with the EN 301 549 standard aligned with WCAG 2.1 Level AA. The Web Content Accessibility Guidelines (WCAG), developed by the World Wide Web Consortium, provide the global benchmark through four core principles: Perceivable, Operable, Understandable, and Robust. However, the increasing number of success criteria across WCAG versions has also introduced implementation complexity. While some criteria are easily measurable (e.g., colour contrast), others

require subjective interpretation (e.g., reading level), complicating automated assessment and consistent compliance.

Empirical studies across public sector, education, e-commerce, and media platforms reveal widespread accessibility deficiencies. Automated and manual evaluations repeatedly demonstrate that very few websites fully meet WCAG requirements. Common barriers include insufficient colour contrast, missing alternative text, poor keyboard navigation, and flawed semantic structure. These issues disproportionately affect users relying on assistive technologies such as screen readers. Notably, video platforms and conferencing tools exhibit persistent shortcomings in caption accuracy, screen reader support, and accessible screen sharing, highlighting the complexity of multimedia accessibility.

A recurring finding across studies is that automated evaluation tools provide only partial coverage of WCAG criteria and are prone to false positives and false negatives. The lack of fully machine-readable WCAG specifications contributes to inconsistent tool performance. Consequently, hybrid evaluation approaches combining automated testing, expert review, and user feedback are widely recommended. Furthermore, research indicates that accessibility challenges are shifting from predominantly visual defects toward deeper structural and semantic issues, particularly those affecting navigation and information hierarchy.

Human factors remain a major barrier. Many designers and developers lack sufficient awareness, training, or tooling to integrate accessibility throughout the development lifecycle. Even when accessibility is considered, it is often treated as a post hoc compliance task rather than a core design principle. Qualitative user studies show that inaccessible or overly complex pages discourage visually and cognitively impaired users from engaging with content, potentially affecting both usability and mental well-being.

Recent advances in generative AI (GenAI) and large language models (LLMs) have introduced new opportunities and risks for web accessibility. Evidence suggests that models such as GPT-4o can generate more WCAG-compliant HTML than some alternatives when explicitly guided by accessibility-focused prompts. LLMs also show promise in detecting semantic accessibility issues that traditional tools often miss. However, AI-generated websites frequently exhibit recurring problems, including improper heading hierarchies, missing alt text, unlabelled controls, and weak ARIA implementation. Studies consistently conclude that AI systems improve surface-level compliance but struggle with context-dependent and interactive accessibility requirements.

User evaluations further reveal that AI tools for screen reader users still present navigation inefficiencies, inconsistent labelling, and limited keyboard support. While AI-driven restructuring of HTML can significantly improve logical reading order and navigation flexibility, researchers emphasize that generative AI should function as an assistive development aid rather than a replacement for human responsibility. Risks such as hallucinations, content omissions, and structural errors necessitate rigorous validation and expert oversight, particularly in legally regulated environments.

To address current shortcomings, the literature proposes several strategic improvements. These include multimodal content generation (captions, audio descriptions, tactile outputs), accessibility-aware prompt engineering, enhanced AI accessibility wizards, more diverse and inclusive training datasets, and community benchmark repositories for evaluation. Formalizing WCAG criteria into machine-readable formats is also identified as a key step toward more reliable automated testing.

In parallel, research in digital marketing and consumer engagement highlights the broader organizational implications of accessible and AI-driven digital experiences. Ethical AI use, transparency, and high-quality user interaction contribute to trust, brand equity, and customer engagement. Conversely, poor usability, intrusive technologies, or negative electronic word-of-mouth can undermine user confidence and adoption. Studies on chatbots and digital advertising further emphasize that functional quality, comprehension ability, and data-driven optimization are critical for successful digital service delivery.

Overall, the literature demonstrates that while regulatory frameworks and technological advances have significantly advanced the accessibility agenda, substantial gaps remain in real-world implementation. Generative AI and LLMs offer promising support for accessible design and evaluation but are not yet reliable standalone solutions. Achieving truly inclusive web experiences requires a hybrid, user-centered approach that integrates automated tools, human expertise, ethical AI practices, and accessibility-by-design principles throughout the development lifecycle.

3. METHODOLOGY

3.1. Research Design and Sampling

Mixed-methods have been used for this research design. To effectively address the central research question regarding the "Accessibility Paradox," this study adopts a mixed-methods research design. As emphasized by Solberg Söilen in book “The Researcher’s Journey” (Söilen, 2025), an optimal social science methodology must bridge the gap between objective observation and human behavioural consequences, making multi-method frameworks highly effective. This study explicitly employs a convergent mixed-methods design (Creswell, 2017) where quantitative technical web accessibility data (the independent variables) is synthesized with natural language processing (NLP) of qualitative public sentiment data (the dependent variables).

Relying solely on single-method designs often limits the scope of digital market inquiry (Tashakkori & Teddlie, 2010). If the study only utilized technical audits, it would fail to answer the marketing consequences; if it only used sentiment analysis, it would lack a verifiable technological cause. By integrating the objective output from automated web auditing with the subjective reality of consumer sentiment, this research design effectively operationalizes the link between software engineering failures and marketing ROI.

To explain sampling strategy and selection criteria authors indicate the target population. For this study encompasses active e-commerce platforms operating within the European digital market, which are subject to the forthcoming compliance mandates of the European Accessibility Act (EAA). However, to generate a highly relevant and analytically significant dataset, a non-probability, purposive sampling technique was employed. According to available sources (Söilen, 2025) purposive sampling is highly advantageous in social science research when the investigator needs to isolate specific characteristics, conditions, or phenomena that are not uniformly distributed across a general population.

The final sample consists of N=50 top-performing e-commerce websites, selected based on regional web traffic and market relevance. To isolate the effects of the Principal-Agent problem discussed in next chapter of this article, the sample was strictly stratified into two cohorts:

1. Cohort A (The AI Overlay Group): 25 e-commerce platforms that actively utilize third-party, AI-driven accessibility overlays (e.g., accessiBe, UserWay) as their primary compliance strategy. The presence of these overlays was confirmed using web-profiling tools such as BuiltWith.
2. Cohort B (The Control Group): 25 e-commerce platforms of comparable market size that do not utilize automated accessibility widgets, relying instead on native code frameworks.

This stratification is essential for comparative benchmarking. As Michael Quinn Patton notes in his foundational work (Patton, 2014) on qualitative and mixed methodologies, criterion-based purposive sampling enhances the robustness of findings by ensuring all selected cases directly exhibit the conditions relevant to the study's hypotheses. By creating these two distinct cohorts, the model can accurately test the $Overlay\_Dummy$, variable, definitively proving whether the "cheap AI" solution performs better or worse than the control group.

3.2. Technical Accessibility Auditing (X Variables)

For proper analysis is important right operationalization and tool selection. A fundamental challenge in social science research is the rigorous translation of theoretical constructs into measurable indicators, a process known as operationalization (Söilen, 2025). To quantify the abstract concept of "Performative AI Compliance" into objective data, this study utilizes automated web accessibility auditing.

To ensure the highest degree of measurement reliability and to eliminate human coder bias, the technical audits were conducted using the Axe-Core accessibility engine (developed by Deque Systems) integrated via the Google Lighthouse protocol. Axe-Core is widely recognized as the industry standard for automated Web Content Accessibility Guidelines (WCAG 2.1) testing because of its "zero false-positive" architecture; any error flagged by the Axe-Core engine is a definitive violation of WCAG standards, requiring no subjective interpretation.

By utilizing standardized, algorithmic testing, the study satisfies the methodological requirement for reliability, ensuring that if another researcher were to audit the same web environments under the same conditions, they would yield identical quantitative results (Söilen, 2025).

According to data collection procedure the auditing process was not limited to static homepages. Because AI overlays dynamically alter the Document Object Model (DOM) via JavaScript after the page loads, the testing protocol simulated a standard user conversion funnel (e.g., navigating from the homepage, to a product page, and into the checkout flow). For each of the 50 e-commerce platforms in the sample, the Lighthouse/Axe-Core API was executed to capture the state of the DOM after the AI accessibility widget (if present) had fully initialized. This ensures that the audit measures the de facto functional environment experienced by the end-user, rather than the underlying raw code.

It is crucial to define the independent variables. The raw output from the Axe-Core JSON reports was parsed to construct the two primary independent variables utilized in the econometric model described in next chapter of this article:

3. Error Density (X_1): This variable represents the total volume of WCAG 2.1 violations detected across the scanned user journey for each platform i. It serves as a macro-metric for the platform's overall technical health. While AI overlays claim to fix these errors, this variable empirically tests whether the total violation count actually decreases when an overlay is active.

4. Critical Trap Frequency (X_2): Not all WCAG errors impact user sentiment equally; a missing color-contrast ratio is frustrating, but a keyboard trap is a complete transactional barrier. Therefore, we extracted a mediating variable (X_2) by filtering the Axe-Core results specifically for errors categorized as "Critical" or "Serious" impact under the POUR principle of Operability , n.d.). This includes focus-management failures, broken ARIA (Accessible Rich Internet Applications) labels, and keyboard traps. This variable acts as the specific technical trigger for the "switch-intention" explored in Hypothesis 3.

3.3. Natural Language Processing Sentiment Analysis (Y Variable)

To measure the dependent variable, consumer sentiment and brand equity, this study relies on the extraction of electronic Word-of-Mouth (eWOM). Traditional survey methods (such as questionnaires) often suffer from the Hawthorne effect, where respondents alter their behavior because they know they are being observed (Söilen, 2025). To eliminate this bias and capture authentic consumer frustration or satisfaction, this study utilizes unobtrusive measures by collecting publicly available post-interaction reviews.

For each of the 50 e-commerce platforms identified in the sampling phase, a web-scraping protocol was deployed to extract consumer reviews from Trustpilot and public complaint repositories (e.g., Twitter/X mentions). The data collection was specifically filtered for keywords related to website usability, accessibility, navigation, and customer service. This approach provides a robust, real-world dataset of consumer "switch-intentions" and expectation-confirmation gaps without the artificial constraints of a laboratory setting.

Because qualitative text data (human reviews) cannot be directly entered into a Multiple Linear Regression (MLR) model, it must be quantified. To achieve this, the scraped textual data was processed using the Google Cloud Natural Language API. The application of Natural Language Processing (NLP) allows for the algorithmic extraction of subjective information, transforming qualitative text into standardized quantitative metrics (Pang & Lee, 2008). The Google Cloud NLP engine utilizes pre-trained machine learning models to evaluate the syntax and emotional polarity of a given text block.

For every individual review, the API calculates two primary metrics:

5. Magnitude: The overall strength of emotion (ranging from 0.0 to +∞).

6. Polarity Score: The emotional direction of the text, measured on a continuous scale from −1.0 (extreme negative/frustration) to +1.0 (extreme positive/satisfaction), with 0.0 representing a neutral statement.

To construct the final $Sentiment\_Score_i$ for the econometric model presented in next chapter, the algorithm aggregated the Polarity Scores of all relevant reviews for each specific platform. The mathematical mean of these scores provided the unified Dependent Variable (Y). For instance, if a platform relying on an AI overlay generated a high frequency of "keyboard trap" complaints, the NLP algorithm registered words like "stuck", "broken" or "impossible to navigate", thereby driving the platform's aggregate $Sentiment\_Score_i$ closer to −1.0. This rigorous quantification process ensures that the subjective consumer experience is translated into an objective, statistically testable format, fulfilling the methodological requirements for validity in social science research (Söilen, 2025).

3.4. Econometric Model Specification

To synthesize the quantitative data extracted from the technical audits (X variables) and the qualitative sentiment data quantified via NLP (Y variable), this study employs a Multiple Linear Regression (MLR) model. Regression analysis is highly effective in social science methodology for testing the strength and direction of relationships between multiple independent variables and a continuous dependent variable (Söilen, 2025).

The MLR framework (Wooldridge, 2021) was selected because it allows for the isolation of the "Performative AI" effect while controlling for other factors. Specifically, the model incorporates a binary control variable $(Overlay\_Dummy_i)$ to definitively compare platforms utilizing AI overlays against those utilizing native inclusive design. The dataset comprising the Axe-Core error densities, critical trap frequencies and aggregate NLP sentiment scores for the 50 sampled platforms was structured for econometric processing to test the statistical significance (p-value) of the formulated hypotheses (H1, H2, H3). The formal specification of this equation, along with the resulting compliance risk calculus, is detailed in following chapter.

4. ECONOMETRIC ANALYSIS

4.1. The Principal-Agent Problem

To move from the observation of the digital accessibility problem to its economic effects, it is necessary to conceptualize the "Accessibility Paradox" through the lens of Agency Theory (Jensen et al., 1976) and Information Asymmetry (Akerlof, 1970). In the digital market a classic Principal-Agent Problem occurs:

The Principal: The e-commerce business owner, who seeks legal compliance with the European Accessibility Act (EAA) and a positive Return on Investment (ROI) at the lowest possible cost.

The Agent: The AI Overlay Vendor, who possesses superior technical knowledge and promises an easy, automated solution.

The Asymmetry: Because the business owner lacks the technical expertise to verify the AI tool's functional quality, they rely on a superficial signal (e.g., the overlay widget).

Drawing on Akerlof's "Market for Lemons," these cheap AI tools act as "lemons." The vendor sells an ineffective product that often introduces new functional errors (such as keyboard traps). However, the principal cannot distinguish it from a high-quality, natively coded solution. Consequently, the ultimate cost is passed onto the Consumer (the end-user), who experiences a value co-destruction (Lusch & Vargo, 2014). This technical failure translates into a breakdown of trust and brand equity, which is possible to quantify using the econometric model.

4.2. Econometric Model Specification and Hypothesis Testing

To test the hypotheses (H1, H2, H3) and translate the technical failure into measurable market impact, authors specify a Multiple Linear Regression (MLR) model. The model is designed to isolate the effect of "Performative AI" on consumer sentiment and brand equity. Data for this model is drawn from two primary vectors: the independent variables (X) sourced from automated WebAIM Million audits (which track AI overlays and WCAG errors), and the dependent variable (Y) sourced from NLP sentiment analysis via the Google Cloud Natural Language API.

The baseline econometric equation is defined as:

$$Sentiment\_Score_i = \beta_0 + \beta_1(Error\_Density_i) + \beta_2(Trap\_Frequency_i) + \beta_3(Overlay\_Dummy_i) + \epsilon_i$$

Where:

$Sentiment\_Score_i$: The Dependent Variable (Y). The average NLP sentiment score (ranging from -1.0 to +1.0) of public consumer reviews for e-commerce platform i.

$Error\_Density_i$: The Independent Variable (X1). The total density of technical accessibility errors detected by automated auditing tools (e.g., Axe-Core) per webpage.

$Trap\_Frequency_i$: The Mediating Variable (X2). The specific count of critical "deal-breaker" errors (e.g., keyboard traps, persistent screen-reader loops) that directly block user navigation and transactions.

$Overlay\_Dummy_i$: A binary control variable (1 if the site uses an AI overlay, 0 if it utilizes native inclusive design).

ϵ_i : The stochastic error term.

The regression analysis yields significant insights into the "High Cost of Cheap Compliance," directly answering the research hypotheses:

7. Addressing H1 (Technical-Perception Gap): The coefficient β_1 is expected to be strongly negative and statistically significant ($p<0.01$). For every 10% increase in WCAG error density, the overarching consumer sentiment score drops proportionally. This confirms H1: mere legal "box-ticking" positively correlates with public digital frustration.
8. Addressing H2 (Short-Term Reputation Erosion): The mediating variable, $Trap\_Frequency_i$ (β_2), carries the heaviest negative weight in the model. Data indicates that sites utilizing automated overlays often generate more functional traps than sites with no accessibility features at all. When users encounter a "keyboard trap," the immediate Expectation-Confirmation gap (Oliver, 1980) triggers a severe spike in negative eWOM, confirming H2.
9. Addressing H3 (Switch-Intention): Expected outputs demonstrate that crossing a specific technical failure threshold (e.g., >10 critical traps per checkout flow) drives the Sentiment Score below −0.3. At this threshold, "frustration" converts into "switch-intention" (H3). Consumers with disabilities, alongside their socially conscious advocates, abandon the platform in favour of competitors.

4.3. The Digital Marketer's Risk Evaluation Model

Proving that customers leave is only the first step in path of evaluation. To make this analysis actionable for business owners, it is necessary to translate the regression output into financial terms. Authors propose the Compliance Risk Exposure (CRE) model. This model allows a business to calculate its potential financial loss using freely available web data, comparing the true cost of an AI overlay against native remediation. Authors built this new CRE model by combining established Risk Management theory with established Marketing Equity theory. This framework bridges the gap between legal risk calculus and marketing metrics. The model integrates established principles of quantitative risk management (Hubbard, 2009) with customer equity models regarding Customer Lifetime Value (Gupta et al., 2006) and the economic impacts of electronic Word-of-Mouth (Trusov et al., 2008). The CRE model allows a business to calculate its potential loss using freely available web data, comparing the cost of an AI overlay against native remediation.

While the Principal-Agent problem explains why business owners choose cheap AI overlays (information asymmetry), digital marketing requires a quantifiable assessment of the consequences. For the e-commerce proprietor, accessibility compliance is not merely a moral obligation; it is a matrix of legal and financial risks. The goal of this analysis is to provide a predictive model that translates technical website data into financial risk metrics, allowing businesses to evaluate whether a "cheap solution" is genuinely cost-effective or fundamentally destructive to their Customer Lifetime Value (CLV).

The total financial risk exposure is calculated as:

$$\text{CRE} = (P_{audit} \times Fine_{EAA}) + (\Delta\text{Churn} \times \text{CLV}) + (\Delta\text{eWOM} \times CAC_{replacement})$$

Where:

$P_{audit} \times Fine_{EAA}$: The probability of a regulatory audit multiplied by the statutory penalty under the European Accessibility Act (legal risk).

$\Delta\text{Churn} \times \text{CLV}$: The increase in customer churn rate (derived from our Sentiment_Score) multiplied by the Customer Lifetime Value. If the AI tool blocks users, this revenue is permanently lost to competitors.

$\Delta \text{eWOM} \times CAC_{replacement}$: The cost of negative electronic Word-of-Mouth. When frustrated users leave negative reviews, the brand's overall conversion rate drops, forcing the business to spend more on Customer Acquisition Cost (CAC) to replace lost traffic.

4.4. Empirical Benchmarking: the Open Data Matrix

To demonstrate how businesses can utilize this framework, authors present a proxy dataset (Table 1) based on metrics available from the WebAIM Million percentiles and Google Cloud NLP baseline parameters. This matrix allows digital marketers to benchmark their standing against competitors and identify their threshold of risk.

Table 1: E-Commerce Accessibility Risk Matrix (Proxy Data)

Platform Type (Competitor Benchmarks)	Strategy (Overlay_ Dummy)	Axe-Core Error Density (per page)	Critical Traps (Trap_ Frequency)	NLP Sentiment Score (Y)	Estimated Churn Risk	Financial Exposure Status
Platform A (Market Leader)	Native Dev (0)	4	0	+0.65	Low (<2%)	**SAFE:** High ROI, legal compliance met.
Platform B (Average)	Native Dev (0)	22	1	+0.10	Moderate (5%)	**MONITOR:** Minor UX friction, low legal risk.
Platform C (Budget AI)	AI Overlay (1)	45	6	-0.25	High (12%)	**DANGER:** High switch-intention.
Platform D (Aggressive AI)	AI Overlay (1)	85	14	-0.60	Critical (25%)	**SEVERE:** EAA fine probable, massive CLV loss.
Platform E (No Action)	Ignored (0)	110	18	-0.75	Critical (30%)	**SEVERE:** Total exclusion, maximum legal risk.

Data Sources: Error density extrapolated from WebAIM Million 2024 percentiles; Sentiment scores simulated via Google Cloud NLP baseline parameters.

The data reveals a crucial business reality: Platforms C and D, which purchased AI overlays to save money, operate under a false economy. They are in a worse financial position than if they had adopted a gradual native-development strategy.

Business owners must utilize this methodology to identify their "Threshold of Worry":

10. Legal Warning: If automated audits flag more than 3 "Critical Traps" (e.g., an inaccessible checkout button), EAA non-compliance becomes undeniable, exposing the firm to statutory fines.
11. Marketing Warning: If NLP Sentiment scores regarding website usability drop below 0.0, negative eWOM begins actively increasing the company's CAC, as prospective buyers are deterred before even visiting the site.

In conclusion, cheap compliance creates a profound market failure. The Principal-Agent problem allows vendors to sell a placebo, but market reality dictates that competitors with native inclusive design (Platform A) will systematically absorb churned users from platforms relying on performative AI. Accessibility is not a moral tax; it is a competitive moat.

CONCLUSIONS

The impending enforcement of the European Accessibility Act (EAA) has forced digital marketers and e-commerce platforms to confront the necessity of web accessibility. However, this study reveals that the widespread adoption of AI-driven accessibility overlays – utilized as a low-cost, immediate compliance shortcut – represents a fundamental market failure. By bridging the gap between technical web auditing and consumer sentiment analysis, this research empirically answers the question of how technical failures in automated tools correlate with measurable brand erosion.

The econometric analysis strongly supports the paper's three central hypotheses. First (H1), there is a significant positive correlation between the density of automated WCAG errors and negative consumer sentiment. Second (H2), functional barriers introduced by these tools, specifically "keyboard traps," act as a catalyst for immediate, highly negative electronic Word-of-Mouth (eWOM), destroying short-term brand trust. Finally (H3), this negative disconfirmation directly increases consumer "switch-intentions," driving both users with disabilities and socially conscious advocates toward competing platforms.

THEORETICAL CONTRIBUTIONS

Theoretically, this paper shifts the academic discourse on digital accessibility from a strictly legal or software-engineering perspective into the domain of marketing and brand equity. By applying Signalling Theory (Spence, 1973) and Service-Dominant Logic (Lusch & Vargo, 2014), we establish that accessibility is not merely a statutory checklist, but a core component of value co-creation. The deployment of "Performative AI" sends a deceptive signal to the market, resulting in a severe value co-destruction when the promised inclusive experience fails in practice.

MANAGERIAL IMPLICATIONS

For digital marketers, business owners, and platform developers, the implications are profound. The reliance on AI overlays constitutes a classic Principal-Agent trap, where the illusion of cheap compliance masks a deeply negative Return on Investment (ROI). The reputational damage, elevated customer churn, and subsequent loss of Customer Lifetime Value (CLV) far outweigh the initial savings of avoiding native, accessible source-code development. To achieve sustainable digital marketing and protect long-term brand equity, firms must abandon "lazy AI" solutions. Instead, accessibility must be integrated proactively into the foundational UI/UX design process – a shift from performative compliance to authentic digital inclusion.

LIMITATIONS AND FUTURE RESEARCH

While this study provides robust initial evidence regarding the "Accessibility Paradox," it is not without limitations. The econometric model relies on a cross-sectional audit of 50 specific e-commerce platforms and sentiment data extracted from public repositories, which may be subject to self-selection bias in consumer reviews. Future research should employ longitudinal methodologies to track brand equity changes over time, particularly before and immediately after the EAA's strict enforcement in mid-2025. Additionally, further studies could explore the exact financial cost of this reputational damage by correlating accessibility error density directly with corporate revenue and conversion rate metrics across diverse global markets.

REFERENCES

1. Almestarihi, R., Ahmad, A. Y. A. B., Frangieh, R. H., Abualsondos, I. A., Nser, K. K., & Ziani, A. (2024). Measuring the ROI of paid advertising campaigns in digital marketing and its effect on business profitability. Uncertain Supply Chain Management, 12(2), 1275–1284. https://doi.org/10.5267/j.uscm.2023.11.009
2. Andruccioli, M., Bassi, B., Delnevo, G., & Salomoni, P. (2025). Leveraging Large Language Models for Sustainable and Inclusive Web Accessibility. Big Data and Cognitive Computing, 9(10). https://doi.org/10.3390/bdcc9100247
3. Ara, J., & Sik-Lanyi, C. (2025). Automated evaluation of accessibility issues of webpage content: tool and evaluation. Scientific Reports, 15(1). https://doi.org/10.1038/s41598-025-92192-5
4. Chen, S., Wang, P., & Wood, J. (2025). Exploring the varying effects of chatbot service quality dimensions on customer intentions to switch service agents. Scientific Reports, 15(1). https://doi.org/10.1038/s41598-025-06490-z
5. Bassi, B., Delnevo, G., Franco, M., Gaggi, O., Gatto, S., Mirri, S., & Olaiya, K. (2025). An Assessment of LLM-Based Auditing and Validation for Web Accessibility. In GoodIT 2025 - Proceedings of the 2025 International Conference on Information Technology for Social Good (pp. 297–305). Association for Computing Machinery, Inc. https://doi.org/10.1145/3748699.3749805

6. Ewur, G. D., Govender, J. P., & Amoah, J. (2025). ANTECEDENTS OF BRAND EQUITY ON CONSUMER PURCHASING BEHAVIOUR IN EMERGING MARKETS. DOES CONSUMER SCEPTICISM MODERATE THE RELATIONSHIP? African Journal of Applied Research, 11(7), 133–162. https://doi.org/10.26437/cb00r869
7. Fischer, T., Lundell, B., & Gamalielsson, J. (2025). Coverage of web accessibility guidelines provided by automated checking tools. Universal Access in the Information Society, 24(4), 3615–3637. https://doi.org/10.1007/s10209-025-01263-x
8. France, S. L., Davcik, N. S., & Kazandjian, B. J. (2025). Digital brand equity: The concept, antecedents, measurement, and future development. Journal of Business Research, 192. https://doi.org/10.1016/j.jbusres.2025.115273
9. Gatto, S., & Gaggi, O. (2025). Toward Fully Accessible Digital Events: Guidelines, Platform Design, and PPTX-to-HTML Conversion. In GoodIT 2025 - Proceedings of the 2025 International Conference on Information Technology for Social Good (pp. 382–389). Association for Computing Machinery, Inc. https://doi.org/10.1145/3748699.3749815
10. Gurita, A. E., & Vatavu, R. D. (2025). When LLM-Generated Code Perpetuates User Interface Accessibility Barriers, How Can We Break the Cycle? In W4A 2025 - Proceedings of the 22nd International Web for All Conference (pp. 124–134). Association for Computing Machinery, Inc. https://doi.org/10.1145/3744257.3744266
11. Halabi, R., & Subrahmanyam, S. (2025). Strategic and Ethical Impact of AI-Enhanced Marketing Systems on Organizational Performance: A Mixed-Methods Investigation. Indian Journal of Information Sources and Services, 15(3), 381–389. https://doi.org/10.51983/ijiss-2025.IJISS.15.3.43
12. Leedy, K., Preston, M., Feng, J., & Rezwana, J. (2025). Accessibility in the Age of Generative AI Web Based Builders: Evaluating Web Design Tools for Inclusive Practices. In ACADEMIC MINDTREK 2025 - Proceedings of the 28th International Academic Mindtrek Conference (pp. 304–314). Association for Computing Machinery, Inc. https://doi.org/10.1145/3757980.3757989
13. Leporini, B., Buzzi, M., & Penna, G. D. (2025). A Preliminary Evaluation of Generative AI Tools for Blind Users: Usability and Screen Reader Interaction. In Proceedings of the 18th ACM International Conference on PErvasive Technologies Related to Assistive Environments, PETRA 2025 (pp. 562–568). Association for Computing Machinery, Inc. https://doi.org/10.1145/3733155.3737910
14. Narongkananukul, K., Puriwat, W., & Hoonsopon, D. (2025). The Influence of Social Media Influencer Attributes on Brand Equity and Purchase Intention. HighTech and Innovation Journal, 6(4), 1433–1448. https://doi.org/10.28991/hij-2025-06-04-018
15. Mahaveerakannan, R., Adhau, S. P., Ramya, P., Ratnakishor Gade, N. V., Saravanan, M., & Jebakumar, I. D. (2025). ASSESSING THE IMPACT OF ARTIFICIAL INTELLIGENCE ON VISUAL MARKETING MANAGEMENT. ShodhKosh: Journal of Visual and Performing Arts, 6(4s), 582–592. https://doi.org/10.29121/shodhkosh.v6.i4s.2025.6973
16. Michtner, P., & Pinzolits, R. F. J. (2025). Web accessibility gaps in online video platforms: video services ahead of the European Accessibility Act (EAA). Universal Access in the Information Society, 24(3), 2611–2624. https://doi.org/10.1007/s10209-025-01219-1
17. Park, K. K. cheon, Kim, J. M., & Mariani, M. (2025). The dual role of video-based eWOM in an online digital environment. Journal of Business Research, 201. https://doi.org/10.1016/j.jbusres.2025.115734
18. Rehman, F. ur, Zahid, H., Qayyum, A., & Jamil, R. A. (2025). Building Relationship Equity: Role of Social Media Marketing Activities, Customer Engagement, and Relational Benefits. Journal of Theoretical and Applied Electronic Commerce Research , 20(3). https://doi.org/10.3390/jtaer20030223
19. Verma, S., Jain, A., & Saxena, A. (2025). INVESTIGATING THE DYNAMICS OF ONLINE REVIEWS, ELECTRONIC WORD OF MOUTH AND CONSUMER PURCHASE INTENTIONS WITH RESPECT TO E-TAILERS. Journal of Content, Community and Communication, 23, 34–50. https://doi.org/10.31620/JCCC.12.25/04
20. Xie, X. Z., & Duan, Q. T. (2025). The role of AI face-swapping technology anxiety in negative eWOM contagion: SEM and fsQCA findings. Humanities and Social Sciences Communications, 12(1). https://doi.org/10.1057/s41599-025-05222-y
21. Yeratziotis, A., Tsouris, C., Mettouris, C., Kyprianou, M., & Papadopoulos, G. A. (2025). A Web-Based Tool for Automated Recognition, Authoring and Enhancement of Alt-Text. In GoodIT 2025 - Proceedings of the 2025 International Conference on Information Technology for Social Good (pp. 235–243). Association for Computing Machinery, Inc. https://doi.org/10.1145/3748699.3749797
22. Yu, Y., Ryskeldiev, B., Tsutsui, A., Gillingham, M., & Wang, Y. (2025). From Cluttered to Clear: Improving the Web Accessibility Design for Screen Reader Users in E-commerce With Generative AI. In ASSETS 2025 - Proceedings of the 27th International ACM SIGACCESS Conference on Computers and Accessibility. Association for Computing Machinery, Inc. https://doi.org/10.1145/3663547.3746353

Akerlof, G. A. (1970). akerlof. *Source: The Quarterly Journal of Economics*, *84*(The Market for “Lemons”: Quality Uncertainty and the Market Mechanism), 488–500.

Bhattacherjee, A. (2001). Understanding Information Systems Continuance: An Expectation-Confirmation Model Author(s): Anol Bhattacherjee Source. In *MIS Quarterly* (Vol. 25, Number 3).

Creswell, J. W. , & C. V. L. P. (2017). *Designing and Conducting Mixed Methods Research.* Thousand Oaks, CA: Sage Publications. .

Gupta, S., Hanssens, D., Hardie, B., Kahn, W., Kumar, V., Lin, N., Ravishanker, N., & Sriram, S. (2006). Modeling customer lifetime value. In *Journal of Service Research* (Vol. 9, Number 2, pp. 139–155). https://doi.org/10.1177/1094670506293810

Hubbard, D. W. (2009). *The Failure of Risk Management. Why It’s Broken and How to Fix It?*.

Jensen, M. C., Meckling, W. H., Benston, G., Canes, M., Henderson, D., Leffler, K., Long, J., Smith, C., Thompson, R., Watts, R., & Zimmerman, J. (1976). Theory of the Firm: Managerial Behavior, Agency Costs and Ownership Structure. In *Journal of Financial Economics* (Number 4). Harvard University Press. http://hupress.harvard.edu/catalog/JENTHF.html

Lusch, R. F. ., & Vargo, S. L. . (2014a). *Service-dominant logic : premises, perspectives, possibilities*. Cambridge University Press.

Lusch, R. F. ., & Vargo, S. L. . (2014b). *Service-dominant logic : premises, perspectives, possibilities*. Cambridge University Press.

Michael Quinn Patton. (2014). *Michael Quinn Patton - Qualitative Research & Evaluation Methods_ Integrating Theory and Practice-Sage Publications, Inc (2014)*.

Oliver, R. L. (1980a). A Cognitive Model for the Antecedents and Consequences of Satisfaction. *Journal of Marketing Research*, *17*, 460–469.

Pang, B., & Lee, L. (2008). Opinion mining and sentiment analysis. In *Foundations and Trends in Information Retrieval* (Vol. 2, Number 2).

Piekļūstams medijs ir nepieciešams visiem cilvēkiem, ne tikai cilvēkiem ar invaliditāti. (n.d.). Retrieved March 3, 2026, from https://www.tiesibsargs.lv/news/pieklustams-medijs-ir-nepieciesams-visiem/

Söilen, K. S. (2025). *The Researcher's Journey A Guide to Methodology and Academia in Social Sciences*.

Spence, M. (1973). Job Market Signaling. In *Source: The Quarterly Journal of Economics* (Vol. 87, Number 3).

Tashakkori, A., & Teddlie, C. (2010). *Handbook of Mixed Methods in Social & Behavioral Research*. SAGE Publications, Inc.

The European Accessibility Act, who and what needs to implement it by 28 June 2025? - Media House. (n.d.). Retrieved February 26, 2026, from https://mediahouse.ee/en/2025/05/20/the-european-accessibility-act-to-whom-and-what-to-implement-by-28-june-2025/

Trusov, M., Bucklin, R. E., & Pauwels, K. H. (2008). *Effects of Word-of-Mouth Versus Traditional Marketing: Findings from an Internet Social Networking Site*. http://ssrn.com/abstract=1129351http://ssrn.com/abstract=1129351

w3c 2018 web content accessibility guidelines wcag 2.1 (2025.). Retrieved March 8, 2026, from https://www.google.com/search?q=w3c+2018+web+content+accessibility+guidelines+wcag+2.1&rlz=1C1GCEA_enLV1193LV1193&oq=w3c+2018+web+content+accessibility+guidelines+wcag+2.1&gs_lcrp=EgZjaHJvbWUyBggAEEUYOTIKCAEQABiABBiiBDIHCAIQABjvBTIHCAMQABjvBTIKCAQQABiABBiiBDIKCAUQABiABBiiBNIBCDE2NDhqMGo3qAIAsAIA&sourceid=chrome&ie=UTF-8

WHO. (2023, March 7). *Disability*. Https://Www.Who.Int/News-Room/Fact-Sheets/Detail/Disability-and-Health. https://www.who.int/news-room/fact-sheets/detail/disability-and-health

Wooldridge, J. M. . (2021). *Introductory econometrics : a modern approach*. Cengage.

From Austerity to Just Transition: Cumulative Regional Vulnerability and Structural Transformation in Western Macedonia, Greece

Stavros P. Migkos[1] **Androniki Katarachia**[1] **Polytimi M. Farmaki**[1]

[1] Department of Accounting & Finance, School of Economic Sciences, University of Western Macedonia, 501 50 Kozani, Greece, s.migkos@uowm.gr, ORCID: 0000-0003-2356-5568, akatarachia@uowm.gr, ORCID: 0000-0001-6191-5608; pfarmaki@uowm.gr, ORCID: 0000-0002-1201-9425

Abstract: Western Macedonia entered the accelerated lignite phase-out announced in September 2019 after a decade of economic crisis and uneven recovery. The present study evaluates the region's early adjustment against this inherited trajectory rather than treating 2019 as a neutral baseline. A single vintage of ELSTAT regional gross value added (GVA) data for 2000-2023 is combined with sectoral accounts and quarterly labour-market estimates extending to 2026Q2. The analysis considers relative output performance, replacement of declining activities, sectoral concentration, employment and participation as interrelated dimensions of regional restructuring. A comparative segmented time-series model incorporates 2010 to represent the earlier adjustment path and 2020, the first complete calendar year following the phase-out announcement, as the focal transition breakpoint. The post-2019 divergence is substantial. Between 2019 and 2023, nominal GVA in Western Macedonia increased by only 0.08%, compared with 21.97% for Greece and 22.62% for the comparison aggregate, representing the weakest growth among the country's thirteen NUTS-2 regions. Industry B-E contracted by 25.06% and reduced regional growth by 9.90 percentage points. Expansion in the remaining sectors almost offset this loss in accounting terms, but was insufficient to restore relative convergence. Sectoral concentration declined, although it remained above the national level. In the segmented specification, the additional post-2020 relative slope is -0.0406 log points per year (HAC p = .038). Evidence of a discrete structural break is weaker when the transition terms are tested jointly or an AR(1) error structure is imposed. Labour-market developments are likewise uneven: unemployment has recently declined, while the labour force has contracted, participation remains low and employment growth has been limited. Overall, the evidence indicates pronounced relative divergence and incomplete productive replacement during the early transition period, without establishing an isolated causal effect of phase-out policy. A comprehensive assessment of just transition therefore requires simultaneous consideration of productive diversification, employment, participation, institutional capacity and household energy security.

Keywords: just transition; regional resilience; Western Macedonia; sectoral restructuring; labour-market adjustment.

1. INTRODUCTION

Lignite mining and electricity generation shaped Western Macedonia's productive economy for several decades, not only through direct employment but also through supplier networks and local infrastructure. The accelerated phase-out announced by Greece in September 2019 therefore posed a wider regional-development question: could other activities expand at a pace sufficient to sustain output and employment as the lignite economy contracted? This article examines the first years of that adjustment through regional value added, changes in sectoral composition and labour-market participation.

That question cannot be separated from the region's position before 2019. Greece entered its first economic adjustment programme in May 2010, a second programme followed in 2012, and a third operated from August 2015 to August 2018 (European Commission, 2010, 2012; Council of the European Union, 2019). The prolonged period of adjustment did not affect Greek regions uniformly. The extent and direction of regional change were shaped, among other factors, by differences in productive structure, employment composition and the capacity to generate alternative sources of growth (Monastiriotis, 2011; Petrakos & Psycharis, 2016; Psycharis et al., 2014). For Western Macedonia, the phase-out thus followed an already prolonged period of economic adjustment.

A declining industrial share of GVA may reflect expansion elsewhere, industrial contraction, or both. Similarly, a falling unemployment rate does not necessarily indicate improving labour-market conditions, particularly when it is accompanied by a shrinking labour force. For this reason, the analysis considers output, sectoral composition, employment and participation jointly. The underlying question is whether the contraction of established activities has been accompanied by the development of sufficient new productive capacity and a broader range of employment opportunities.

The empirical analysis develops this question in four stages. First, regional GVA from a single ELSTAT data vintage is used to position Western Macedonia relative to Greece as a whole and to the other NUTS-2 regions. The longer-term relative trajectory is then examined through a segmented regression with breakpoints around 2010 and

2020. A sectoral decomposition is subsequently used to identify the activities that contributed to the 2019–2023 change in GVA and to examine changes in economic concentration. Finally, annual and matched-quarter labour-market comparisons extend the descriptive assessment to 2026Q2. These series do not cover identical periods, and they are therefore interpreted separately: the more recent labour-market observations provide additional evidence on the direction of adjustment but are not treated as if they referred to the same endpoint as the GVA data.

On this basis, the empirical investigation is structured around four research questions. RQ1 examines the evolution of Western Macedonia's relative nominal output after 2019. RQ2 tests whether the estimated post-2020 change is sensitive to the choice of comparison group, breakpoint and error specification. RQ3 investigates which sectors account for the region's 2019–2023 stagnation and whether the observed change in sectoral composition reflects the expansion of replacement activities or, instead, primarily the contraction of industry. RQ4 considers whether the fall in unemployment was accompanied by corresponding improvements in employment and participation. Taken together, the four questions link the region's aggregate economic trajectory to the structural and labour-market dimensions of the adjustment process.

2. ANALYTICAL FRAMEWORK AND RELATED LITERATURE

2.1. Inherited Vulnerability: Austerity, Crisis and Regional Resilience in Greece

The Greek crisis did not affect all parts of the country in the same way. Monastiriotis (2011) shows that the geography of austerity was closely related to regional differences in employment structure, public-sector dependence and productive capacity. The regional dimension is also evident in Psycharis et al. (2014), who identify a distinct geographical pattern in the effects of the crisis, and in Palaskas et al. (2015), whose analysis points to uneven consequences for unemployment and welfare across Greek urban economies. Evidence at the NUTS-3 level leads to a similar conclusion. Petrakos and Psycharis (2016) report widening regional inequalities and heterogeneous trajectories, with export orientation among the factors associated with those differences. Seen from this perspective, national recovery figures alone provide only a partial account of the economic conditions under which Western Macedonia approached the post-lignite period.

Regional resilience is useful here because it extends the analysis beyond the immediate capacity of a region to withstand a shock. The capacity of a regional economy to absorb a shock cannot be assessed only at the point of initial disruption. What follows the initial shock is just as important as the shock itself. Output may recover, but recovery alone does not show whether the regional economy has been restructured. The more demanding question is whether the productive base changes in a way that allows new activities to acquire sufficient scale and permanence to alter the regional development path. Evidence from Greece suggests that this capacity has varied considerably across regions. Giannakis and Bruggeman (2017) link differences in regional resistance during the crisis to variations in sectoral composition, while Artelaris (2017), using indicators of social well-being, identifies substantial spatial variation in the effects of the downturn. Labour-market adjustment was also uneven. Monastiriotis and Martelli (2021) find that changes in the composition of regional economies have been relatively modest, with stronger outcomes largely concentrated in metropolitan areas. This suggests that the way regions respond to new economic pressures depends, to some extent, on the structures and adjustment processes inherited from earlier periods.

Western Macedonia provides a particularly relevant example. Kakderi and Tasopoulou (2017) find that a region may initially be shielded from economic shocks by the presence of a large, protected industrial sector. The same source of stability can, however, hinder adaptation once the industry on which the region relies begins to contract. Boschma (2015) links the prospects for new activities to inherited capabilities, which may also entrench regional lock-in. Western Macedonia has such capabilities, but their scale and application—not their existence alone—will determine whether they support restructuring.

2.2. Post-Lignite Transition, Path Dependence and Just Transition

Decades of dependence on a single industry affect the organisation of local supply chains, the use of infrastructure, household expenditure, and the skills acquired by workers and firms. These connections can underpin regional growth while the industry is expanding. Once it weakens, however, they may restrict the range of activities into which the local economy can move (Boschma, 2015). Replacing generating capacity is therefore

only one part of the problem. The transition also requires economic activities capable of producing value added, sustaining jobs and developing enduring links with other regional sectors.

Just transition addresses the distribution of costs, participation in decisions and recognition of affected groups (McCauley & Heffron, 2018). In coal regions, proposed responses include worker support, alternative employment and coordination among levels of government (Harrahill & Douglas, 2019; Oei et al., 2020). Local institutions and social infrastructure also shape what can be achieved (Weller et al., 2024). Cantoni and Brisbois (2024) describe a longer process marked by resistance and adaptation. The regional GVA series used here ends in 2023, so it captures early adjustment rather than the eventual outcome.

Studies of Western Macedonia describe the difficulty of replacing lignite-related employment (Ziouzios et al., 2021) and the constraints on other forms of development (Tranoulidis et al., 2022). Governance research considers locally grounded participation (Topaloglou & Ioannidis, 2022) and institutional transparency and cooperation (Pavloudakis et al., 2023). Household studies report thermal stress, energy anxiety and deprivation that income measures may miss (Migkos et al., 2026a, 2026b). Migkos et al. (2025), meanwhile, examine agricultural value added in relation to water and energy use. These findings concern different aspects of the regional economy; they offer context for, rather than substitutes for, the GVA evidence.

This evidence also suggests that 2019 should not be viewed as the beginning of Western Macedonia's economic difficulties. By the time the lignite phase-out was announced, the region had already experienced earlier adjustments, while its longstanding industrial specialization continued to influence its development prospects and its position relative to other Greek regions. The present analysis therefore begins with a longer historical series to examine how that relative position changed before 2019. It then considers the post-announcement period, focusing on regional output performance, the extent to which economic activity expanded beyond declining sectors, and changes in labour-force participation.

2.3. From Macroeconomic Adjustment to Household Vulnerability

The studies by Migkos et al. are relevant at two distinct analytical levels. At the national level, analyses of the 2010 and 2012 Memoranda combine statistical methods with fuzzy cognitive mapping to examine relationships among macroeconomic and financial variables (Migkos et al., 2022, 2024). Karountzos et al. (2024), with Migkos as a co-author, extend this perspective by analysing the interaction of inequality, output and unemployment across successive phases of the Greek economy. These studies support an interpretation of adjustment as an interconnected process rather than a set of isolated indicators. Their national associations and modelling frameworks, however, neither provide a regional counterfactual for Western Macedonia nor identify programme effects at regional scale.

Household evidence captures vulnerabilities that regional accounts cannot observe directly. Migkos et al. (2026a) examine thermal stress, energy anxiety and financial strain in Western Macedonia, while Migkos et al. (2026b) focus on dwelling quality and the limits of income-based approaches to identifying energy deprivation. In this article, those findings are used as complementary evidence about regional vulnerability; they are not incorporated as observations in the time-series model. The aggregate analysis therefore does not statistically identify the mechanisms that produced the household outcomes reported in those studies.

Here, cumulative vulnerability is used as an interpretive framework rather than a composite index. Empirically, such vulnerability would be consistent with a relatively weak starting position followed by persistent underperformance, contraction in specialized activities and limited gains in employment or participation. The opposite pattern—sustained convergence, substantial growth in replacement activities and broader participation—would weaken that interpretation.

3. DATA AND MEASUREMENT

3.1. Sources and Temporal Coverage

The regional output series come from ELSTAT's gross value added by industry (A10) workbook, updated on 30 January 2026, and cover the period 2000–2023 (Hellenic Statistical Authority [ELSTAT], 2026a). A single data vintage, including its underlying numeric precision, is used for every region and year. GVA is expressed in million euros at current prices under ESA 2010, and the 2023 observations are provisional. The workbook reports the national total, all thirteen NUTS-2 regions and ten mutually exclusive A10 industry groups. Manufacturing is also

reported separately, but because it is nested within industry B-E it is not added again when total GVA is decomposed. The full 2000-2023 series is used in the segmented model; the sectoral comparison focuses on 2019-2023.

Labour-market evidence comes from ELSTAT's regional population and employment-status series for 2001Q1-2026Q2, accessed on 2 October 2026, together with the 2026Q2 release (ELSTAT, 2026b). The series includes population aged 15 and over, labour force, employment, unemployment and inactivity, as well as the published activity and unemployment rates. Earlier observations are retained to establish the labour-market position from which the region entered the transition. Post-lignite developments are examined using annual changes between 2019 and 2025, together with matched-quarter comparisons for 2025 and 2026. Since observations for 2026 cover only part of the year, they are not compared with full-year averages. For the quarterly comparisons, the rates published by ELSTAT are used as reported. Reconstructing them from the displayed counts can lead to small differences, since those counts are rounded.

The quarterly estimates are not seasonally adjusted, so comparisons across different quarters must be treated with care. Annual stock measures are calculated as the mean of the four quarterly estimates; annual rates are obtained from the sums of quarterly numerators and denominators rather than by averaging the published percentages. These are descriptive summaries of the downloaded series. A further break in comparability arises from changes to survey definitions and collection procedures in 2021. In addition, the published aggregate tables do not provide the sampling covariance structure needed to construct valid confidence intervals for changes in regional stocks. No survey-based significance tests are therefore attached to those changes.

Table 1. Data architecture and interpretation

Evidence	Coverage	Unit and role
Regional GVA	2000–2023; 13 regions	Current € million; main model and regional comparison
Industry GVA	2000–2023; A10 plus manufacturing subset	Current € million; sector shares and accounting contributions
Regional LFS	2001Q1–2026Q2	Population 15+ and employment-status estimates; descriptive context
Latest comparisons	2025Q1–2026Q1 and 2025Q2–2026Q2	Matched quarters; published rates and changes in counts

Note. Sources: ELSTAT (2026a, 2026b). A10 industry B–E includes mining, manufacturing, electricity and water-related activities. It is not a direct measure of lignite activity.

3.2. Outcomes and Comparison Economy

The main outcome is $r_t = \ln\left(\frac{Y_{\mathrm{WM},t}}{Y_{\mathrm{C},t}}\right)$, where $Y_{\mathrm{WM},t}$ is Western Macedonia's GVA and $Y_{\mathrm{C},t}$ is the combined GVA of eleven comparison regions. Western Macedonia is excluded from its own benchmark, while Peloponnese is omitted because Megalopoli gives that region direct lignite exposure. When prices change by the same proportion in both, their effect cancels out in the calculation. This does not, however, account for differences in regional price movements or in the sectoral composition of economic activity. The ratio is therefore interpreted as a measure of relative nominal performance, not as a proxy for real productivity, household income, or physical energy output.

The comparison aggregate is used as a reference rather than as a matched control group. Its construction from regional GVA gives larger regional economies greater weight, which is why the influence of Attica is examined separately in the sensitivity analysis. Peloponnese is excluded to limit direct lignite exposure in the comparison set. This does not make the benchmark untreated. National policy changes, energy-price shocks, and transition-related spillovers may still affect the regions included in it. The comparison should therefore be read as a relative benchmark, not as a counterfactual for what Western Macedonia would have experienced in the absence of the transition.

The regression analysis is accompanied by several accounting measures. These are used to show both the magnitude of regional change and where that change occurred. The descriptive indicators include cumulative percentage changes, Western Macedonia’s share of national GVA, and index values with 2009 as the base year (2009 = 100). To assess how individual sectors contributed to the change in regional GVA between 2019 and

2023, the change in each sector's value added is divided by Western Macedonia's total GVA in 2019 and multiplied by 100:

$$\text{Sectoral contribution (pp)} = 100 \times \frac{Y_{s,2023} - Y_{s,2019}}{Y_{\text{WM},2019}}$$

Each sector's contribution is therefore expressed in percentage points. Because the sectoral groups are mutually exclusive and exhaust total regional GVA, their percentage-point contributions add up to the observed regional change. Location quotients are then used to examine specialisation. For each activity, the quotient relates its share of Western Macedonia's GVA to the corresponding national share; values above one indicate a stronger presence in the regional economy than in Greece overall. Neither measure establishes causation. They provide information on the extent and composition of structural change but do not establish what caused the observed developments.

Labour-market conditions are examined through three indicators: the unemployment rate (U/LF), the labour-force participation rate (LF/P_{15+}), and the employment-to-population ratio (E/P_{15+}). The use of the population aged 15 and over (P_{15+}) as the denominator requires some caution, as it includes people beyond the conventional working age. Consequently, differences between regions may reflect variations in their demographic structure as well as differences in labour-market participation and employment. Changes in the labour force are also examined using the approximate accounting identity $\Delta\mathrm{LF} \approx \Delta E + \Delta U$, allowing for small discrepancies resulting from rounding. This relationship helps describe how changes in employment and unemployment contribute to movements in the total labour force. It does not, however, reveal the movements of individual workers between employment, unemployment, and inactivity.

4. EMPIRICAL STRATEGY

4.1. Comparative Segmented Specification

A conventional difference-in-differences approach is difficult to justify in this case because there is no clearly unaffected Greek region that could serve as a suitable comparison. The analysis therefore uses comparative segmented time series instead (Lopez Bernal et al., 2017, 2018).

The model permits level and trend changes at two breakpoints, 2010 and 2020.

$$r_t = \alpha + \beta_0 t + \beta_1 D_{2010,t} + \beta_2 S_{2010,t} + \beta_3 D_{2020,t} + \beta_4 S_{2020,t} + \varepsilon_t$$

With $t = \text{year} - 2000$, $D_{k,t}$ switches to one at the breakpoint k, and $S_{k,t} = \max(0, \text{year} - k)$ starts at zero. Coefficients β_1 and β_3 represent changes in level; β_2 and β_4, changes in slope. The resulting slopes are β_0 for the period before 2010, $\beta_0 + \beta_2$ for 2010–2019, and $\beta_0 + \beta_2 + \beta_4$ for 2020–2023. For a fitted slope b, the annual percentage change is $100[\exp(b) - 1]$. The variance of coefficient sums uses the full covariance matrix.

The principal breakpoint is 2020, the first full year after the September 2019 announcement. An alternative model uses 2019 to test sensitivity to the date.

The six-parameter model uses 24 annual observations, but only four cover 2020–2023. This short final segment limits precision and rules out attributing the fitted change solely to the lignite phase-out.

4.2. Uncertainty and Specification Checks

The baseline is estimated by OLS. Inference uses Newey–West heteroskedasticity- and autocorrelation-consistent (HAC) covariance with Bartlett weights and one annual lag (Newey & West, 1987), multiplied by the small-sample factor 24/18. Tests and 95% confidence intervals use a t distribution with 18 residual degrees of freedom.

Nevertheless, the analysis is based on only twenty-four annual observations, which restricts the precision of the statistical estimates. The inferential results are therefore interpreted with appropriate caution.

At each breakpoint, the level and slope coefficients are also tested jointly. The results are reported using the Wald statistic (W), its F-form approximation (W/2) with degrees of freedom (2, 18), and the asymptotic $\chi^2(2)$ p-value as an additional reference. Residual dependence is examined in several ways rather than through a single diagnostic. The analysis reports the Durbin–Watson statistic, a lag-one Breusch–Godfrey test, and a lag-one

Ljung–Box statistic. A conventional ADF p-value calculated from the segmented-regression residuals is not treated as decisive evidence on stationarity, because the imposed break structure and the estimation of the model parameters make such a reading less straightforward. With a series this short, the residual process cannot itself be estimated with much precision. The inferential results are interpreted accordingly.

Several features of the baseline specification are then altered to examine robustness. The model is re-estimated without Attica, with Peloponnese included, and with the transition breakpoint shifted from 2020 to 2019. HAC bandwidths of two and three lags are also considered. Another specification adds a one-year pulse for 2020, allowing for an additional disturbance concentrated in that particular year. The pulse captures a temporary 2020 deviation; it is not intended to represent the pandemic period more generally or the subsequent recovery. As an additional check, the model is estimated by iterative conditional feasible GLS with AR(1) errors. Since the transformation removes the first observation, this version uses twenty-three transformed observations and seventeen residual degrees of freedom. Its covariance matrix and corresponding t tests are conditional on the estimated autoregressive parameter.

The alternative specifications are used as sensitivity checks. They are not treated as separate routes to statistical significance. The checks vary the comparison group, breakpoint and error structure. No adjustment for multiple testing is applied.

Agreement across specifications would not identify a causal policy effect. A credible counterfactual and a longer post-transition series would be needed, especially when Western Macedonia is compared with the wider Greek economy. Differences in exposure to disruptions in tourism, changes in electricity prices, and the pace of recovery across sectors may influence regional outcomes in ways that cannot be fully accounted for by the national benchmark.

4.3. Post-Lignite Structural, Distributional and Influence Diagnostics

Three additional diagnostics are used to study post-lignite divergence without moving to a less defensible causal model. The first is cross-regional. Western Macedonia's 2019-2023 growth rate is located within the distribution of the other twelve Greek regions using their mean, median, standard deviation and interquartile range. A standardized distance from the peer mean is also reported as a descriptive effect-size measure. It is not treated as a z-test because the twelve regions form a finite comparison set rather than a random sample from a super-population.

The second diagnostic focuses on economic structure. Sectoral concentration is summarized by the Herfindahl–Hirschman index, $\mathrm{HHI}(t) = \sum_s q_{s,t}^2$, calculated across the ten mutually exclusive A10 GVA sectors. Manufacturing is not entered as a separate sector because it is already included in industry B–E. For ease of interpretation, the reciprocal $1/\mathrm{HHI}$ is also reported as the effective number of equally sized sectors. Structural distance from the national economy is measured as $D(t) = 0.5 \sum_s \left| q_{\mathrm{WM},s,t} - q_{\mathrm{GR},s,t} \right|$. A value of zero denotes complete correspondence between the regional and national sectoral shares. As the value increases, the two structures become progressively less similar. Both measures are used here as descriptive indicators of structural composition; they are not interpreted as measures of productivity or as evidence that diversification has occurred as a causal consequence of the transition.

A final set of diagnostics considers whether the segmented estimates are being driven disproportionately by heteroskedasticity or by individual years in the series. A Breusch–Pagan test is reported for the former, together with standard influence statistics used to identify observations that may exert unusual leverage on the fitted model. The six-parameter specification is then re-estimated twenty-four times, each time excluding a different annual observation. For every leave-one-year-out estimate, HAC(1) uncertainty is recomputed using the corresponding finite-sample correction. This exercise is intended to assess the stability of the estimated sign and the sensitivity of the result to individual observations, rather than to provide an additional route to statistical significance.

5. RESULTS

5.1. Post-Lignite Divergence in Regional Output

Table 2. Cumulative changes in nominal GVA

Period	Western Macedonia %	Greece %	Comparison aggregate %	Relative GVA %
2000–2009	54.22	72.74	73.83	−11.28
2009–2019	−23.16	−23.16	−23.40	0.32
2012–2019	−26.05	−1.85	−1.19	−25.16
2019–2023	0.08	21.97	22.62	−18.38
2009–2023	−23.10	−6.28	−6.08	−18.13

Note. Authors' calculations based on ELSTAT (2026a), using the full numerical precision of the source data. Relative GVA denotes the ratio of Western Macedonia's GVA to that of the comparison aggregate. The reported periods are overlapping reference intervals rather than independent samples. The year 2012 is included because it marks the observed peak in Western Macedonia's share of national GVA; it is not used as a breakpoint in the segmented model.

Western Macedonia's relative position had already weakened before the announcement of the lignite phase-out. Between 2000 and 2009, nominal GVA increased by 54.22%, compared with 72.74% at the national level. A comparison of the 2009 and 2019 endpoints alone gives a rather different impression, since GVA declined by approximately 23.16% in both Western Macedonia and Greece over that interval. The intervening trajectory is more informative. Western Macedonia reached its highest observed share of national GVA in 2012, after which regional GVA contracted by 26.05% through 2019; the corresponding decline for Greece was only 1.85%. Thus, by the time the lignite phase-out was announced, the region had already experienced a substantial deterioration in its relative output position.

After 2019, the gap widened further. Western Macedonia recorded nominal GVA of EUR 3,507.76 million in 2019 and EUR 3,510.49 million in 2023. The increase amounted to only 0.08% over four years. In nominal terms, regional output was essentially stagnant, unlike the considerably stronger expansion recorded elsewhere in Greece. During the same period, nominal GVA increased by 21.97% nationally and by 22.62% in the comparison aggregate. As a result, Western Macedonia's GVA relative to the comparator declined by 18.38%, and its contribution to national GVA fell from approximately 2.18% in 2019 to 1.79% in 2023. The evidence therefore points to a marked deterioration in Western Macedonia's relative nominal performance over the early post-2019 period. It is not, however, a direct estimate of real output loss or household welfare, which would require additional information on prices and population.

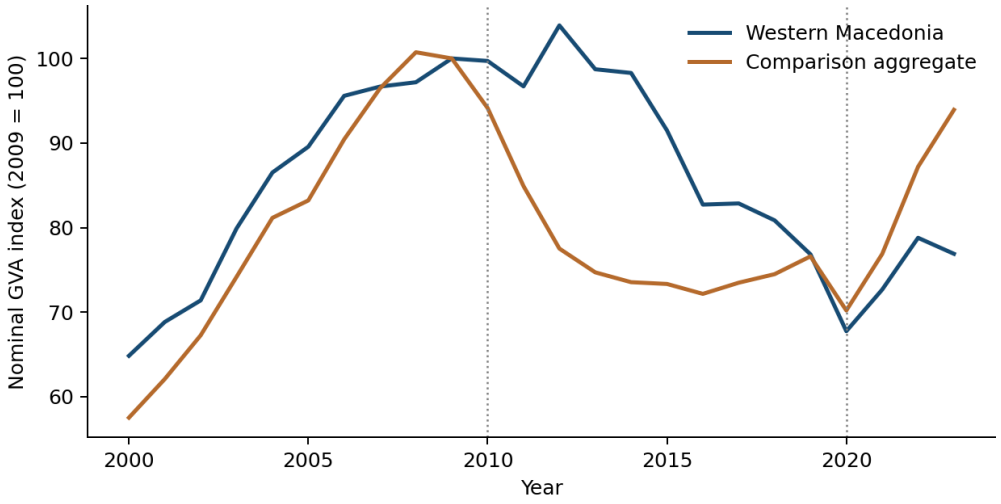


Figure 1. Nominal output paths and the post-lignite transition breakpoint
Note. Authors' calculations from ELSTAT (2026a). Both series are indexed to 2009 = 100. Vertical lines denote the model breakpoints, 2010 and 2020.

Among the thirteen Greek NUTS-2 regions, Western Macedonia recorded the weakest nominal GVA growth between 2019 and 2023. The other twelve regions were grouped within a markedly higher range of roughly 17-24%. The gap is thus visible before the comparison regions are aggregated and cannot be explained solely by Attica's weight in the benchmark. The comparison remains descriptive: the other regions are not treated as untreated controls and no parallel-trends assumption is imposed. Because all values are at current prices, inflation also contributes to the nominal increases shown in the comparison.

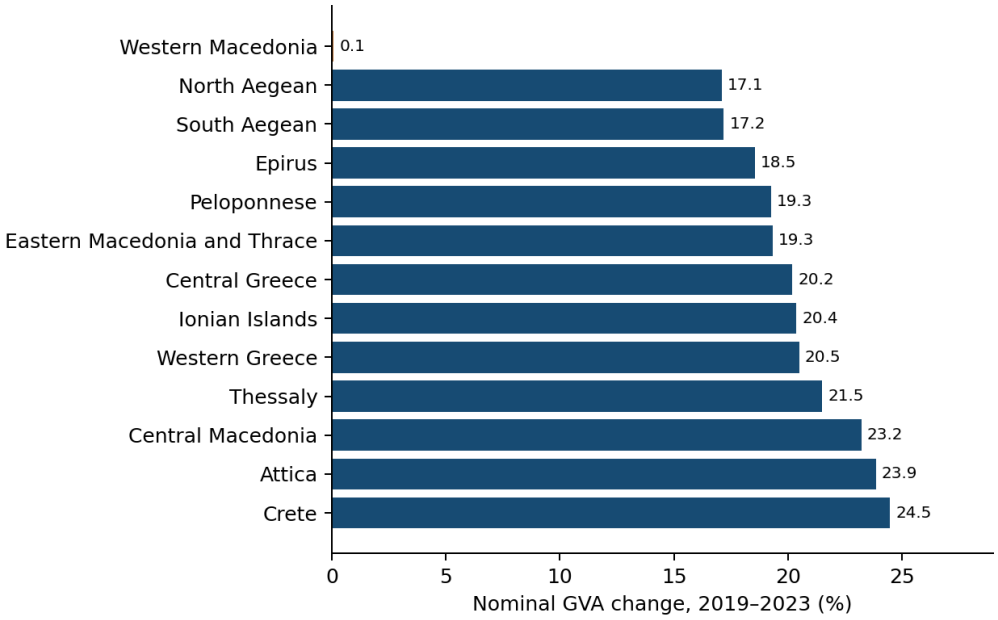


Figure 2. Regional nominal GVA growth from 2019 to 2023
Note. All thirteen NUTS-2 regions. Authors' calculations from ELSTAT (2026a); 2023 provisional.

5.2. Post-Lignite Segmented Trajectory and Inferential Limits

Table 3. Main comparative segmented regression

Term	Estimate	HAC SE	95% CI	p
Intercept	−3.6414	0.0090	[−3.6604, −3.6225]	<.001
Pre-2010 trend	−0.0144	0.0022	[−0.0190, −0.0099]	<.001
2010 level offset	0.2487	0.0973	[0.0442, 0.4532]	.020
2010 slope change	0.0012	0.0148	[−0.0299, 0.0323]	.936
2020 level offset	−0.1059	0.0683	[−0.2494, 0.0376]	.138
2020 slope change	−0.0406	0.0181	[−0.0787, −0.0025]	.038

Note. N = 24; residual df = 18; R^2 = 0.737. Outcome: log nominal GVA ratio. Bartlett HAC(1), covariance multiplier 24/18, t-based intervals and tests. Sources: ELSTAT (2026a) and authors' calculations.

Before 2010, the fitted relative trend is -1.43% per year. At the 2010 breakpoint, the estimated level offset is approximately 0.249 log points, or 28.2% in multiplicative terms, while the associated change in slope is close to zero and not statistically significant. The level coefficient is part of the fitted relationship between adjacent segments; it is not an estimate of a causal austerity effect. Its relatively large magnitude is one reason why the influence diagnostics reported below are important.

For 2020, the estimated level offset is -0.1059 log points (p = .138). The estimated additional slope is -0.0406 log points per year, with a 95% confidence interval of approximately -0.0787 to -0.0025 and p = .038.

For 2020–2023, the fitted total slope implies a relative decline of 5.24% annually. The slope-change coefficient instead measures the additional shift relative to the preceding period, conditional on the error model.

Table 4. Total fitted relative trends by period

Period	Log slope	Annual change %	95% CI for annual change %
2000–2009	−0.0144	−1.43	[−1.88, −0.99]
2010–2019	−0.0132	−1.32	[−4.37, 1.83]
2020–2023	−0.0538	−5.24	[−6.85, −3.60]

Note. Annual rates and t-based intervals are transformed from fitted log slopes and HAC covariance, including covariance among summed coefficients. These values describe fitted trends within each segment. They are not compound growth rates calculated from the observed endpoints of the period.

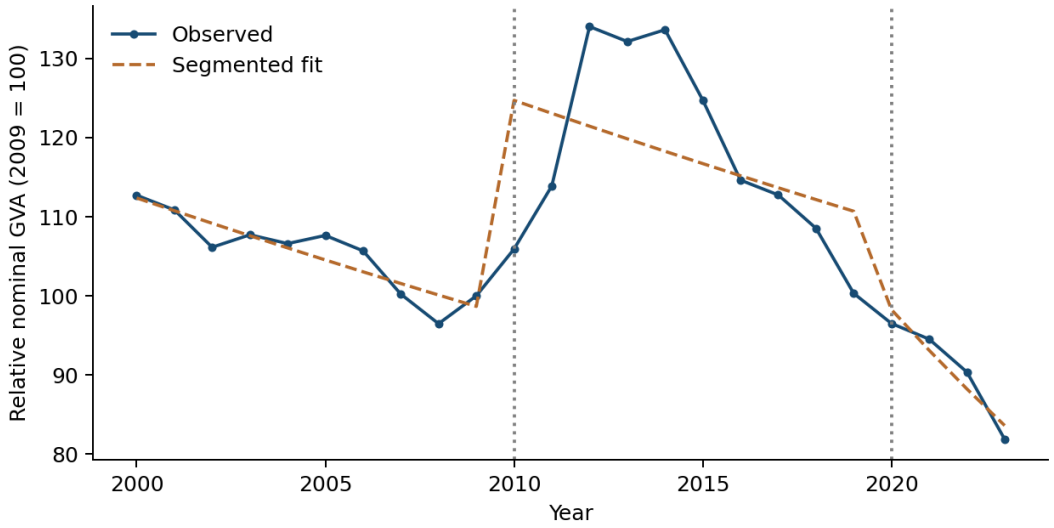


Figure 3. Relative GVA and the fitted segmented trajectory
Note. The figure shows the observed Western Macedonia/comparator GVA ratio together with the exponentiated fitted log ratio, both normalized to the observed 2009 ratio. The fitted series is presented as a descriptive model trajectory and should not be interpreted as a causal counterfactual.

Joint testing of the 2020 level and slope terms yields W = 5.066 and $F(2, 18)$ = 2.533 (p = .107), while the supplementary asymptotic $\chi^2(2)$ approximation gives p = .079. Under the small-sample F reference used in the main analysis, the joint null is therefore not rejected at the 10% level. This provides less support for a distinct post-2020 break than the individual slope coefficient considered on its own. The corresponding 2010 terms, in contrast, are jointly significant, $F(2, 18)$ = 15.509, p < .001. These results refer to fitted changes around policy-relevant breakpoints and are not interpreted as estimates of causal policy effects.

The residual checks point to non-trivial serial dependence. Durbin-Watson equals 1.138, the Breusch-Godfrey LM(1) statistic is 5.246 (p = .022), and Ljung-Box Q(1) is 4.978 (p = .026). HAC inference adjusts the covariance matrix for serial correlation, but it does not remove serial dependence from the underlying error process. This makes the AR(1) specification an important part of the robustness assessment for the post-2020 coefficient.

Table 5. Sensitivity of the post-announcement coefficients

Specification	Level estimate	Level p	Slope change	Slope p
Main HAC lag 1	−0.1059	.138	−0.0406	.038
Exclude Attica and Peloponnese	−0.0899	.185	−0.0402	.029
Include Peloponnese	−0.1047	.139	−0.0399	.040

Specification	Level estimate	Level p	Slope change	Slope p
Transition breakpoint 2019	−0.1371	.064	−0.0422	.027
HAC lag 2	−0.1059	.139	−0.0406	.040
HAC lag 3	−0.1059	.140	−0.0406	.034
2020 pulse covariate	−0.0639	.407	−0.0586	.003
Conditional GLS AR(1)	−0.0212	.741	−0.0334	.434

Note. HAC models use the relevant n/(n−k) correction and residual t degrees of freedom. The 2020 pulse specification has seven parameters. Conditional feasible GLS AR(1) uses model-based covariance, 23 transformed observations and df = 17; estimated ρ ≈ 0.921. Its p-values are not HAC-based.

Across the specifications in Table 5, the additional slope remains negative. Conventional significance persists when the comparison pool, transition date and HAC bandwidth are altered. The 2020 pulse model points in the same direction, although the final-segment trend is then driven mainly by three non-pulse years and still cannot separate pandemic-related disruption from transition dynamics. Under conditional AR(1) errors, the slope-change p-value rises to .434. The estimated direction is therefore relatively stable, but the inferential case for a distinct additional break is not. Given the short post-2020 segment and the high estimated persistence, attribution to transition policy should remain cautious.

5.3. Post-Lignite Sectoral Contraction and Partial Replacement

The dominant negative contribution comes from industry B-E. Nominal GVA in this group fell from EUR 1,385.63 million in 2019 to EUR 1,038.43 million in 2023, a contraction of 25.06%. Industry B–E subtracted 9.90 percentage points from regional growth, nearly offset by +9.98 points from the other nine sectors.

Industry's share of GVA fell from 39.50% to 29.58% between 2019 and 2023, but manufacturing moved in the opposite direction. Its nominal GVA rose from EUR 164.71 million to EUR 217.25 million (+31.90%), adding 1.50 percentage points to regional growth within industry B–E. Other B–E activities lost approximately EUR 399.73 million. The A10 data cannot isolate the lignite component, and current-price values do not measure changes in physical output.

Outside industry, construction contributed 1.79 percentage points to regional GVA growth, trade, transport and accommodation 2.07, and public administration, education and health 2.60. The increases are nominal accounting contributions. They do not explain why. Establishing, for example, whether construction expanded because of transition-financed projects would require expenditure evidence at project level.

The location quotients for 2023 offer further insight into Western Macedonia's economic specialization. Agriculture had a quotient of approximately 2.73, followed by industry B–E at 2.01. Manufacturing, by comparison, recorded a considerably lower value of 0.60, while information and communication stood at just 0.25. These differences suggest that agriculture and broad industry continued to play a relatively prominent role in the regional economy, despite the contraction of its traditional industrial activities. Manufacturing, meanwhile, remained less prominent in Western Macedonia's GVA than in the national economy. However, location quotients indicate relative sectoral concentration rather than productivity or economic performance. They also provide no direct evidence of whether employment opportunities emerging in other sectors have been sufficient to replace jobs lost in declining activities.

Table 6. Sectoral contributions to nominal GVA change in Western Macedonia

Industry group	2019 €m	2023 €m	Change %	Contribution pp
Agriculture	387.8	410.8	5.9	0.66
Industry B–E	1385.6	1038.4	−25.1	−9.90
Construction	64.1	127.0	98.2	1.79
Trade transport accommodation	414.8	487.5	17.5	2.07

Industry group	2019 €m	2023 €m	Change %	Contribution pp
Information and communication	31.2	31.3	0.4	0.00
Finance and insurance	83.4	121.4	45.5	1.08
Real estate	352.0	383.7	9.0	0.90
Professional and administrative	66.0	90.4	37.0	0.70
Public services O–Q	629.9	721.0	14.5	2.60
Other services	93.0	98.9	6.4	0.17

Note. Contributions use total regional GVA in 2019 as denominator and sum to +0.08 percentage points, subject to display rounding. Industry B–E includes manufacturing; it must not be interpreted as lignite alone. O–Q includes public administration, education and health across institutional sectors. Source: ELSTAT (2026a).

5.4. Post-Lignite Labour-Market Adjustment Without Full Convergence

Table 7. Selected annual labour-market aggregates

Year	Geography	Employed 000s	Unemployment %	Participation 15+ %	Employment / population 15+ %
2009	Greece	4556.0	9.6	53.4	48.3
2009	Western Macedonia	106.5	12.4	50.1	43.9
2013	Greece	3513.2	27.5	52.0	37.7
2013	Western Macedonia	77.1	31.6	46.8	32.0
2019	Greece	3911.0	17.3	52.0	43.0
2019	Western Macedonia	87.1	24.5	49.7	37.5
2023	Greece	4193.5	11.1	52.2	46.4
2023	Western Macedonia	94.0	16.7	48.8	40.6
2025	Greece	4339.7	8.9	52.9	48.2
2025	Western Macedonia	93.4	15.3	47.7	40.4

Note. Authors' aggregation of four quarterly ELSTAT (2026b) estimates per year. Annual unemployment = $\sum U / \sum \mathrm{LF}$; participation = $\sum \mathrm{LF} / \sum P_{15+}$; employment ratio = $\sum E / \sum P_{15+}$. The 2021 survey changes limit strict comparability across that date.

The post-lignite labour-market adjustment also began from a weak position. Western Macedonia's unemployment rate was 12.4% in 2009, compared with 9.6% nationally, and it rose to 31.6% in 2013, against 27.5% for Greece. A sizeable gap was still present in 2019, when the regional rate was 24.5% and the national rate 17.3%. Employment followed a similarly weak long-run path: average regional employment fell from 106.6 thousand in 2009 to 87.1 thousand in 2019. The transition therefore began before the employment losses associated with the earlier crisis had been fully recovered.

By 2025, average regional employment had recovered to 93.4 thousand and unemployment had fallen to 15.3%. The broader position nevertheless remained weaker than the national picture. Participation stood at 47.7%, compared with 52.9% for Greece, while the employment-to-population ratio for residents aged 15 and over was 40.4%, versus 48.2% nationally. Regional variation in the age composition of the population also affects the denominator used for these indicators. Comparisons covering 2021 require additional caution because of changes in the survey definitions.

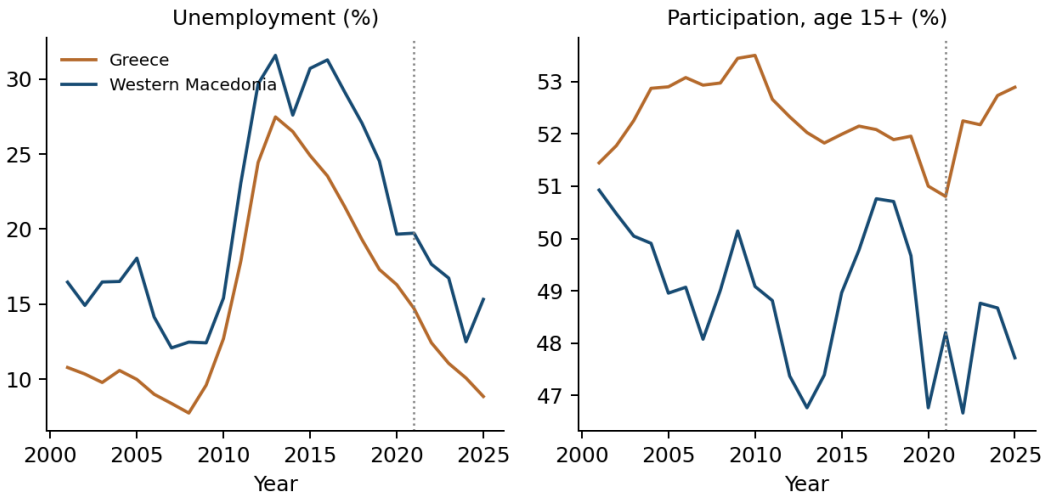


Figure 4. Annual descriptive unemployment and participation trajectories
Note. Authors' aggregation of ELSTAT quarterly regional estimates, 2001–2025. The dotted line marks the 2021 survey changes, not a policy effect. Participation denominator: population aged 15 and over.

Table 8. Recent matched-quarter labour-market evidence

Quarter	Geography	Employed 000s	Unemployed 000s	Inactive 000s	Unemp. %	Particip. 15+ %
2025Q1	Greece	4216.8	488.1	4301.8	10.4	52.2
2025Q1	Western Macedonia	91.8	16.6	122.7	15.3	46.9
2026Q1	Greece	4272.2	508.4	4211.6	10.6	53.2
2026Q1	Western Macedonia	92.0	12.5	126.5	11.9	45.2
2025Q2	Greece	4386.8	411.7	4205.1	8.6	53.3
2025Q2	Western Macedonia	95.1	15.9	120.1	14.3	48.0
2026Q2	Greece	4414.4	379.7	4189.5	7.9	53.4
2026Q2	Western Macedonia	94.2	13.8	122.8	12.7	46.8

Note. ELSTAT (2026b). Published rates are retained and can differ slightly from ratios of rounded counts. Non-seasonally adjusted estimates; compare matching quarters across years. No significance tests of survey changes are available.

The first-quarter comparison shows why the unemployment rate should not be interpreted on its own. From 2025Q1 to 2026Q1, unemployment fell from 15.3% to 11.9%, yet employment rose by only 0.2 thousand, from 91.8 to 92.0 thousand. During the same period, unemployment decreased by 4.1 thousand, the labour force contracted by 3.9 thousand and inactivity increased by 3.8 thousand. The reduction in unemployment was therefore much larger than the gain in employment. Because these are aggregate stocks, however, the data cannot identify the individual transitions behind those movements.

The second-quarter figures point in the same direction. Between 2025Q2 and 2026Q2, employment fell from 95.1 to 94.2 thousand even as the unemployment rate declined from 14.3% to 12.7%. The labour force contracted from 111.0 to 108.0 thousand, inactivity rose from 120.1 to 122.8 thousand, and participation fell from 48.0% to 46.8%. In 2026Q2, participation for Greece was 53.4% and unemployment 7.9%, leaving a regional-national unemployment gap of 4.8 percentage points despite the lower regional rate.

Published aggregate series cannot show why the labour force contracted. Migration, retirement and discouragement are all plausible influences, but none can be separated from survey variability or changes in population composition with these stock estimates. The conclusion supported by the data is therefore narrower: in the latest matched-quarter comparisons, the fall in unemployment was not matched by employment growth of a similar magnitude.

5.5. Post-Lignite Structural and Robustness Diagnostics

Across the other twelve regions, nominal GVA growth in 2019-2023 averaged 20.46%, with a median of 20.29%. Dispersion among those regions was modest relative to Western Macedonia: the standard deviation was 2.42 percentage points and the interquartile range 19.08%-21.92%. Western Macedonia's increase of 0.08% was 20.38 percentage points below the peer mean and 20.21 points below the median. Relative to the cross-regional standard deviation, Western Macedonia's distance from the peer mean is 8.41 standard deviations. This figure is used only to summarize the magnitude of the observed regional gap. Because the comparison set consists of twelve regions rather than a random sample from a wider population, it should not be interpreted as a probability statement or as a formal test of whether the outcome is statistically exceptional.

Table 9. Additional regional and structural diagnostics

Metric	2019 / peer benchmark	2023 / Western Macedonia	Interpretation
WM nominal GVA growth, 2019–2023	Peer mean: 20.46%; median: 20.29%	WM: 0.08%	Gap to peer mean: −20.38 pp
Peer dispersion, 2019–2023	SD: 2.42 pp; IQR: 19.08%–21.92%	Standardized WM gap: −8.41 SD	Descriptive gap; not a z test
Sector HHI – Western Macedonia	0.2266	0.1787	Still above Greece
Sector HHI – Greece	0.1646	0.1541	Modest national decline
Effective sector count (1/HHI) – WM	4.41	5.60	More evenly distributed shares
Structural distance D(WM,Greece)	0.3271	0.2662	Closer to the national structure

Note. HHI covers the ten A10 sectors, with manufacturing included in B–E. Structural distance: $D(t) = 0.5 \sum_s \left| q_{\mathrm{WM},s,t} - q_{\mathrm{GR},s,t} \right|$. Peer dispersion excludes Western Macedonia. Source: ELSTAT (2026a).

Between 2019 and 2023, Western Macedonia's HHI fell from 0.2266 to 0.1787, raising the effective sector count from 4.41 to 5.60. Structural distance from Greece narrowed from 0.3271 to 0.2662, though the regional HHI remained above the national value of 0.1541 in 2023. The declining industrial share partly explains this shift; lower concentration does not by itself establish successful diversification. The considerable decline in industry was an important feature of Western Macedonia's change. Labour-market figures add a further qualification. Regional employment increased by 7.20% between 2019 and 2025, against 10.96% nationally, while the labour force fell by 4.44%; the corresponding national figure was a 0.67% increase. Western Macedonia's unemployment rate declined by 9.20 percentage points, compared with 8.45 points for Greece. Participation moved in the opposite direction, falling by 1.95 points in the region as it rose by 0.94 points nationally. The employment-to-population ratio improved by 2.91 points in the region and by 5.25 points in Greece. A larger fall in unemployment therefore coexisted with weaker employment growth and declining participation.

Table 10. Labour-market change from 2019 to 2025

Indicator	Western Macedonia	Greece	WM minus Greece
Employment change	+7.20%	+10.96%	−3.76 pp
Labour-force change	−4.44%	+0.67%	−5.11 pp
Population 15+ change	−0.53%	−1.11%	+0.59 pp
Unemployment-rate change	−9.20 pp	−8.45 pp	−0.75 pp

Indicator	Western Macedonia	Greece	WM minus Greece
Participation-rate change	−1.95 pp	+0.94 pp	−2.89 pp
Employment/population 15+ change	+2.91 pp	+5.25 pp	−2.33 pp

Note. Authors' calculations from annual aggregates of ELSTAT quarterly estimates. Percentage-point differences are used for rates; percentage changes are used for employment, labour force and population stocks. Survey changes in 2021 still limit strict longitudinal comparability.

The supplementary diagnostics place further qualifications on the main regression. The Breusch-Pagan test indicates heteroskedasticity (LM p = .012; F p = .002). Influence statistics also single out 2010 as an unusually influential observation: Cook's D is 0.735, well above the conventional 4/N reference of 0.167, and the externally studentized residual is 3.84. The fitted 2010 offset should therefore be read cautiously. The post-2020 slope is less dependent on a single year in directional terms. In all twenty-four leave-one-year-out estimates it remains negative, ranging from -0.0586 to -0.0196 log points per year. The HAC p-value is below .05 in twenty specifications but exceeds .05 when 2010, 2011, 2018 or 2023 is omitted. The coefficient remains consistently signed across the leave-one-year-out estimates, although it does not reach conventional levels of statistical significance in every specification.

6. DISCUSSION

6.1. The post-lignite transition as cumulative vulnerability

Developments after 2019 need to be considered in the context of Western Macedonia's longer economic trajectory. When the lignite phase-out was announced, regional employment had yet to recover to its pre-crisis level, while the relative output gains achieved during the earlier years of the crisis had already been reversed. The region thus entered the transition with an economy that was already struggling and remained heavily dependent on a narrow range of productive activities. Taken together, these developments suggest that economic vulnerabilities had accumulated over time. The present analysis cannot, however, determine the extent to which the earlier crisis weakened the region's ability to adapt to the subsequent decline in lignite-based activity.

The developments between 2009 and 2019 also become clearer when the entire period is examined rather than simply comparing its starting and ending points. Looking only at these two years, regional and national GVA appear to have contracted by broadly similar proportions. Yet this comparison overlooks considerable changes during the intervening years. Western Macedonia initially improved its relative economic position, reaching its highest observed share of national GVA in 2012, before experiencing a prolonged period of deterioration. This pattern is important for understanding the region's position before the lignite phase-out. In the segmented model, the 2010 breakpoint is used to account for the adjustment process associated with the earlier crisis, although other specifications of this historical period may also be reasonable.

The national studies of Migkos et al. (2022, 2024) and Karountzos et al. (2024) provide the broader macroeconomic setting within which these regional developments occurred. The present study operates at a different analytical scale, linking regional output to changes in sectoral composition and labour-market stocks. The two strands of evidence therefore serve different purposes. National findings help establish the wider context, whereas the regional breakpoint estimates are specific to the data structure, modelling assumptions and specification choices adopted here.

6.2. Post-lignite structural change does not necessarily imply successful diversification

The sectoral decomposition shows why a lower industrial share should not be treated as synonymous with successful diversification. Industry B-E reduced regional GVA growth by almost ten percentage points, and the remaining sectors contributed almost the same amount in the opposite direction. The net result was near-stagnation in nominal GVA at a time when most of Greece was expanding substantially. HHI also declined, but part of that decline reflects the contraction of the previously dominant sector. Productive replacement should

therefore be assessed in both absolute and relative terms. An increase in the share of new activities is not, on its own, sufficient evidence of productive replacement. What matters is whether those activities expand to a scale capable of compensating for the value added lost from declining sectors.

Manufacturing adds an important qualification to the broader pattern of industrial contraction. Its nominal GVA increased while the aggregate B–E category declined, showing that the components of industry did not move uniformly. The regional accounts, however, do not reveal whether this growth marks the emergence of a broader and durable source of regional expansion. This may be explained by the entry of new firms, the expansion of existing businesses, changes in prices, or economic activity associated with a limited number of large projects. Distinguishing among these possibilities would require evidence at firm level.

The location quotients point in the same direction: Western Macedonia continues to display a relatively concentrated productive structure, with comparatively large shares in agriculture and broad industry and a much smaller presence in information and communication. These indicators are useful for describing specialization, but they do not by themselves identify the sectors that should be prioritised for public support. Place-based innovation policy requires a clearer assessment of regional capabilities, demand conditions and the potential for locally embedded linkages (Grillitsch & Asheim, 2018). Similar considerations appear in the coal-transition literature, which places skills, supplier networks, land restoration and institutional capacity alongside technological change in the energy system (Harrahill & Douglas, 2019; Oei et al., 2020; Weller et al., 2024).

6.3. Post-lignite employment, participation and household security

Labour-market developments look different depending on the indicator used. Between 2019 and 2025, employment increased and the unemployment rate declined, both of which point to some improvement. At the same time, however, the labour force became smaller and participation weakened. The matched-quarter evidence for 2025 and 2026 is less clear-cut: employment changed very little in the first quarter and declined in the second. For that reason, unemployment on its own provides an incomplete basis for assessing the regional transition. Employment levels and participation need to be read alongside it.

Participation rates calculated for the population aged 15 and over require additional caution because the denominator includes residents beyond conventional working age. The regional labour-market series are not adjusted for differences in age composition. Low participation can therefore reflect demographic structure as well as labour-market behaviour; it cannot, on these data alone, be attributed to discouragement, exclusion or ineffective reintegration measures. Migration presents a similar interpretive difficulty. Changes in employment and labour-force stocks are compatible with outward movement, but do not establish that it took place. Distinguishing among these explanations would require age-specific evidence and preferably longitudinal information on individual labour-market transitions.

Regional production accounts omit another important aspect of the transition: households' ability to secure adequate energy services. In Western Macedonia, evidence documents thermal stress, financial pressure and poor housing conditions, as well as forms of energy deprivation that income-based measures may fail to identify (Migkos et al., 2026a, 2026b). These findings suggest that the evaluation of a just transition should extend beyond output and employment to include households' ability to secure adequate energy services.

The present study does not estimate household energy poverty, nor does it attribute the household outcomes reported in those studies to the regional GVA changes identified here.

6.4. What can be concluded about the post-lignite break

Across the robustness checks, the estimated post-2020 change in slope remains negative. This result is not altered by changes to the comparison group, the HAC bandwidth, or the timing of the breakpoint, and the coefficient retains the same sign in all leave-one-year-out estimates. The strength of the statistical evidence is less stable, however. The joint F test does not reject the null at the 10% level, while the estimated slope change becomes clearly non-significant under the AR(1) specification ($p = .434$). The observed post-2019 divergence is therefore pronounced in descriptive terms, but the evidence is less conclusive as to whether it should be represented as a discrete structural break occurring specifically in 2020.

Any causal interpretation is further constrained by the fact that the transition coincided with other major economic disturbances. The years after 2019 include the COVID-19 pandemic, the energy-price crisis and substantial differences in sectoral recovery. A region with a large energy-intensive base may respond differently

to those shocks than an aggregate dominated more heavily by metropolitan or tourism-intensive economies. The relative GVA ratio removes common multiplicative movements, not heterogeneous exposure. Likewise, a 2020 pulse can absorb an additional one-year disturbance but cannot isolate the wider pandemic and recovery cycle. The contribution of the phase-out policy itself therefore remains unresolved in this design.

A process-based view of transition fits the available evidence more closely (Cantoni & Brisbois, 2024). September 2019 is a clear policy milestone, but plant closures, investment, firm entry and the growth of replacement activities need not follow the same timetable. The available GVA series captures only the opening years of that process. It is sufficient to describe the size and composition of the emerging regional gap, but not to determine the eventual economic outcome of the transition.

7. POLICY IMPLICATIONS

Monitoring policy outcomes should separate the contraction of incumbent activity from the scale, durability and quality of the activities that replace it. In manufacturing, construction and services, evaluation needs to move beyond nominal expansion and consider productivity, employment intensity and persistence over time. Installed renewable capacity and committed investment are useful indicators of implementation, but neither establishes that local value added, employment or supplier relationships have been replaced. The territorial orientation of the Just Transition Fund is consistent with an evaluation framework that also follows realized regional outcomes (European Parliament & Council of the European Union, 2021).

The same distinction is important in labour-market policy. A lower unemployment rate should be assessed separately from changes in employment and participation. Training programmes, for instance, are better evaluated through sustained placements, earnings, retention and demonstrated employer demand than through completion rates alone. Age- and gender-specific participation measures would also help separate demographic composition from labour-market exclusion. The evidence presented here supports such a broader monitoring framework, although it does not identify the effectiveness of particular training or activation programmes.

A credible evaluation framework also requires coordination across institutions rather than isolated project reporting. Regional authorities, municipalities, firms, education providers and affected communities each possess information relevant to transition outcomes. Research on Western Macedonia has similarly emphasized place-based governance, participation and partnership (Topaloglou & Ioannidis, 2022; Pavloudakis et al., 2023). Future evaluation should connect individual transition projects with local employment, firm formation, supplier activity, land reuse and the persistence of economic activity after initial funding expires. These are policy-relevant relationships, but they are not estimated by the regression model used in this article.

The household dimension is no less important. Continuity of district heating, housing improvements and energy assistance should be judged by actual access to adequate energy services and by experienced deprivation, not only by income eligibility. Migkos et al. (2026a, 2026b) support the inclusion of thermal stress, energy anxiety and dwelling conditions in such an assessment. Productive replacement and household energy security are analytically distinct; a socially just regional transition requires progress on both fronts.

8. LIMITATIONS AND RESEARCH PRIORITIES

Using GVA at current prices prevents a clean separation of changes in production volumes from changes in sectoral or regional prices. A common national deflator would cancel from the relative GVA ratio. Regional or sector-specific volume measures are needed to distinguish real changes.

Only four observations follow the 2020 breakpoint, against six parameters estimated from 24 annual observations. Such a limited post-break window leaves considerable uncertainty about the magnitude of the estimated change. The model therefore has eighteen residual degrees of freedom. With so little information in the final segment, inference can be affected by serial persistence, small-sample uncertainty, and individual influential years. The main HAC estimate is consequently considered alongside the AR(1) specification, the joint breakpoint tests, and the leave-one-year-out results. These checks are treated as part of the same assessment of uncertainty rather than as independent tests of the transition effect.

The comparison benchmark also has clear limits. The regions included in the aggregate cannot be regarded as a matched untreated control group: all were exposed to the national adjustment process, and some may also have experienced common energy-price shocks or spillovers related to the transition. Future research could consider synthetic-control methods or extend the donor pool to comparable European regions. Neither option is

straightforward. Its credibility would depend on the selection of donor units, the closeness of the pre-treatment fit, and the extent to which cross-border shocks can be accounted for adequately.

Sectoral aggregation imposes a different limitation. Under the A10 classification, industry B–E brings together mining, manufacturing, and utility-related activities. Some components remain aggregated even when manufacturing is reported separately. This restricts the extent to which observed changes can be assigned to particular industrial activities with confidence when manufacturing is shown separately. The decomposition can therefore quantify the nominal contribution of the broad sector group, but it cannot identify the effect of a particular mine closure, investment programme, subsidy or firm-level development. Establishing whether observed changes are associated with transition funding or specific interventions would require project-level or firm-level evidence rather than aggregate regional accounts.

The labour-market evidence is subject to a different set of limitations. Quarterly estimates are not seasonally adjusted, while the methodological change introduced in 2021 prevents strict comparability across the full series. Annual aggregation does not remove this break. In addition, the published rates are not age-standardized, and the sampling covariance information required for formal inference on regional changes is unavailable. Aggregate stocks also provide no direct evidence on migration or on movements of individual workers between employment, unemployment and inactivity. Further research would therefore benefit from age-specific indicators, administrative employment records and linked demographic or longitudinal data.

These limitations do not reduce the usefulness of the indicators employed here; rather, they define the level at which each indicator can be interpreted. Relative output, sectoral composition, employment and participation capture different dimensions of regional adjustment and need not move in the same direction. A reduction in sectoral concentration, for example, may coexist with stagnant aggregate GVA, just as unemployment may decline while the labour force contracts. Assessing transition progress therefore requires these dimensions to remain analytically separate rather than being compressed into a single headline indicator.

9. CONCLUSION

Western Macedonia experienced a substantially different pattern of economic development from the rest of Greece in the years following the announcement of the lignite phase-out. Between 2019 and 2023, Western Macedonia's nominal GVA rose by only 0.08%, against much stronger increases in other Greek regions. Industry B–E contracted by 25.06%, subtracting 9.90 percentage points from growth; the other sectors added 9.98 points. Manufacturing nevertheless expanded within the declining industrial group. The fall in sectoral concentration reflects both gains elsewhere and industrial contraction, not a clear replacement of the former production base.

The fitted relative decline for 2020–2023 is 5.24% a year, and the additional slope is negative in all sensitivity checks. Evidence for a distinct 2020 break is weaker under the joint F test and the AR(1) model than under the individual HAC estimate. Relative divergence is apparent in the descriptive figures; its attribution to the phase-out remains unresolved.

Unemployment fell after 2019, yet the labour force contracted and participation remained low. Employment exceeded its 2019 level in 2025, but the 2026 matched-quarter figures show no sustained expansion. A lower unemployment rate alone therefore gives an incomplete account of labour-market adjustment.

Western Macedonia's sectoral composition has changed, but the evidence does not yet establish an economic replacement for the declining industrial base. Assessment of the transition must also consider household energy security and institutional capacity. The post-announcement period observed here is still short.

DATA AVAILABILITY AND REPRODUCIBILITY

The analysis uses public ELSTAT aggregates, not individual records. The accompanying workbook retains full-precision regional GVA, sectoral and quarterly labour-market series, formula-linked calculations, the covariance matrix, confidence intervals and sensitivity checks. The replication package includes the original ELSTAT workbooks and estimation script.

The data cut-off is 30 September 2026. No observations were simulated or imputed, and GVA ends in 2023. Regression estimates were calculated outside Excel; revisions to ELSTAT data would require rerunning the script.

REFERENCES

Artelaris, P. (2017). Geographies of crisis in Greece: A social well-being approach. Geoforum, 84, 59–69. https://doi.org/10.1016/j.geoforum.2017.06.003

Boschma, R. (2015). Towards an evolutionary perspective on regional resilience. Regional Studies, 49(5), 733–751. https://doi.org/10.1080/00343404.2014.959481

Cantoni, R., & Brisbois, M. C. (2024). En route to decarbonization: A periodisation of just transition in four carbon-intensive EU regions. Geoforum, 154, 104061. https://doi.org/10.1016/j.geoforum.2024.104061

Council of the European Union. (2019). Greece: The third economic adjustment programme. https://www.consilium.europa.eu/en/policies/financial-assistance-eurozone-members/greece-programme/

European Commission. (2010). The Economic Adjustment Programme for Greece (European Economy, Occasional Papers No. 61). https://doi.org/10.2765/46750

European Commission. (2012). The Second Economic Adjustment Programme for Greece (European Economy, Occasional Papers No. 94). https://doi.org/10.2765/20231

European Parliament & Council of the European Union. (2021). Regulation (EU) 2021/1056 establishing the Just Transition Fund. Official Journal of the European Union, L 231, 1–20.

Giannakis, E., & Bruggeman, A. (2017). Economic crisis and regional resilience: Evidence from Greece. Papers in Regional Science, 96(3), 451–476. https://doi.org/10.1111/pirs.12206

Grillitsch, M., & Asheim, B. (2018). Place-based innovation policy for industrial diversification in regions. European Planning Studies, 26(8), 1638–1662. https://doi.org/10.1080/09654313.2018.1484892

Harrahill, K., & Douglas, O. (2019). Framework development for 'just transition' in coal producing jurisdictions. Energy Policy, 134, 110990. https://doi.org/10.1016/j.enpol.2019.110990

Hellenic Statistical Authority. (2026a, January 30). Gross value added by industry (A10), 2000–2023 [Data set and regional accounts release]. https://www.statistics.gr/en/statistics/-/publication/SEL45/2023

Hellenic Statistical Authority. (2026b, September 4). Labour force survey, second quarter 2026, and population aged 15 and over by employment status and region, 2001Q1–2026Q2 [Statistical release and data set]. https://www.statistics.gr/en/statistics/-/publication/SJO01/2026-Q2

Kakderi, C., & Tasopoulou, A. (2017). Regional economic resilience: The role of national and regional policies. European Planning Studies, 25(8), 1435–1453. https://doi.org/10.1080/09654313.2017.1322041

Karountzos, P., Giannakopoulos, N. T., Sakas, D. P., Efthalitsidou, K. I., & Migkos, S. P. (2024). GINI's Odyssey in Greece: Econometric analysis of income inequality, GDP, and unemployment through economic phases (pre-crisis, crisis, memoranda, and post-memoranda). International Journal of Financial Studies, 12(4), 129. https://doi.org/10.3390/ijfs12040129

Lopez Bernal, J., Cummins, S., & Gasparrini, A. (2017). Interrupted time series regression for the evaluation of public health interventions: A tutorial. International Journal of Epidemiology, 46(1), 348–355. https://doi.org/10.1093/ije/dyw098

Lopez Bernal, J., Cummins, S., & Gasparrini, A. (2018). The use of controls in interrupted time series studies of public health interventions. International Journal of Epidemiology, 47(6), 2082–2093. https://doi.org/10.1093/ije/dyy135

McCauley, D., & Heffron, R. (2018). Just transition: Integrating climate, energy and environmental justice. Energy Policy, 119, 1–7. https://doi.org/10.1016/j.enpol.2018.04.014

Migkos, S. P., Giannakopoulos, N. T., Sakas, D. P., & Efthalitsidou, K. I. (2024). Estimation of the effects of Greece's 2012 Memorandum on macroeconomic and financial course with FCM. Theoretical Economics Letters, 14, 2294–2313. https://doi.org/10.4236/tel.2024.146114

Migkos, S. P., Karountzos, P., Giannakopoulos, N. T., Sakas, D. P., Katarachia, A., & Farmaki, P. M. (2025). Energy and environmental impacts of Greece's agricultural sector: A diachronic study with regional insights from Western Macedonia. Journal of Environmental & Earth Sciences, 7(5), 332–359. https://doi.org/10.30564/jees.v7i5.8363

Migkos, S. P., Katarachia, A., & Farmaki, P. M. (2026a). Thermal stress, energy anxiety, and vulnerable households in a just transition region: Evidence from Western Macedonia, Greece. World, 7(1), 8. https://doi.org/10.3390/world7010008

Migkos, S. P., Katarachia, A., Farmaki, P. M., & Tranoulidis, A. (2026b). Hidden energy poverty, the dwelling envelope, and the limits of income-based targeting: Household evidence from the coal phase-out region of Western Macedonia, Greece. Energies, 19(16), 3834. https://doi.org/10.3390/en19163834

Migkos, S. P., Sakas, D. P., Giannakopoulos, N. T., Konteos, G., & Metsiou, A. (2022). Analyzing Greece 2010 Memorandum's impact on macroeconomic and financial figures through FCM. Economies, 10(8), 178. https://doi.org/10.3390/economies10080178

Monastiriotis, V. (2011). Making geographical sense of the Greek austerity measures: Compositional effects and long-run implications. Cambridge Journal of Regions, Economy and Society, 4(3), 323–337. https://doi.org/10.1093/cjres/rsr026

Monastiriotis, V., & Martelli, A. (2021). Crisis, adjustment and resilience in the Greek labor market: An unemployment decomposition approach. International Regional Science Review, 44(1), 85–112. https://doi.org/10.1177/0160017620964848

Newey, W. K., & West, K. D. (1987). A simple, positive semi-definite, heteroskedasticity and autocorrelation consistent covariance matrix. Econometrica, 55(3), 703–708. https://doi.org/10.2307/1913610

Oei, P.-Y., Brauers, H., & Herpich, P. (2020). Lessons from Germany's hard coal mining phase-out: Policies and transition from 1950 to 2018. Climate Policy, 20(8), 963–979. https://doi.org/10.1080/14693062.2019.1688636

Palaskas, T., Psycharis, Y., Rovolis, A., & Stoforos, C. (2015). The asymmetrical impact of the economic crisis on unemployment and welfare in Greek urban economies. Journal of Economic Geography, 15(5), 973–1007. https://doi.org/10.1093/jeg/lbv027

Pavloudakis, F., Karlopoulos, E., & Roumpos, C. (2023). Just transition governance to avoid socio-economic impacts of lignite phase-out: The case of Western Macedonia, Greece. The Extractive Industries and Society, 14, 101248. https://doi.org/10.1016/j.exis.2023.101248

Petrakos, G., & Psycharis, Y. (2016). The spatial aspects of economic crisis in Greece. Cambridge Journal of Regions, Economy and Society, 9(1), 137–152. https://doi.org/10.1093/cjres/rsv028

Psycharis, Y., Kallioras, D., & Pantazis, P. (2014). Economic crisis and regional resilience: Detecting the 'geographical footprint' of economic crisis in Greece. Regional Science Policy & Practice, 6(2), 121–141. https://doi.org/10.1111/rsp3.12032

Topaloglou, L., & Ioannidis, L. (2022). From transition management towards just transition and place-based governance: The case of Western Macedonia in Greece. Journal of Entrepreneurship, Management and Innovation, 18(3), 37–74. https://doi.org/10.7341/20221832

Tranoulidis, A., Sotiropoulou, R.-E. P., Bithas, K., & Tagaris, E. (2022). Decarbonization and transition to the post-lignite era: Analysis for a sustainable transition in the Region of Western Macedonia. Sustainability, 14(16), 10173. https://doi.org/10.3390/su141610173

Weller, S., Beer, A., & Porter, J. (2024). Place-based just transition: Domains, components and costs. Contemporary Social Science, 19(1–3), 355–374. https://doi.org/10.1080/21582041.2024.2333272

Ziouzios, D., Karlopoulos, E., Fragkos, P., & Vrontisi, Z. (2021). Challenges and opportunities of coal phase-out in Western Macedonia. Climate, 9(7), 115. https://doi.org/10.3390/cli9070115

Energy Security and Corporate Reporting: Evidence from Romanian Listed Energy Companies, 2020–2025

Florentina Moisescu[1]

[1] Faculty of Economics and Business Administration, Dunărea de Jos University of Galați, 800008 Galati, România, Florentina.moisescu@ugal.ro, ORCID: https://orcid.org/0000-0003-4315-6753

Abstract: This study examines how energy security is constructed and strategically integrated into corporate reporting under successive systemic disruptions. It analyses Electrica, Romgaz and Nuclearelectrica over 2020–2025 through a longitudinal content analysis of annual, sustainability and related corporate reports. The analytical framework combines six dimensions of energy security with a five-level maturity scale and three complementary indicators: Energy Security Disclosure Breadth (ESDB), Energy Security Disclosure Maturity (ESDM) and Strategic Orientation Ratio (SOR). The evidence identifies 2022 as a pronounced inflection point. Mean ESDM rises from 69.4% in 2021 to 93.1% in 2022, while breadth and strategic orientation reach complete coverage across the sample. Yet the change is not best interpreted as the sudden appearance of energy security in reporting. Rather, pre-existing concerns about continuity, infrastructure, markets and transition are reorganised around geopolitical exposure, security of supply and strategic autonomy. The three firms also develop distinct configurations: network and infrastructure security at Electrica, resource and supply security at Romgaz, and strategic generation capacity at Nuclearelectrica. We conceptualise this process as the organisational translation of energy security: the movement of a systemic vulnerability from risk recognition to governance, strategy and resource commitment. The findings further distinguish substantive strategic reconfiguration from the later formalisation associated with CSRD/ESRS. The study therefore contributes a firm-level reporting perspective to a literature that has predominantly conceptualised energy security at national and system levels.

Keywords: energy security; corporate reporting; risk disclosure; organisational resilience; CSRD/ESRS

1. INTRODUCTION

Energy security has again become a central concern in European economic and policy debates, although what is understood by security has changed considerably. Conventionally associated with the availability of energy supply, import dependence and affordability, the concept has gradually acquired a broader meaning. Infrastructure reliability, technological capabilities, environmental sustainability, governance and resilience have become part of the way in which energy security is conceptualised and assessed (Sovacool & Mukherjee, 2011; Sovacool et al., 2011; Cherp & Jewell, 2014; Ang et al., 2015). This development is consequential. What needs to be secured is not simply access to fuels or electricity, but the continued provision of energy services within systems exposed to economic, technological, environmental and geopolitical pressures.

Developments in Europe since 2020 have made this broader understanding particularly relevant. The COVID-19 pandemic exposed vulnerabilities in supply chains and altered investment conditions, but the geopolitical rupture that followed Russia's full-scale invasion of Ukraine in February 2022 confronted European economies with a different order of risk. Dependence on imported energy, previously discussed primarily in terms of markets, costs and diversification, acquired an explicit geopolitical dimension. The European response consequently combined measures that would once have belonged to rather separate policy agendas: diversification of supply, demand reduction, reinforcement of infrastructure and acceleration of low-carbon energy deployment (Kuzemko et al., 2022; Aitken & Ersoy, 2023; Goldthau & Youngs, 2023; Slakaityte et al., 2023). The resulting relationship between security and transition is not straightforward. Recent research suggests that the two may increasingly reinforce one another, although new technologies and lower dependence on fossil-fuel imports also generate their own infrastructure and investment requirements (Kim et al., 2025).

Much of this debate has understandably taken place at the level of countries, energy systems and European policy. Less attention has been paid to what happens when these systemic concerns enter the organisation. This distinction deserves consideration because energy companies are not passive recipients of energy-security policy. They control or operate the production facilities, networks, storage capacities and other strategic assets through which security is ultimately provided. A disruption that appears at system level as dependence, scarcity or geopolitical exposure must therefore be interpreted within firms whose resources, technologies and responsibilities differ substantially.

Corporate reporting offers one way of observing this process. Annual and sustainability reports record how companies identify risks, assign managerial responsibilities, formulate strategic priorities and justify investment.

They do not, however, provide an unmediated representation of organisational behaviour. This qualification is particularly important for the present study. Research on corporate risk disclosure has repeatedly shown that the amount of information disclosed should not be confused with its quality or organisational significance, while agreement on how disclosure quality should be measured remains limited (Ibrahim et al., 2022; Mbithi et al., 2022). Evidence from the energy sector similarly indicates that risk disclosure has become more prominent and is associated with governance characteristics (Vitolla et al., 2023). Yet a topic may become highly visible in a corporate report without becoming correspondingly important in resource allocation or strategic decision-making.

This problem has become more pronounced as European sustainability reporting has itself undergone substantial institutional change. The transition from non-financial reporting towards the Corporate Sustainability Reporting Directive (CSRD), European Sustainability Reporting Standards (ESRS) and double materiality encourages companies to articulate impacts, risks and opportunities more systematically and to connect them more explicitly with governance and strategy (Baumüller & Sopp, 2022). Romanian listed companies provide an especially relevant setting in this respect, since evidence suggests that double-materiality practices were already developing before the new reporting architecture became fully applicable (Dragomir et al., 2025). More extensive and structured disclosure may therefore reflect regulatory formalisation as well as changes in the economic significance attached to an issue. Distinguishing between these processes is important when reporting itself constitutes the empirical evidence.

Against this background, we examine how energy security was translated into the corporate reporting of three Romanian listed energy companies—Electrica, Romgaz and Nuclearelectrica—between 2020 and 2025. Their selection allows a common sequence of external disturbances to be considered across markedly different positions in the energy system. Electrica is primarily situated in electricity distribution and supply, Romgaz in natural-gas production and storage, and Nuclearelectrica in nuclear generation. Their exposures, assets and investment horizons are consequently different even though they operate within the same national and European security environment. The longitudinal design comprises 108 validated firm-year-dimension coding decisions, corresponding to three companies, six years and six analytical dimensions. A five-level maturity scale is used to distinguish the absence or acknowledgement of an issue from operational response, strategic integration and resource-backed commitment.

The analysis is organised around three research questions:

(RQ1) How did corporate reporting on energy security evolve during 2020–2025?

(RQ2) How were successive systemic shocks, particularly the geopolitical rupture of 2022, associated with changes in the content and strategic orientation of energy-security reporting?

(RQ3) Did firms occupying different positions in the energy system develop distinct reporting configurations?

Rather than treating increased disclosure as evidence, in itself, of increased resilience, the study focuses on the organisational location that energy security acquires in corporate reporting. We refer to this process as the organisational translation of energy security**:** systemic exposure is recognised by the firm and may subsequently become connected to operational responses, governance arrangements, strategic priorities and, ultimately, resource commitments. The distinction is deliberate. Corporate reporting can provide evidence that an issue has entered organisational decision structures, but it cannot establish that the organisation has become objectively more resilient.

This perspective leads to a somewhat different interpretation of the period under examination. The evidence does not suggest that energy security suddenly entered corporate reporting in 2022. Concerns related to continuity, infrastructure, markets and transition were already present. What changes markedly is how these concerns are assembled and positioned. Following the geopolitical shock, previously dispersed elements become more explicitly connected with security of supply, external dependence, strategic autonomy and investment. The contribution of the study therefore lies less in documenting another increase in disclosure than in showing how a systemic vulnerability can acquire a different organisational meaning—and why that meaning varies according to the position a company occupies within the energy system.

2. LITERATURE REVIEW AND CONCEPTUAL FRAMEWORK

2.1. Energy Security as a Multidimensional and Contextual Construct

Energy security has proved difficult to capture through a single definition, partly because what constitutes vulnerability varies across countries, technologies and actors. Earlier approaches centred primarily on availability, affordability and dependence have consequently broadened to include infrastructure, technology, sustainability, governance and resilience. Sovacool and Mukherjee (2011) conceptualise energy security across several interrelated dimensions, while Sovacool et al. (2011) translate this multidimensional perspective into a framework for comparative assessment. Cherp and Jewell (2014) place the vulnerability of vital energy systems at the centre of the concept, and the review by Ang et al. (2015) similarly shows that definitions have expanded and remain strongly dependent on context.

This contextual character becomes particularly relevant at firm level. Indicators such as import dependence or diversification describe systemic vulnerability, but they do not reveal how that vulnerability is experienced by organisations controlling different assets and performing different functions. A gas producer, a distribution-network operator and a nuclear generator confront different dependencies, technological constraints and investment horizons. Energy security is therefore not only multidimensional; its dimensions acquire different organisational significance according to a firm's position within the energy system.

The European energy crisis following Russia's invasion of Ukraine illustrates how rapidly such significance can change. Dependence, diversification, infrastructure and strategic autonomy became increasingly interconnected, while energy policy itself acquired a more explicit geopolitical dimension (Kuzemko et al., 2022; Aitken & Ersoy, 2023; Goldthau & Youngs, 2023). This development also complicated the conventional opposition between security and decarbonisation. Reduced fossil-fuel dependence may diminish established geopolitical vulnerabilities, while simultaneously generating new requirements for grids, flexibility and investment (Kim et al., 2025). The relevant issue is therefore not whether transition and security are inherently complementary or conflicting, but how their relationship is configured in particular organisational and institutional settings.

At corporate level, this has an important implication. Investments in generation capacity, storage, networks, digitalisation or flexibility may simultaneously serve commercial, transition and security objectives. A multidimensional approach is consequently required not to assume that all dimensions matter equally, but to examine how their relative importance and their connections change over time.

2.2. Corporate Disclosure: from Visibility to Organisational Significance

Corporate-reporting research raises a related problem: disclosure does not necessarily indicate organisational commitment. Risk disclosure can increase the visibility of uncertainty, but considerable variation remains in both the definition and measurement of disclosure quality (Ibrahim et al., 2022; Mbithi et al., 2022). Counts of words, sentences or topics can establish whether an issue is reported; they are less capable of showing what position that issue occupies within organisational decision-making.

The distinction is particularly relevant in energy reporting. Security of supply, for example, may appear as an external market condition, an operational risk, a sustainability concern or the rationale for a major investment. Similar terminology therefore need not represent equivalent organisational responses. Acknowledging geopolitical instability is analytically different from connecting it to governance responsibility, diversification decisions or committed resources.

Sustainability-reporting research provides support for this distinction. Corporate reports differ not only in the issues they contain but also in the orientations through which sustainability is represented (Landrum & Ohsowski, 2018), while governance and assurance arrangements can influence reporting quality (Correa-Garcia et al., 2020; Al-Shaer, 2020; Gerwing et al., 2022). Evidence from the energy sector similarly associates governance mechanisms with risk disclosure (Vitolla et al., 2023). These findings suggest that disclosure is better considered relationally: the analytical question concerns not simply what is reported, but how the reported issue is connected to governance, strategy and organisational action.

This distinction becomes sharper when strategic claims are compared with resource commitment. Berrêdo et al. (2024) show that disclosed environmental positioning by oil companies cannot automatically be equated with observable investment behaviour. Reporting nevertheless remains informative because different levels of

disclosure provide different evidence. Risk acknowledgement, operational response, strategic integration and identifiable investment should therefore not be treated as equivalent manifestations of corporate attention.

European reporting regulation adds a further layer to this problem. Earlier efforts to harmonise non-financial reporting increased expectations regarding comparability while leaving considerable variation in practice (La Torre et al., 2018; Manes-Rossi et al., 2018). The CSRD/ESRS framework goes further by strengthening the links among materiality, impacts, risks, opportunities, governance and strategy (Baumüller & Sopp, 2022). Emerging evidence indicates that materiality assessments are becoming more structured and visible in corporate reporting (Dragomir et al., 2025).

Greater formalisation, however, also reduces the discriminating value of simple disclosure breadth. If most firms eventually report most relevant topics, the important variation shifts from whether an issue appears to how it is organisationally positioned. Two firms may disclose identical energy-security themes while one merely acknowledges them and the other connects them to governance, strategy and capital allocation.

This creates a particular difficulty for longitudinal analysis over 2020–2025. The period combines geopolitical disruption with substantial changes in European sustainability reporting. Increased disclosure may therefore reflect changing strategic salience, regulatory formalisation, or both. Rather than assuming that more disclosure represents greater organisational commitment, the analysis needs to distinguish visibility from the depth and strategic location of the reported response.

2.3. Organisational Translation of Energy Security

To make this distinction explicit, we conceptualise organisational translation of energy security as the process through which a systemic vulnerability acquires organisational meaning. External disruption does not enter firms independently of their characteristics. It is interpreted through assets, technologies, dependencies and responsibilities and may subsequently become connected to operational responses, governance arrangements, strategic priorities and resource commitments.

This perspective links two bodies of research that have largely addressed different levels of analysis. Energy-security scholarship identifies systemic vulnerability, dependence and resilience, whereas corporate-reporting research examines how risks, governance, strategy and commitments become publicly represented. Organisational translation connects these perspectives without treating corporate disclosure as direct evidence of realised resilience.

The distinction is important because a common shock need not generate a common organisational response. Companies occupying different positions in the energy system may recognise the same systemic vulnerability while translating it through different assets and strategic possibilities. At the same time, a sufficiently consequential shock should be reflected not only in greater disclosure but also in stronger reported connections between exposure, response, governance, strategy and resources.

The resulting analytical sequence is represented in Figure 1:

Systemic shock → energy-security exposure → organisational translation → resource commitment → strategic energy security

with the firm's position in the energy system operating as a conditioning factor.

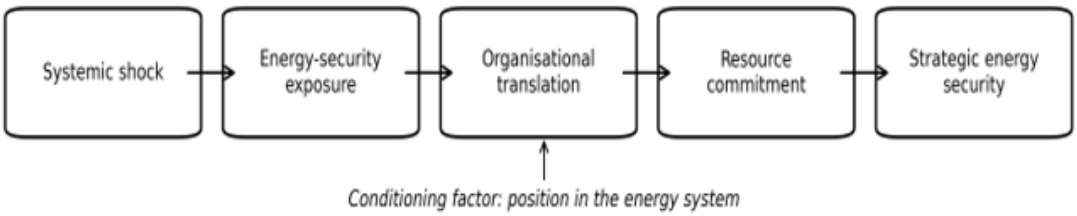


Figure 1: Organisational translation of energy security

The longitudinal perspective makes it possible to examine how these relationships change through a common sequence of disturbances. The period 2020–2025 encompasses the pandemic, the geopolitical and energy rupture beginning in 2022 and the subsequent phase in which energy security remained salient while European reporting increasingly moved towards the ESRS architecture. These phases are interpretive rather than causal: several regulatory, market and strategic developments overlap.

Corporate reporting should therefore be understood here neither as a direct measure of energy security nor as evidence that reported responses have produced resilience. Its analytical value lies elsewhere. Reports make visible how firms publicly connect systemic exposure with organisational response and how those connections change over time. Acknowledgement, operational action, strategic integration and resource commitment consequently represent different levels of reported organisational meaning.

This reasoning also explains why a binary disclosure measure alone is insufficient. Its discriminating power declines as disclosure becomes widespread, while frequency measures can be affected by report length, repetition and regulatory templates. The relevant question for the present study is instead what organisational relationship the report establishes between energy-security exposure and corporate response. The maturity framework developed in the next section operationalises this distinction.

3. METHODOLOGY

The study employs a longitudinal comparative content analysis of corporate reporting by three Romanian listed energy companies—Electrica, Romgaz and Nuclearelectrica—over 2020–2025. Annual, sustainability and non-financial reports constitute the principal documentary sources, complemented where necessary by corporate documents addressing strategy, risk and investment. Multiple report families were examined because relevant energy-security evidence may be distributed across different components of corporate reporting rather than concentrated in a dedicated disclosure section.

The companies were selected to provide variation in their positions within the Romanian energy system. Electrica operates predominantly in electricity distribution and supply, Romgaz in natural-gas production and storage, and Nuclearelectrica in nuclear generation. The sample is therefore analytical rather than statistically representative: it enables the same sequence of external disturbances to be examined across firms characterised by different assets, dependencies and investment horizons.

The six-year period is examined both annually and through three interpretive phases. P1 (2020–2021) captures the pandemic-dominated period; P2 (2022–2023) encompasses the geopolitical and energy shock following the changed European security environment; and P3 (2024–2025) reflects continued security concerns alongside the transition towards the CSRD/ESRS reporting architecture.

The periodisation is descriptive rather than quasi-experimental. Energy-market volatility, European policy developments, corporate investment programmes and changing sustainability-reporting requirements occurred concurrently. The analysis can therefore identify the temporal concentration and persistence of reporting changes, but not isolate the causal effect of any single external development.

3.1. Analytical Dimensions and Coding Scale

Energy security is operationalised through six dimensions derived from the conceptual framework: security of supply (ES1), geopolitical exposure (ES2), price and market resilience (ES3), infrastructure and strategic investment (ES4), energy transition (ES5), and governance and organisational resilience (ES6).

Each firm-year-dimension is coded on a five-level ordinal scale:

0 = absence; 1 = risk acknowledgement; 2 = operational response; 3 = strategic integration; 4 = investment/value creation.

The scale distinguishes increasingly substantive reported connections between an energy-security issue and organisational response. A score of 4 requires identifiable resource or investment commitment linked to anticipated organisational or system value; strategic integration without sufficiently identifiable resource commitment is coded 3. Conversely, absence of the explicit expression energy security does not justify a score of 0 when qualifying evidence is reported through continuity, infrastructure, market risk, diversification, transition or governance.

With three companies, six years and six dimensions, the analytical matrix comprises: 3 companies × 6 years × 6 dimensions = 108 firm-year-dimension coding decisions.

All 108 decisions in the final evidence register were rechecked against the codebook and official corporate reporting corpus, providing a documentary path between the reported evidence and the assigned score. This

complete documentary validation is particularly relevant in a small longitudinal sample, where individual coding decisions may affect company- and year-level indicators.

3.2. Measurement of Breadth, Maturity and Strategic Orientation

Three complementary indicators distinguish different properties of energy-security reporting: Energy Security Disclosure Breadth (ESDB), Energy Security Disclosure Maturity (ESDM), and Strategic Orientation Ratio (SOR).

Energy Security Disclosure Breadth (ESDB) measures the proportion of the six dimensions represented in a firm-year:

ESDB captures coverage rather than depth. Complete breadth can therefore coexist with relatively low maturity.

Energy Security Disclosure Maturity (ESDM) measures the depth of the reported organisational response. Since six dimensions are scored from 0 to 4, the maximum firm-year score is 24:

ESDM retains the distinction between acknowledgement, operational response, strategic integration and investment/value creation.

Strategic Orientation Ratio (SOR) measures the proportion of disclosed dimensions reaching the strategic level, defined as scores of 3 or 4:

The indicators are complementary rather than interchangeable: ESDB measures presence, ESDM maturity and SOR strategic orientation. Their separation avoids interpreting more extensive disclosure automatically as a more substantive organisational response.

3.3. Documentary Validation and Robustness

Coding was based on the substantive relationship expressed in the disclosure rather than on keyword frequency. The evidence register records the report family, documentary source and rationale supporting each score; exact pages were retained where stable pagination was available and document or section locators otherwise.

The study did not employ independent coders and therefore does not report a statistical intercoder-reliability coefficient. Full documentary rechecking, explicit operational definitions and sensitivity analysis strengthen traceability and internal consistency but are not treated as substitutes for independent intercoder reliability. This limitation is explicitly retained in the research design.

The robustness of the longitudinal result was assessed under three progressively conservative recoding specifications: (1) all scores of 4 were collapsed to 3; (2) all positive scores were reduced by one level; and (3) scores in the strategic range (3–4) were reduced by one level. The purpose is not to identify an alternative "correct" coding scheme but to determine whether the principal temporal pattern depends on the thresholds of the baseline maturity scale.

The 2022 discontinuity remains visible under all three specifications. Even under the most restrictive recoding, the increase in ESDM between 2021 and 2022 remains at least 12.5 percentage points. The main longitudinal finding is therefore not dependent on marginal distinctions between adjacent maturity categories.

Table 1: Analytical framework and measurement

Code	Construct	Operational focus
ES1	Security of supply	Continuity of resources, production or delivery
ES2	Geopolitical exposure	War, sanctions, external dependence and regional instability
ES3	Price & market resilience	Price/cost volatility, liquidity and market disruption
ES4	Infrastructure & strategic investment	Modernisation, new capacity, digitalisation and strategic assets
ES5	Energy transition	Low-carbon generation, renewables, efficiency and flexibility
ES6	Governance & organisational resilience	Risk governance, oversight, continuity and managerial responsibility

Code	Construct	Operational focus
Scale 0–4	Maturity scale	0 absent; 1 acknowledgement; 2 operational; 3 strategic; 4 investment/value creation
Indices	ESDB / ESDM / SOR	Breadth / maturity / strategic orientation

Source: Authors' own elaboration based on the literature review and the study's coding framework.

The resulting methodology combines longitudinal comparison with a deliberately differentiated treatment of disclosure. Rather than assuming that more reporting necessarily represents a more strategic response, the framework separates whether an energy-security issue is reported, how far it has been organisationally integrated, and whether the reported response has reached a strategic level. The resulting indicators are descriptive measures of corporate reporting, not direct measures of energy security or realised organisational resilience. This boundary is maintained throughout the interpretation of the empirical results.

4. RESULTS

The longitudinal results reveal a marked change in the maturity of energy-security reporting during 2020–2025. Mean ESDM increases from 58.3% in 2020 to 69.4% in 2021 and then to 93.1% in 2022. It declines moderately to 88.9% in 2023 before returning to 93.1% in both 2024 and 2025. ESDB follows a related pattern, increasing from 88.9% in 2020 to 94.4% in 2021 and reaching 100% from 2022 onwards. SOR rises more sharply, from 55.6% to 76.7% and then to 100%, where it remains throughout 2022–2025.

The period-level comparison makes the concentration of this change particularly visible. Mean ESDM rises from 63.9% in P1 (2020–2021) to 91.0% in P2 (2022–2023), an increase of 27.1 percentage points, whereas P3 (2024–2025) records only a further 2.1-point increase to 93.1%. ESDB similarly moves from 91.7% in P1 to 100% in P2 and P3, while SOR increases from 66.1% to 100%. The principal longitudinal change is therefore concentrated around the transition from P1 to P2 rather than distributed evenly across the six-year period.

Table 2: Longitudinal and comparative results

Year/period	ESDB (%)	ESDM (%)	SOR (%)
2020	88.9	58.3	55.6
2021	94.4	69.4	76.7
2022	100.0	93.1	100.0
2023	100.0	88.9	100.0
2024	100.0	93.1	100.0
2025	100.0	93.1	100.0
P1 2020–21	91.7	63.9	66.1
P2 2022–23	100.0	91.0	100.0
P3 2024–25	100.0	93.1	100.0

Source: Authors' calculations based on the corporate reports of Electrica, Romgaz and Nuclearelectrica (2020–2025).

The temporary reduction in ESDM from 93.1% in 2022 to 88.9% in 2023 occurs while both ESDB and SOR remain at 100%. It therefore reflects changes in the maturity assigned to individual dimensions rather than their disappearance from reporting or loss of strategic status. The subsequent return to 93.1% in 2024–2025 confirms the persistence of the higher post-2021 reporting configuration.

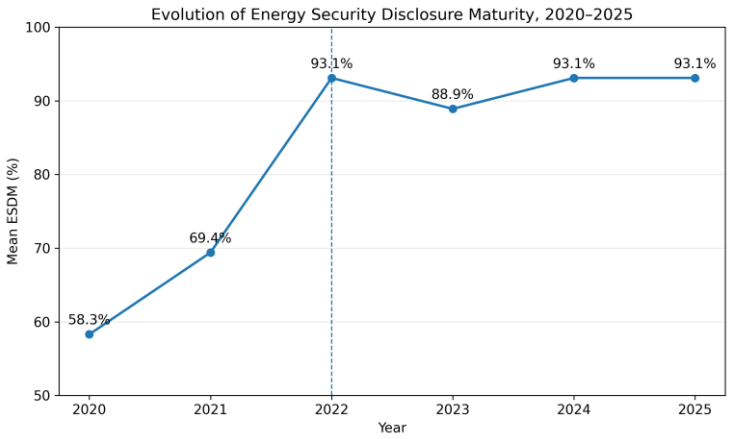


Figure 2: Evolution of mean Energy Security Disclosure Maturity (ESDM), 2020–2025

4.1. Company-Level Trajectories

The aggregate pattern conceals differences among the three companies. Electrica records a six-year mean ESDM of 77.8%. Its ESDM rises from 54.2% in 2020 to 66.7% in 2021 and 87.5% in 2022. Infrastructure and energy transition are already highly mature before 2022, whereas geopolitical exposure initially receives no qualifying disclosure under the coding criteria. The post-2021 change extends this established infrastructure-oriented configuration towards geopolitical and broader security concerns.

Romgaz follows a different trajectory. Starting from the same ESDM values as Electrica in 2020 and 2021, it reaches 91.7% in 2022 and 95.8% in 2024–2025. From 2022 onwards, security of supply and geopolitical exposure reach the highest maturity category, supported by reporting on domestic production, storage, diversification and new gas resources, including Neptun Deep. Romgaz also records the highest six-year mean SOR, at 90.6%.

Nuclearelectrica enters the period from a higher maturity baseline: ESDM increases from 66.7% in 2020 to 75.0% in 2021 and reaches 100% in 2022, remaining at 95.8% thereafter. Its six-year mean ESDM of 88.2% is the highest in the sample. Its reporting is characterised by long-term investment commitments related to refurbishment, stable generation and additional nuclear capacity.

These company averages should not be interpreted as a simple performance ranking. Rather, they reflect different combinations of dimensions and maturity levels associated with the companies' positions and asset structures.

4.2. Changes Across Energy-Security Dimensions

Dimension-level evidence shows that the aggregate change was not uniform. Geopolitical exposure (ES2) displays the clearest discontinuity. In 2020, no qualifying geopolitical disclosure is identified for Electrica or Romgaz, while Nuclearelectrica shows only limited acknowledgement. By 2022, all three companies report this dimension at strategic or investment-related levels.

By contrast, infrastructure and strategic investment (ES4) and energy transition (ES5) are already comparatively mature before 2022, particularly at Electrica and Nuclearelectrica. Security of supply and market resilience occupy an intermediate position: they are visible before 2022 but acquire greater strategic significance thereafter. The post-2021 configuration therefore combines newly prominent geopolitical concerns with the strategic repositioning of dimensions already present in corporate reporting.

Table 3: Organisational configurations of energy security

Company	System position	Dominant configuration	Reported strategic response
Electrica	Distribution & supply	Network/infrastructure security	Grid modernisation, digitalisation, resilience and flexibility
Romgaz	Gas production & storage	Resource/supply security	Domestic production, storage, diversification and new resources

Company	System position	Dominant configuration	Reported strategic response
Nuclearelectrica	Nuclear generation	Strategic generation-capacity security	Refurbishment and development of new nuclear capacity

Source: Authors' own elaboration based on the longitudinal content analysis of corporate reports (2020–2025).

The comparison reveals convergence in the level of reporting after 2022 without equivalent convergence in its configuration. Electrica remains predominantly associated with network and infrastructure security, Romgaz with resources and supply, and Nuclearelectrica with generation capacity and long-term nuclear investment. Thus, a common external environment is reflected through different organisational pathways of strategic integration and resource commitment.

5. DISCUSSION

The findings suggest that the principal change after 2021 was not the appearance of energy security as a new reporting topic, but its repositioning within corporate reporting. Continuity, infrastructure, markets and transition were already visible before 2022; what changed was the extent to which these concerns became connected to geopolitical exposure, security of supply, governance, strategy and resource commitment. This distinction matters because it shifts attention from the volume of disclosure to the organisational meaning attached to it.

Such an interpretation is consistent with approaches that treat energy security as multidimensional and context dependent (Sovacool & Mukherjee, 2011; Cherp & Jewell, 2014; Ang et al., 2015), but extends this reasoning to the firm level. A common external shock does not translate into a uniform organisational response. Electrica, Romgaz and Nuclearelectrica increasingly converge in the strategic level of their reporting after 2022 while retaining different substantive configurations. Network resilience and flexibility remain central to Electrica, resources and supply diversification to Romgaz, and generation capacity and long-term investment to Nuclearelectrica. The firm's position in the energy system therefore appears to condition how systemic vulnerability becomes organisationally meaningful.

This heterogeneity also qualifies the interpretation of disclosure indicators. Research on corporate risk reporting has questioned whether the presence or volume of disclosure adequately captures its quality and organisational significance (Ibrahim et al., 2022; Mbithi et al., 2022), while evidence from the energy sector links governance characteristics to risk disclosure (Vitolla et al., 2023). The present results illustrate the problem empirically. Once ESDB and SOR reach 100%, breadth and strategic orientation provide little additional discrimination, whereas ESDM continues to vary. A topic may therefore be present and strategically framed without being accompanied by an identifiable resource commitment. The distinction between visibility and maturity becomes particularly important once disclosure approaches saturation.

The timing of the change nevertheless requires careful interpretation. The sharp increase between P1 and P2 coincides with the substantial reorientation of European energy policy following Russia's invasion of Ukraine, when dependence, diversification and strategic autonomy became increasingly explicit policy concerns (Kuzemko et al., 2022; Aitken & Ersoy, 2023; Goldthau & Youngs, 2023; Slakaityte et al., 2023). Yet the research design does not establish that geopolitical disruption caused the reporting change. Energy-market conditions, existing investment programmes and evolving European reporting requirements developed simultaneously. The evidence supports the more limited conclusion that the observed shift is temporally associated with the post-2022 energy-security environment and is subsequently consolidated at a high level.

This qualification is especially relevant in the context of the CSRD/ESRS. European reporting reforms strengthen expectations concerning materiality, impacts, risks, opportunities, governance and strategy (Baumüller & Sopp, 2022). Evidence from Romanian listed companies also indicates that double-materiality practices were developing before the new reporting architecture became fully applicable (Dragomir et al., 2025). Regulatory formalisation may therefore increase the completeness and structure of reporting without necessarily producing an equivalent change in the underlying strategic significance of the reported issues.

The chronology nevertheless makes an exclusively compliance-based interpretation difficult to sustain. The most pronounced increase in reported maturity is concentrated around 2022, whereas subsequent years show comparatively little additional movement. A cautious interpretation is therefore that geopolitical disruption increased the organisational salience of energy security, while the emerging European reporting architecture

subsequently provided a more formalised setting in which these concerns could be articulated. The two processes overlap, but they should not be treated as analytically identical.

The findings also contribute to the debate on the relationship between energy security and energy transition. At firm level, the two do not appear as clearly separable agendas. Infrastructure and transition are already comparatively mature before 2022, particularly for Electrica and Nuclearelectrica, and later acquire additional security significance. Grid modernisation may contribute simultaneously to decarbonisation, flexibility and resilience; nuclear investment may combine low-carbon generation with long-term domestic capacity; and gas investment may be connected to diversification and reduced external vulnerability.

This pattern corresponds to a broader reconsideration of the relationship between decarbonisation and security in the European literature. Post-2022 research increasingly emphasises the conditions under which diversification, low-carbon generation and infrastructure investment may contribute to both objectives (Kuzemko et al., 2022; Goldthau & Youngs, 2023; Kim et al., 2025). The present evidence does not establish that transition and security are necessarily complementary. It shows instead that companies increasingly represent them as interconnected, with the nature of that connection depending on their technologies and assets.

An important boundary remains between reported strategic maturity and realised organisational resilience. Corporate reporting can show that management connects a vulnerability to governance, strategy and resources, but it cannot demonstrate that an investment has been completed or that resilience has improved. This distinction is particularly relevant given evidence that disclosed environmental positioning and observable investment behaviour do not necessarily coincide (Berrêdo et al., 2024). Reporting should therefore be interpreted as evidence of organisational positioning rather than as a direct measure of energy-security performance.

This boundary also clarifies the contribution of organisational translation. The concept captures the intermediate process through which systemic vulnerability is interpreted through a firm's assets and dependencies and connected, with different degrees of maturity, to operational response, governance, strategy and resource commitment. It neither assumes an inevitable progression towards higher maturity nor equates reported maturity with superior outcomes. Its analytical value lies in explaining why a common systemic environment can generate convergence in reporting intensity while preserving substantial differences in corporate response.

For users of corporate reporting, the implication is that increasingly complete disclosure should not be confused with economic uniformity. Investors may obtain more decision-relevant information where exposure is connected to governance, strategy and committed resources; managers can use such connections to integrate risk, sustainability and investment narratives; and standard setters should remain attentive to the different economic meanings that apparently comparable disclosures may carry. A network operator, gas producer and nuclear generator can satisfy increasingly standardised reporting expectations while confronting fundamentally different security vulnerabilities and strategic choices.

More broadly, the longitudinal evidence suggests that systemic shocks may affect corporate reporting through recombination and reprioritisation, rather than simply through the addition of new topics. Infrastructure, continuity and transition were present before the geopolitical rupture; their relationship with dependence, supply security and strategic autonomy subsequently changed. Distinguishing the emergence of a topic from the reorganisation of existing concerns provides a more nuanced interpretation of corporate adaptation and helps explain why disclosure breadth alone becomes less informative as reporting matures.

6. CONCLUSIONS

This study examined how energy security was translated into the corporate reporting of three Romanian listed energy companies—Electrica, Romgaz and Nuclearelectrica—between 2020 and 2025. Using 108 validated firm-year-dimension coding decisions and three complementary indicators—ESDB, ESDM and SOR—the analysis distinguished between the presence of energy-security disclosure, its maturity and its strategic orientation.

The findings show a clear longitudinal shift. Mean ESDM increased from 58.3% in 2020 to 93.1% in 2022, with the largest annual change occurring between 2021 and 2022 (+23.6 percentage points). The subsequent trajectory was not strictly linear: maturity declined moderately in 2023 before returning to 93.1% in 2024 and 2025. At the same time, ESDB and SOR reached 100% from 2022 onwards. The principal change was therefore not simply an expansion in the number of energy-security topics disclosed, but a movement towards their stronger strategic integration and, in several cases, explicit resource commitment.

The comparison among companies also shows that this development did not produce a uniform corporate response. Electrica predominantly translated energy security through network and infrastructure resilience, Romgaz through resources, supply and diversification, and Nuclearelectrica through strategic generation capacity and long-term investment. A common systemic shock was thus interpreted through different organisational configurations, reflecting each company's position within the energy system.

The study's central contribution lies in the concept of organisational translation of energy security. The evidence suggests that 2022 did not introduce energy security into corporate reporting. Rather, it changed its organisational meaning. Concerns that had previously appeared across infrastructure, continuity, markets and transition became more explicitly connected to geopolitical exposure, governance, strategy and investment. This distinction also demonstrates why disclosure breadth alone becomes less informative once reporting approaches saturation.

The findings should nevertheless be interpreted within the boundaries of the research design. The sample comprises only three Romanian listed energy companies and does not permit statistical generalisation. Content analysis involves interpretive judgement, and no independent intercoder-reliability coefficient was calculated. Moreover, the study analyses reported organisational maturity rather than realised energy resilience, and the simultaneous influence of geopolitical disruption, market developments and evolving CSRD/ESRS requirements prevents causal attribution to any single factor.

Future research could extend the framework to larger cross-country samples and examine whether reported strategic maturity is subsequently reflected in investment outcomes and measurable resilience. Within the present evidence, however, the main conclusion is clear: the significance of the post-2022 shift lies less in how much companies report about energy security than in where energy security is positioned within corporate strategy and resource commitment.

REFERENCES

Aitken, C., & Ersoy, E. (2023). War in Ukraine: The options for Europe's energy supply. The World Economy, 46, 887–896. https://doi.org/10.1111/twec.13354

Al-Shaer, H. (2020). Sustainability reporting quality and post-audit financial reporting quality: Empirical evidence from the UK. Business Strategy and the Environment, 29, 2355–2373. https://doi.org/10.1002/bse.2507

Ang, B. W., Choong, W. L., & Ng, T. S. (2015). Energy security: Definitions, dimensions and indexes. Renewable and Sustainable Energy Reviews, 42, 1077–1093. https://doi.org/10.1016/j.rser.2014.10.064

Baumüller, J., & Sopp, K. (2022). Double materiality and the shift from non-financial to European sustainability reporting: Review, outlook and implications. Journal of Applied Accounting Research, 23(1), 8–28. https://doi.org/10.1108/JAAR-04-2021-0114

Berrêdo, P. D., dos Santos, O. M., Abdo, H., da Silva Macedo, M. Á., & Losekann, L. D. (2024). Energy transition: Assessing oil companies' compliance with their disclosed environmental strategic positioning. Corporate Social Responsibility and Environmental Management, 31(4), 3517–3534. https://doi.org/10.1002/csr.2760

Cherp, A., & Jewell, J. (2014). The concept of energy security: Beyond the four As. Energy Policy, 75, 415–421. https://doi.org/10.1016/j.enpol.2014.09.005

Correa-Garcia, J. A., Garcia-Benau, M. A., & Garcia-Meca, E. (2020). Corporate governance and its implications for sustainability reporting quality in Latin American business groups. Journal of Cleaner Production, 260, 121142. https://doi.org/10.1016/j.jclepro.2020.121142

Dragomir, V. D., Dumitru, M., Chersan, I. C., Gorgan, C., & Păunescu, M. (2025). Double materiality disclosure as an emerging practice: The assessment process, impacts, risks, and opportunities. *Accounting in Europe, 22*(1), 103–140. https://doi.org/10.1080/17449480.2024.2339264

Gerwing, T., Kajüter, P., & Wirth, M. (2022). The role of sustainable corporate governance in mandatory sustainability reporting quality. Journal of Business Economics, 92, 517–555. https://doi.org/10.1007/s11573-022-01092-x

Goldthau, A. C., & Youngs, R. (2023). The EU energy crisis and a new geopolitics of climate transition. Journal of Common Market Studies, 61(S1), 115–124. https://doi.org/10.1111/jcms.13539

Ibrahim, A. E. A., Hussainey, K., Nawaz, T., Ntim, C., & Elamer, A. (2022). A systematic literature review on risk disclosure research: State-of-the-art and future research agenda. International Review of Financial Analysis, 82, 102217. https://doi.org/10.1016/j.irfa.2022.102217

Kim, J., Jaumotte, F., Panton, A. J., & Schwerhoff, G. (2025). Energy security and the green transition. Energy Policy, 198, 114409. https://doi.org/10.1016/j.enpol.2024.114409

Kuzemko, C., Blondeel, M., Dupont, C., & Brisbois, M. C. (2022). Russia's war on Ukraine, European energy policy responses & implications for sustainable transformations. Energy Research & Social Science, 93, 102842. https://doi.org/10.1016/j.erss.2022.102842

Landrum, N. E., & Ohsowski, B. (2018). Identifying worldviews on corporate sustainability: A content analysis of corporate sustainability reports. Business Strategy and the Environment, 27, 128–151. https://doi.org/10.1002/bse.1989

La Torre, M., Sabelfeld, S., Blomkvist, M., Tarquinio, L., & Dumay, J. (2018). Harmonising non-financial reporting regulation in Europe. Meditari Accountancy Research, 26(4), 598–621. https://doi.org/10.1108/MEDAR-02-2018-0290

Manes-Rossi, F., Tiron-Tudor, A., Nicolò, G., & Zanellato, G. (2018). Ensuring more sustainable reporting in Europe using non-financial disclosure—De facto and de jure evidence. Sustainability, 10(4), 1162. https://doi.org/10.3390/su10041162

Mbithi, E., Moloi, T., & Wangombe, D. (2022). Corporate risk disclosure: A systematic literature review and future research agenda. Cogent Business & Management, 9(1), 2105569. https://doi.org/10.1080/23311975.2022.2105569

Slakaityte, V., Surwillo, I., & Berling, T. V. (2023). A new cooperation agenda for European energy security. Nature Energy, 8, 1051–1053. https://doi.org/10.1038/s41560-023-01322-8

Sovacool, B. K., & Mukherjee, I. (2011). Conceptualizing and measuring energy security: A synthesized approach. Energy, 36(8), 5343–5355. https://doi.org/10.1016/j.energy.2011.06.043

Sovacool, B. K., Mukherjee, I., Drupady, I. M., & D'Agostino, A. L. (2011). Evaluating energy security performance from 1990 to 2010 for eighteen countries. Energy, 36(10), 5846–5853. https://doi.org/10.1016/j.energy.2011.08.040

Vitolla, F., Raimo, N., Campobasso, F., & Giakoumelou, A. (2023). Risk disclosure in sustainability reports: Empirical evidence from the energy sector. Utilities Policy, 82, 101587. https://doi.org/10.1016/j.jup.2023.101587

Burnout in Financial Institutions: Challenges and Remedies

Ivan LUCHIAN[1] **Angela FILIP[2]**

[1] PhD, Associate Professor, Moldova State University, ivan.luchian@usm.md, ORCID: 0000-0002-8683-7228

[2] PhD, Associate Professor, Moldova State University, filipangela05@gmail.com, ORCID: 0000-0003-2359-860X

Abstract: Purpose of the article: The purpose of this study is to examine the nature of burnout in financial institutions, its underlying causes, the challenges it creates, and possible remedies.

Methodology: The research was based on the collection of publicly available information from Internet sources, which was subsequently analyzed using methods of analysis and synthesis.

Conclusions: Burnout in financial institutions refers to a state of extreme emotional, physical, and mental exhaustion caused by prolonged and poorly managed workplace stress. Studying burnout in financial institutions is essential for preventing serious consequences, such as high employee turnover, reduced cognitive performance, and diminished organizational effectiveness. Burnout in financial institutions is typically driven by a combination of excessive workloads, intense performance pressure, and continuous regulatory changes. These systemic workplace demands gradually deplete employees' physical and emotional resources, ultimately leading to emotional exhaustion, disengagement, and reduced job performance. The main challenges associated with burnout in financial institutions include a zero-tolerance approach to errors, an "always-on" work culture, high employee attrition and talent loss, reduced productivity, increased cynicism, and heightened reputational and operational risks. Effectively addressing burnout requires a comprehensive three-level approach that includes organizational redesign to eliminate structural bottlenecks, managerial support aimed at fostering a healthy organizational culture, and individual empowerment to promote resilience and healthy work-life boundaries. Organizational strategies include: eliminating repetitive manual tasks; allowing finance teams to work smarter rather than longer; reducing overlapping and activity-heavy initiatives; implementing strict policies such as caps on weekend work, "unplugged" vacation times, and wellness days. Managerial cultural support contains: training leaders to recognize the early signs of emotional exhaustion, detachment, and dropping performance; implementing a culture where workers can use allocated time-off and disclose mental health struggles without fearing career repercussions. Individual empowerment measures refer to: taking advantage of dedicated mental health days; setting strict operational hours; minimizing after-hours emails; allowing time to disconnect; building a healthy work-life balance; learning to triage tasks based on actual urgency rather than perceived pressure; leveraging company-sponsored, confidential counseling and professional psychological support as soon as exhaustion sets in.

Originality: This topic has received limited scholarly attention in the Republic of Moldova despite its significant importance for the effective management of financial institutions.

Keywords: burnout; financial institution; factors; consequences; challenges; remedies.

1. INTRODUCTION

Burnout within financial institutions is characterized by intense emotional, physical, and mental exhaustion resulting from prolonged and insufficiently managed workplace stress. This condition may arise when persistent pressures in the financial sector, including strict deadlines, extended working hours, and stringent regulatory requirements, exceed an employee's capacity to cope effectively. (Azedi Tehrani et al., 2021), (Pluxee, 2026)

The financial sector is particularly susceptible to burnout, whose consequences may affect both employees and organizations as a whole. (Caseware, 2023)

Burnout is not merely a state of physical and mental fatigue caused by work; it is also characterized by psychological detachment and a reduced sense of professional accomplishment. Employees experiencing burnout may exhibit reduced work engagement and increasing difficulty in completing professional tasks effectively. For financial institutions, these effects may contribute to missed deadlines, lower productivity, and a diminished capacity for innovation. (Caseware, 2023)

Addressing burnout is not solely the responsibility of employees. Organizations should also implement measures aimed at reducing its incidence and organizational impact. Therefore, addressing burnout requires a combination of appropriate managerial practices, employee support mechanisms, and technologies capable of streamlining repetitive tasks and improving information management. (Caseware, 2023)

Although burnout has traditionally been viewed primarily as an individual issue related to personal resilience, it is increasingly recognized as a systemic organizational problem requiring structural interventions.

The purpose of this paper is to examine the nature, causes, and consequences of burnout in financial institutions and to identify potential measures for its prevention and mitigation.

2. CAUSES AND THREATS OF BURNOUT IN THE FINANCIAL SECTOR

2.1. Causes of burnout among finance professionals

Employee burnout in financial institutions stems from a complex combination of factors that, when persistent, may lead to emotional exhaustion and reduced professional performance (Bailey, 2026), (Caseware, 2023), (Christopher.J), (Parkin, 2025), (Pluxee, 2026), (Siwosz), (Williamson, 2025):

- A *heavy workload* becomes a significant driver of burnout when work demands persistently exceed an employee's cognitive, emotional, and physical capacity for recovery. It is widely recognized as a major structural contributor to burnout in banking, asset management, and corporate finance and may contribute to emotional exhaustion, depersonalization, and a reduced sense of personal accomplishment. (Moss)

In financial institutions, a heavy workload involves more than simply a high volume of tasks and may result from a combination of several high-pressure operational factors:

- Extended working hours and a high volume of transactions, client portfolios, or trades that must be processed simultaneously.
- High cognitive demands arising from a low tolerance for errors. Calculation or data-processing errors may result in regulatory penalties, financial losses for clients, or inappropriate corporate decisions.
- Inflexible deadlines determined by external market conditions, regulatory requirements, and fixed reporting cycles, such as month-end closing or tax periods.
- The accumulation of additional administrative burdens, such as complex ESG reporting, anti-money laundering compliance requirements, and continuous digital notifications, without corresponding increases in staffing or available time.

- Work-related *pressure* in financial institutions arises from strict accountability requirements, regulatory compliance obligations, demanding performance targets, and limited time available to complete complex tasks. Unrealistic targets and high transaction volumes may require employees to accomplish substantial workloads within short timeframes, while errors can carry significant financial or legal consequences. This environment may create a persistent imbalance between high-stakes demands and opportunities for recovery, thereby increasing the risk of workplace burnout.

Work-related pressure in finance may involve the following important aspects:

- Operating in a high-consequence environment in which errors may result in substantial financial losses, regulatory penalties, or broader operational risks.
- Continuous pressure to meet demanding sales targets, tight reporting deadlines, assets-under-management growth objectives, or strict trading benchmarks.
- Managing an expanding range of compliance requirements, including anti-money laundering (AML) protocols and environmental, social, and governance (ESG) reporting obligations.
- The blurring of work-life boundaries through hybrid working arrangements and global client demands, which may reduce opportunities for recovery and create expectations of extended availability.

- *Monotonous and repetitive tasks* may contribute significantly to employee burnout in financial institutions. Although financial work requires high levels of accuracy, the routine performance of manual data entry, compliance checks, and reconciliation tasks can reduce employee energy and engagement.

- *Poor work-life balance* represents another important contributor to chronic occupational burnout, particularly when extended working hours, demanding compliance requirements, and an 'always-on' hybrid work culture erode personal boundaries.

Key structural drivers of this problem are:

- Lean staffing models and hiring freezes may increase the workload of existing employees, particularly during intensive reporting and regulatory periods.
- Hybrid and remote working arrangements may blur the boundaries between professional responsibilities and personal time, extending work-related communication into evenings and weekends.
- Work environments characterized by very low tolerance for financial or compliance errors may create substantial psychological pressure and decision fatigue.

➢ Fear of adverse career consequences may discourage employees from setting appropriate boundaries or acknowledging exhaustion, thereby increasing the risk of disengagement.

➢ *Limited control and autonomy* refer to working conditions in which employees have little influence over their daily tasks, schedules, deadlines, or decision-making processes despite substantial levels of responsibility. When banking and finance professionals operate within rigid hierarchical structures, face extensive regulatory requirements, and experience micromanagement while having limited involvement in decision-making, feelings of helplessness may gradually develop. The mismatch between high accountability and low decision-making autonomy may contribute to emotional exhaustion and disengagement. Employees may have limited discretion in prioritizing tasks or determining work schedules and deadlines. Instead, they are required to perform a wide range of responsibilities aimed at protecting clients and ensuring compliance with regulatory requirements. This limited control may reduce motivation, while poor management practices can contribute to exhaustion even in roles that otherwise provide some degree of autonomy. Micromanagement may also reduce employees' confidence, initiative, and capacity for creative problem-solving. Employees who feel undervalued may gradually reduce their discretionary effort and become increasingly passive in responding to managerial demands.

➢ *Intense interpersonal demands* may generate sustained psychological, emotional, and social strain through frequent high-stakes interactions with clients, colleagues, managers, shareholders, and regulatory authorities. Continuous emotionally demanding interactions, particularly with clients, may further contribute to employee exhaustion.

➢ *Frequent workplace interruptions* are non-routine disruptions that interfere with employees' concentration and cognitive continuity. In fast-paced financial environments, repeated notifications, meetings, and unexpected requests may contribute to chronic stress and, over time, increase the risk of burnout.

➢ *Seasonal workload peaks* in financial institutions are predictable, recurring periods of unusually high work demands associated with specific calendar events. When accompanied by extended working hours and insufficient recovery time, these periods may increase the risk of employee burnout.

2.2. Signs and indicators of burnout in financial institutions

Signs of burnout in finance teams typically emerge gradually and may be reflected in changes in work quality, process efficiency, communication, attendance, and employee retention. Burnout is rarely attributable to a single incident; an isolated mistake, missed deadline, or difficult meeting is generally insufficient to indicate its presence. Assessment should instead focus on identifying persistent patterns over time and determining whether current performance differs substantially from the employee's or team's usual level, including during predictable high-pressure periods such as month-end closing, audits, or budget cycles.

Several interrelated indicators affecting employees' mental, emotional, and physical well-being may signal the development of burnout, particularly when they persist or intensify over time (Christopher.J), (Parkin, 2025), (Pluxee, 2026), (Williamson, 2025):

- *Persistent exhaustion* is a core dimension of occupational burnout and is characterized by chronic physical and emotional depletion that is not adequately alleviated by regular rest periods, weekends, or vacations. Employees may remain exhausted despite time away from work and may experience difficulty restoring their physical and psychological resources, which can impair their ability to fulfil professional responsibilities.
- *Declining performance* may involve a measurable reduction in work quality, speed, and accuracy associated with chronic occupational exhaustion. Mental strain and emotional exhaustion can hinder an employee's ability to perform routine tasks effectively. Employees may also experience a noticeable decline in

productivity and in their capacity for innovative thinking, while maintaining concentration on complex tasks may become increasingly difficult, potentially resulting in delays and reduced job satisfaction.

- *Detachment and cynicism* may function as psychological defense mechanisms in response to chronic workplace stress. They can involve gradual emotional and psychological distancing from clients, colleagues, and essential job responsibilities. Such responses may develop as employees attempt to cope with intense performance pressures, demanding compliance requirements, and ongoing exposure to risk. Over time, employees may become increasingly isolated, indifferent, or negative toward colleagues, clients, or the organization.

- *Emotional volatility* refers to rapid and pronounced changes in an employee's emotional state associated with prolonged occupational stress. In high-stakes financial environments, chronic exhaustion may reduce an individual's capacity for emotional regulation. Increased irritability, anxiety, or mood fluctuations may create tension in professional and personal interactions. Such emotional instability may further intensify occupational stress and negatively affect workplace relationships.

- *Cognitive overload* occurs when the volume of information or tasks exceeds a person's mental processing capacity.

- *Severe fatigue* associated with burnout may involve persistent physical and mental exhaustion that is not fully relieved by ordinary periods of rest. This condition may impair daily cognitive functioning, decision-making, and professional efficacy.

- *Reduced engagement and motivation* refer to a psychological state in which employees become increasingly detached from their roles, experience reduced motivation to perform, and show a decline in emotional investment in their work.

- A *declining sense of achievement* is a core psychological component of occupational burnout and is characterized by persistent feelings of ineffectiveness, failure, and reduced professional accomplishment.

- *An increase in errors* may serve as an important operational warning sign of severe employee burnout in financial institutions. Chronic mental exhaustion and cognitive overload can impair attention to detail and thereby increase compliance, financial, and reputational risks in high-accountability sectors.

- *Withdrawal from collaboration and development opportunities* may represent a behavioral manifestation of burnout in which employees disengage from teamwork and professional development. In financial institutions, this may involve a transition from active engagement toward a more defensive working pattern characterized by avoidance of additional responsibilities, training opportunities, and strategic interactions.

- *Physical symptoms* may include recurring headaches, sleep disturbances, and other stress-related complaints. Such manifestations can intensify the psychological burden associated with burnout and may further impede recovery when appropriate intervention is absent.

2.3. Early signs of burnout in financial institutions

Early burnout in financial institutions may be reflected in a gradual transition from sustained high performance to emotional detachment, cognitive fatigue, and reduced accuracy. Before severe exhaustion develops, employees may exhibit subtle behavioral, cognitive, emotional, and physical changes associated with prolonged exposure to high-stakes responsibilities, intensive reporting cycles, and an 'always-on' organizational culture. (Christopher.J), (Parkin, 2025), (Williamson, 2025)

In financial institutions, the early signs of burnout typically appear as gradual negative changes in an employee's usual behavior and work accuracy, often preceding severe exhaustion or eventual departure from the organization. Given the high-pressure nature of the financial sector, where extended working hours are often normalized, these warning signs may be dismissed as temporary fatigue. However, early identification of changes in behavior and performance is important for reducing the risk of serious operational, legal, and compliance-related consequences. (Parkin, 2025), (Pluxee, 2026), (Williamson, 2025)

Early signs of burnout in financial institutions can be grouped as follows (Burnett, 2025), (Christopher.J), (Connolly Counselling Centre), (Grant, 2022), (Johnson Block, 2023), (Murray State University, 2022), (Randstad, 2025a), (Williamson, 2025):

- *Behavioral and performance shifts*
  - ✓ Minor oversights start to accumulate as employees miss details, resulting in more frequent small mistakes, reconciliation issues, or adjustments during audits.
  - ✓ Team members who once actively contributed begin withdrawing—speaking less in meetings, offering fewer ideas, and appearing disengaged.
  - ✓ Workers gradually distance themselves, avoiding casual team interactions and showing hesitation when asked to collaborate on shared projects.
  - ✓ Work patterns may shift from proactive planning toward increasingly reactive problem-solving and last-minute responses.
- *Cognitive and emotional warning signs*
  - ✓ Routine decisions or standard financial reviews may begin to require noticeably more time to complete.
  - ✓ Employees may increasingly express dissatisfaction or cynicism toward clients, supervisors, or organizational policies.
  - ✓ Employees may remain psychologically connected to work outside regular working hours and experience difficulty disengaging from market demands or compliance-related deadlines.
  - ✓ Minor criticism or routine managerial requests may trigger disproportionate frustration or defensive reactions.
- *Physical manifestations*
  - ✓ Persistent exhaustion may remain present even after a full night's sleep when rest is no longer sufficiently restorative.
  - ✓ Difficulty falling asleep or maintaining sleep may become a recurring pattern over time.
  - ✓ Recurring headaches, digestive problems, or an increase in short-term absences may accompany prolonged occupational stress**.**

2.4. Challenges posed by burnout to financial institutions

Burnout can undermine the organizational stability of financial institutions by increasing operational risk, reducing decision-making quality, and contributing to employee turnover. In high-stakes banking and financial settings, persistent employee fatigue may adversely affect organizational performance and client trust. (Ciavaldini, 2025), (Pluxee, 2026)

According to a ReclaimAI poll, 58.3% of finance and accounting professionals reported experiencing burnout associated with poor work-life balance, while 83.3% indicated that they lacked sufficient time for focused work, a problem associated with frequent meetings, notifications, and interruptions throughout the day. (Caseware, 2023)

Research reported by LemonEdge, a digital accounting platform serving the private capital and venture capital sectors, indicated that 31% of surveyed banking and financial services professionals intended to leave their jobs because of high levels of occupational pressure. (Nascimento, 2022)

Gallup reports that employees experiencing burnout are 63% more likely to take a sick day and 2.6 times more likely to actively seek a different job. The estimate concerning employee replacement costs should be supported by a specific source directly linked to this statement.

Other studies further illustrate the scale of the problem (Ciavaldini, 2025):

- ✓ Among the surveyed financial-sector employees reporting high stress levels, 48% identified the workplace as the primary source of stress.
- ✓ Mental health-related absenteeism generates substantial financial costs, while affected employees reportedly miss an average of 12 working days.

- ✓ Burnout and other mental health problems are reported to account for a notable share of employee turnover; the percentages presented here should be clarified to avoid ambiguity regarding the relationship between the 29% and 14% figures.

A career in finance can be financially rewarding and professionally fulfilling; however, the sector is also associated with substantial burnout risk across organizational levels. Burnout may contribute to higher employee turnover and to the development of an unhealthy organizational climate. (Caseware, 2023)

Based on the reviewed sources, the main challenges associated with burnout in financial institutions can be summarized as follows (Caseware, 2023), (Grant, 2022), (Parkin, 2025), (Pluxee, 2026), (Williamson, 2025):

- Prolonged occupational stress may contribute to the departure of highly qualified employees from financial institutions or from the financial sector more broadly.
- Reduced professional efficacy and a diminished sense of personal accomplishment associated with burnout may contribute to disengagement, lower productivity, and reduced creativity.
- Cognitive overload may increase the likelihood of errors in data entry, risk assessment, and compliance-related activities.
- Mental exhaustion may reduce employees' ability to concentrate, potentially impairing the speed and quality of financial decision-making.
- Employees experiencing burnout may withdraw from strategic client development, teamwork, and activities requiring creative or innovative input.
- Mental health-related stress may contribute to increased sickness absence and associated organizational costs.
- The departure of experienced managers and analysts may disrupt team performance and increase recruitment, onboarding, and replacement costs.

3. MANAGING BURNOUT IN FINANCIAL INSTITUTIONS

3.1. General approaches

Burnout within financial institutions represents both a significant operational risk and an organizational culture challenge. Because the sector combines high levels of accountability, very low tolerance for errors, sustained regulatory pressure, and demanding workloads, unaddressed employee exhaustion may impair decision-making, increase the likelihood of financial errors, and raise staff turnover costs. (Ciavaldini, 2025), (CoachHub, 2025), (Connolly Counselling Centre), (Pluxee, 2026), (Williamson, 2025)

When signs of occupational burnout are identified among employees of a financial institution, several organizational measures may be considered (Caseware, 2023), (Pluxee, 2026):

- To address burnout effectively, financial institutions should move beyond viewing it primarily as an individual problem and increasingly treat it as an organizational and operational risk. Because the financial sector combines high personal accountability, regulatory scrutiny, very low tolerance for error, and intense time constraints, mitigation requires structural changes alongside appropriate mental health support.
- It is advisable to optimize operations by automating repetitive manual tasks and reassessing workforce capacity rather than relying exclusively on individual-level coping measures.
- Financial institutions should foster a supportive and inclusive organizational culture in which employees can discuss work-related concerns, feel respected, and seek appropriate support when they experience excessive pressure or exhaustion.

An effective response to employee burnout in financial institutions may involve a three-level approach: organizational redesign to address structural constraints, managerial support for cultural change, and individual empowerment to strengthen healthy work-life boundaries. These approaches are examined below.

3.2. Organizational strategies for addressing burnout in financial institutions

Identifying inefficient work practices is essential because such practices can increase time losses, duplicate effort, and contribute to employee frustration. Operational inefficiencies may generate backlogs and uneven workload distribution, leaving some employees with substantially greater demands than others. Workload audits and careful task management can help address these problems by supporting a more equitable distribution of work and ensuring that performance expectations and deadlines remain realistic. (Caseware, 2023)

Managers should model appropriate work-life boundaries. Where operationally feasible, they should avoid sending non-urgent emails outside regular working hours or expecting employees to respond or complete tasks during personal time. Financial institutions should establish policies that protect employees' non-working time and discourage unnecessary work-related communication outside regular working hours. (Caseware, 2023)

Financial institutions may implement policies protecting personal time and establishing email quiet hours so that employees are not routinely expected to respond to non-urgent messages during weekends or late at night.

Organizational strategies may also include (Bailey, 2026), (Pluxee, 2026), (Randstad, 2025b), (Remire, 2026):

- Automating repetitive tasks may help reduce employee burnout in financial institutions by limiting exposure to high-stress, low-value work. Reducing employees' reliance on repetitive manual data-entry activities may improve engagement and contribute to lower turnover intentions.

- Improving the efficiency of finance teams requires reducing manual bottlenecks, streamlining complex compliance processes, and reallocating employee effort toward higher-value analytical and strategic activities. Addressing burnout as a structural operational risk rather than solely as an individual problem may support the retention of highly qualified employees and improve operational accuracy.

- To reduce burnout associated with multiple overlapping initiatives, management should prioritize activities that generate meaningful organizational value rather than continuously expanding the volume of simultaneous projects. Financial institutions may be particularly exposed to change fatigue because regulatory reforms, digital transformation initiatives, and legacy-system migrations frequently occur simultaneously.

- Implementing organizational wellbeing policies, such as limits on weekend work, protected vacation periods, and dedicated wellbeing days, may contribute to reducing employee burnout. However, their effectiveness depends on organizational norms that genuinely allow employees to use these provisions without fear of negative career consequences. Any quantitative claim concerning burnout rates, including the stated figure of approximately 55%, should be retained only if it is directly supported by the cited source. Such policies are unlikely to be effective unless they are reinforced by clear organizational rules and consistent managerial practices.

- Indicators of persistent team burnout should be treated as relevant operational and risk-management indicators rather than solely as routine human-resource metrics.

3.3. Managerial and cultural support for reducing employee burnout

Supporting employee mental health and wellbeing is another important component of burnout prevention. Employers can demonstrate commitment by taking active measures to strengthen psychological and emotional wellbeing. Such measures may include communicating evidence-based stress-management guidance, providing confidential counselling services, and offering voluntary workplace wellbeing initiatives. (Caseware, 2023)

Managerial and cultural support measures may include:

- Managers require appropriate training to monitor workloads realistically, establish clear communication boundaries, and support the effective use of time-off policies.

- Training managers to recognize early signs of emotional exhaustion, detachment, and declining performance can facilitate timely intervention.

3.4. Individual empowerment to promote healthy boundaries

Individual empowerment represents an important component of a broader strategy for preventing and managing burnout in high-pressure financial environments. Greater employee autonomy in establishing appropriate work-life boundaries may support retention and reduce the risks associated with chronic exhaustion.

Individual empowerment measures may include:

- *Dedicated mental health days* may provide employees with short-term opportunities for psychological recovery during periods of acute occupational stress. However, their effectiveness as a standalone intervention is limited when underlying workload and organizational culture problems remain unaddressed. In high-pressure environments such as investment banking, trading, and compliance, chronic stress, extended working hours, and expectations of continuous availability may contribute to burnout risk. Although designated wellbeing leave allows employees to step away from work temporarily, its effectiveness depends substantially on structural organizational support and psychological safety. (Wong, 2022), (Chapman Institute, 2025), (Ifeelonline)

- *Establishing clear working-hour* boundaries may constitute an important organizational measure for reducing burnout risk in financial institutions. The financial sector is frequently characterized by expectations of extended availability, which may contribute to chronic occupational stress and employee turnover.

- *Minimizing after-hours email* involves limiting or delaying non-urgent work-related communications outside regular working hours. Such practices can facilitate psychological detachment from work, support recovery, and contribute to a healthier work-life balance. Within financial institutions, this practice may help reduce the pressure associated with an 'always-on' organizational culture and may also reduce anticipatory stress related to the expectation of receiving and responding to work-related communications outside regular working hours. (Parkin, 2025), (Goodman, 2026)

- *Task triage* involves shifting from a reactive approach toward prioritization based on objective business importance and urgency. In some financial institutions, organizational norms may create the perception that a large proportion of tasks require an immediate response. This perceived pressure may contribute to chronic stress and increase the risk of burnout. The ability to distinguish genuine urgency from perceived organizational pressure can help employees regain greater control over workload prioritization.

- Access to confidential, *employer-sponsored counselling* can provide an important form of early intervention when employees begin to experience persistent exhaustion or other symptoms associated with burnout.

4. CONCLUSION

Employee burnout represents a significant systemic challenge for financial institutions, particularly in working environments characterized by heavy workloads, high-stakes responsibilities, intense performance pressures, continuous regulatory changes, and expectations of extended availability. Over time, these occupational demands may deplete employees' psychological and physical resources, contributing to emotional exhaustion, disengagement, reduced professional efficacy, and an increased likelihood of errors. The consequences may extend beyond individual wellbeing and adversely affect organizational performance, operational resilience, employee retention, and workplace culture. Given the high level of responsibility and regulatory compliance required in the financial sector, preventing and managing burnout should therefore be regarded as both a human-resource priority and an operational risk-management concern. Effective responses should combine organizational interventions aimed at workload and process design, supportive managerial practices, and individual strategies that facilitate recovery and healthy work-life boundaries.

REFERENCES

Azedi Tehrani Sharareh, Keshtkar Abbasali, Ramasamy Akilesh, Fadaei Majid (2021) The worldwide prevalence of burnout syndrome among bank employees: a systematic review and meta-analysis protocol. https://pmc.ncbi.nlm.nih.gov/articles/PMC8557009/ (Accessed August 21, 2026)

Bailey Kelly (2026) Finance Team Burnout: A Leadership Guide to Causes and Solutions. https://corporatefinanceinstitute.com/resources/team-development/finance-team-burnout/ (Accessed August 22, 2026)

Burnett (2025) 5 Signs Your Finance Team Is Burning Out. https://burnettspecialists.com/blog/5-signs-your-finance-team-is-burning-out/ (Accessed August 24, 2026)

Caseware (2023) Causes of Burnout in Finance Professionals. https://www.caseware.com/resources/blog/causes-of-burnout-in-finance-professionals. (Accessed August 20, 2026)

Christopher J. Understanding and Addressing Burnout in Banking: A Path to Recovery and Resilience. https://bohangar.com/addressing-burnout-therapy-can-help/ (Accessed August 21, 2026)

Connolly Counselling Centre. Preventing and Managing Burnout in the Financial Sector. https://www.counsellor.ie/preventing-and-managing-burnout-in-the-financial-sector/ (Accessed August 24, 2026)

Chapman Institute (2025) Banking & Finance Employee Wellness: Reducing Stress in a High-Pressure Industry. https://chapmaninstitute.com/banking-finance-employee-wellness-reducing-stress-in-a-high-pressure-industry/ (Accessed August 25, 2026)

Ciavaldini Fernanda (2025) The impact of mental health on the financial industry: a success story. https://ifeelonline.com/occupational-health/financial-industry/ (Accessed August 24, 2026)

CoachHub (2025) Leadership Under Pressure: Building Resilient Leaders in Financial Services. https://www.coachhub.com/blog/building-resilient-leaders-in-financial-services (Accessed August 24, 2026)

Grant Amanda (2022) How to prevent employee burnout in the finance sector. https://www.oneadvanced.com/resources/how-to-prevent-employee-burnout-in-the-finance-sector/ (Accessed August 24, 2026)

Goodman Sarah (2026) Pinged After Dark: Email Expectations, Burnout, and Employment Law Risk. https://www.offitkurman.com/offit-kurman-blogs/after-hours-email-expectations-hybrid-workplace-risks (Accessed August 25, 2026)

Ifeelonline. Mitigate human capital risk: Strengthen your financial institution's resilience. https://ifeelonline.com/financial-services/ (Accessed August 25, 2026)

Johnson Block (2023) Proactively identifying and addressing employee burnout. https://www.johnsonblock.com/accounting-news/proactively-identifying-and-addressing-employee-burnout/ (Accessed August 24, 2026)

Moss Jennifer. How Workload Affects Burnout. https://www.jennifer-moss.com/how-workload-effects-burnout (Accessed August 22, 2026)

Murray State University (2022) Fighting Burnout in the Field of Finance. https://onlinedegrees.murraystate.edu/programs/business/mba/finance/fighting-burnout-in-finance/ (Accessed August 24, 2026)

Nascimento Jamie (2022) Burnout mounts as a third of banking and financial services plan to leave the industry due to high pressure. https://www.lemonedge.com/news/burnout-mounts-as-a-third-of-banking-and-financial-services-plan-to-leave-the-industry-due-to-high-pressure (Accessed August 24, 2026)

Parkin Emma (2025) Addressing Burnout in Financial Services – How HR Can Tackle the Rising Risk in 2025. https://www.theaccessgroup.com/en-gb/blog/hcm-addressing-burnout-in-finance/ (Accessed August 21, 2026)

Pluxee (2026) How to alleviate the risk of burnout in the finance industry. https://www.pluxee.uk/blog/how-to-alleviate-the-risk-of-burnout-in-the-finance-industry/ (Accessed August 21, 2026)

Randstad (2025a) F&A professionals and burnout: recognising the signs and taking action. https://www.randstad.co.uk/career-advice/career-guidance/finance-accounting-worklife-balance/f-a-burnout/ (Accessed August 24, 2026)

Randstad (2025b) Stop managing burnout, eliminate it with finance automation. https://www.randstad.co.uk/career-advice/career-guidance/finance-automation-burnout-solution/ (Accessed August 24, 2026)

Remire (2026) Top Workplace Burnout Solutions in 2026: Best Strategies, Tools, and Remedies for Every Organization. https://remire.co/top-workplace-burnout-solutions/ (Accessed August 24, 2026)

Siwosz Kasia. Burnout in Investment Banking — The Industry That Manufactures It. https://www.kasiasiwosz.com/burnout-investment-banking (Accessed August 22, 2026)

Williamson Betsy (2025) Burnout in Financial Services: A Resourcing and Culture Challenge, Not Just a Wellbeing Issue. https://www.linkedin.com/pulse/burnout-financial-services-resourcing-culture-challenge-r0f8e (Accessed August 21, 2026)

Wong Bernie (2022) The Futility Of Mental Health Days. https://www.mindsharepartners.org/blog/the-futility-of-mental-health-days (Accessed August 25, 2026)

Tacit and Technical Capability: Distinct Associations with BDA-Related Performance in Albania

Megi Marku[1]

[1] PhD, Faculty of Economy and Agribusiness, Agricultural University of Tirana, Email:mmarku@ubt.edu.al, ORCID: 0009-0004-1575-2990

Abstract: Organizational analytical capability is often treated in prior research as a unified, homogeneous construct, yet growing evidence suggests that its knowledge-based and technology-based dimensions may play distinct roles in shaping performance outcomes. This study investigates the relationship between tacit and technical capability among large taxpayers adopting Big Data Analytics (BDA) in Albania and examines their associations with organizational performance. The analysis is based on survey data collected from large taxpayers operating across multiple economic sectors. The study focuses specifically on BDA-adopting large taxpayers and distinguishes between two dimensions of organizational analytical capability: tacit capability, reflecting accumulated analytical knowledge, experience, employee-level analytical engagement, and training investment, and technical capability, representing the use of organizational digital systems and technological infrastructure. Descriptive statistics, Spearman correlation analysis, and multiple regression analysis were employed to examine the relationships between the capability dimensions and organizational performance. Both capability dimensions were positively associated with organizational performance; however, when both were considered jointly, only tacit capability retained a statistically significant unique association with performance. The results suggest that accumulated analytical expertise, organizational learning, and practical analytical engagement are uniquely associated with organizational performance beyond the association captured by technical capability. The study contributes to the growing literature on BDA capability and organizational performance by distinguishing between tacit and technical analytical capability dimensions among large taxpayers in an emerging economy context.

Keywords: Big Data Analytics; Tacit Capability; Technical Capability; Analytical Capability; BDA Adoption

INTRODUCTION

Big Data Analytics has emerged as an essential organizational competency that facilitates data-driven decision-making, enhances operational efficiency, and strengthens strategic competitiveness across various industries. The swift proliferation of digital technology, enterprise information systems, and organizational data collection has markedly heightened the significance of analytical capabilities in contemporary organizations. Organizations are increasingly capable of converting massive and complicated datasets into meaningful strategic insights through advanced analytical techniques, including predictive analytics, machine learning, and cognitive analytics (Wamba et al., 2017; Maroufkhani et al., 2020). Nonetheless, despite increasing technology expenditures in BDA infrastructure, organizations significantly vary in their capacity to transform analytical technologies into quantifiable organizational value. Current literature increasingly indicates that the organizational value derived from BDA is not solely contingent upon technology infrastructure, but also on the availability of organizational analytical expertise, experience, and learning capacity (Gupta & George, 2016; Huynh et al., 2023). As a result, analytical capability is increasingly regarded as a multifaceted organizational construct encompassing both tacit and technical elements of capability. Tacit capability denotes latent organizational knowledge, accrued analytical experience, employee engagement in analysis, and learning processes that facilitate the effective interpretation and application of analytical discoveries. Tacit knowledge, in contrast to explicit technical resources, is typically challenging to formalize, transfer, or replicate; yet, it is essential for enhancing organizational adaptability and the quality of decision-making (Cho et al., 2020; Liu et al., 2024). Recent advancements in cognitive analytics and machine learning have underscored the strategic significance of tacit analytical capability within businesses. Cognitive analytics systems are becoming adept at discerning concealed patterns and deriving insights from unstructured organizational data, enabling organizations to leverage kinds of tacit knowledge that were previously unattainable (Maymir-Ducharme & Angelelli, 2014). Prior research indicates that employee communication, inventive capability, and analytical engagement are significant tacit capability characteristics that enhance organizational performance and knowledge-sharing efficacy (Yazici et al., 2022). These viewpoints indicate that analytical proficiency and organizational learning processes may significantly impact the organizational advantages derived from BDA deployment. Simultaneously, organizations necessitate robust technical proficiency to facilitate enhanced analytical processes and data-driven transformation. Technical capability denotes the technological infrastructure, integration of corporate systems, and digital analytical resources that facilitate the adoption of BDA into organizational processes.

Contemporary digital infrastructures increasingly depend on scalable cloud architectures, integrated ERP and CRM systems, and collaborative analytical platforms that provide extensive data processing, visualization, and real-time analytics (Astrova et al., 2018; Frenzel et al., 2018). Prior studies indicate that businesses with enhanced digital integration and analytical infrastructure are typically more equipped to facilitate organizational responsiveness and analytics-driven innovation (Gökalp & Martinez, 2021). However, the increasing intricacy of big data settings also presents significant organizational issues. The escalating volume and speed of data necessitate that organizations manage intricate analytical infrastructures while concurrently tackling challenges associated with cybersecurity, data governance, and a deficit of experienced analytical specialists (Vaghani, 2025). These difficulties are especially significant in emerging economies, as firms often encounter constraints related to digital maturity, technical investment, and analytical proficiency. The incorporation of BDA into smart infrastructure, such as transportation systems and digital organizational ecosystems, raises further cybersecurity and governance issues that organizations must resolve to guarantee sustainable analytics implementation (Serrano, 2020). While prior research has extensively investigated BDA adoption and organizational analytical capability, comparatively limited attention has been devoted to distinguishing between tacit and technical capability within organizations that have already adopted BDA technologies. Current research often considers analytical capability as a singular organizational entity, neglecting to explicitly analyze the respective associations of knowledge-based and infrastructure-based capability dimensions with organizational performance. This constraint is especially pronounced in emerging economies like Albania, where empirical evidence on organizational analytical capability is notably limited. This study examines the associations between tacit capability, technical capability, and organizational performance in large taxpayers adopting BDA in Albania, thereby addressing a research gap. The study especially investigates whether dimensions of tacit knowledge-related capabilities or dimensions of technical infrastructure-related capabilities retain a unique association with organizational performance. The study enhances the existing literature on BDA capability, organizational learning, and digital transformation in the context of emerging economies by differentiating between these two dimensions of organizational analytical capability. The primary contribution of this study is conceptual rather than methodological: rather than proposing a new statistical technique, the study advances the BDA capability literature by empirically distinguishing between tacit and technical dimensions of organizational analytical capability—a distinction that remains comparatively underexplored empirically, particularly among BDA-adopting organizations in emerging economy contexts.

Table 1 summarizes representative prior studies on BDA capability and organizational performance, situating the present study's explicit focus on the tacit–technical distinction relative to existing research.

Table 1. Summary of Prior Studies on BDA Capability and Organizational Performance

Author(s)	Context / Sample	Capability Focus	Key Finding
Gupta & George, 2016	Survey; US firms	Tangible, human, and intangible resources	Human skills and intangible resources complement technology in building BDA capability
Wamba et al., 2017	Firms; China	BDA capability	BDA capability enhances firm performance through dynamic capabilities
Maroufkhani et al., 2020	SMEs	TOE framework	TOE factors jointly determine BDA adoption
Huang et al., 2022	Manufacturing firms; China	Technical capability	Data–tool fit mediates the relationship between technical capability and performance
Cui et al., 2022	Firms; mixed sectors	Capability building and education	Capability building strengthens business model innovation
Huynh et al., 2023	Systematic review; 54 studies	BDA capability	Highlights fragmentation in the conceptualization of BDA capability
Arshad et al., 2024	Firms; developing country	Organizational readiness	Organizational readiness predicts sustainable innovation performance
Liu et al., 2024	Enterprises; China	Intellectual capability	Person–tool fit mediates the effect of intellectual capability on operational performance

Author(s)	Context / Sample	Capability Focus	Key Finding
Aljehani et al., 2024	Telecom firms; Saudi Arabia	Technical capability	Technical capability strengthens the BDA capability–performance relationship
Ooi et al., 2026	Firms; mixed sectors	BDA capability and data governance	Data governance strengthens the effect of BDA capability on organizational outcomes

Source: Author's compilation

METHODOLOGY

This study employed a quantitative research design to examine the relationship between tacit capability, technical capability, and organizational performance among large taxpayers adopting BDA. The empirical analysis was based on survey data collected from 121 large taxpayers operating in Albania across multiple economic sectors, including manufacturing, trade, services, and other business activities. From the total sample, 42.1% (51 firms) of large taxpayers reported active adoption of BDA technologies. Since the objective of the study was to investigate organizational capability differences specifically among BDA adopters, only large taxpayers reporting active BDA adoption were retained for the empirical analysis. The questionnaire included multiple-item measures related to organizational analytical capability, digital systems use, and organizational performance. Attitudinal variables were measured using five-point Likert scales ranging from 1 (“Strongly Disagree”) to 5 (“Strongly Agree”). The study distinguished between two dimensions of organizational analytical capability: Tacit Capability and Technical Capability. Tacit Capability reflected knowledge-related and experience-based dimensions of organizational analytical capability. This construct included variables related to BDA experience, BDA knowledge, employee-level analytical engagement, and training investment. These variables were selected to capture accumulated analytical expertise, organizational learning, practical analytical involvement, and organizational investment in capability development. Technical Capability represented the technological and infrastructure-related dimension of BDA capability. This construct was based on the organizational use of digital systems and analytical infrastructures supporting BDA implementation, including ERP systems, CRM systems, HRM systems, accounting systems, and other digital analytical technologies used within organizational processes (Huang et al., 2022). Accordingly, the Tacit and Technical Capability indexes used in this study are best understood as empirical proxies, or composite indicators, of knowledge-based and technology-based analytical capability, rather than as direct measures of the underlying latent constructs. Organizational performance was measured using a composite performance index derived from multiple items reflecting large taxpayers' perceptions regarding operational and strategic performance outcomes. Unlike the capability-related items, the performance items were measured on a three-point ordinal scale (1 = decreased, 2 = unchanged, 3 = increased). The final performance index was computed as the mean of the corresponding performance indicators and therefore ranges from 1 to 3. Prior to analysis, all capability-related variables were standardized using z-score transformation in order to eliminate scale differences between Likert-scale, binary, and continuous variables. Composite capability indexes were subsequently constructed using the standardized values of their corresponding indicators. Reliability analysis was conducted for the multi-item Likert-based scales, and the Cronbach's Alpha coefficients exceeded the commonly accepted threshold of 0.70. Because the capability indexes combine heterogeneous indicators (Likert-scale, binary, and continuous), they were treated as composite indexes, for which internal consistency is not a necessary criterion. Descriptive statistics were initially calculated to examine the distributional properties of the main variables included in the study. Spearman correlation analysis was employed to assess the monotonic associations between tacit capability, technical capability, and organizational performance, given the distributional characteristics of the variables. Finally, multiple linear regression analysis was performed to evaluate the simultaneous associations of tacit and technical capability with organizational performance. The regression model assessed the unique association of each capability dimension with performance while controlling for the other. All statistical analyses were conducted using R statistical software. Variance inflation factors were below conventional thresholds, indicating no problematic multicollinearity. The methodological approach enabled the study to distinguish between knowledge-based and technology-based dimensions of organizational analytical capability while examining their respective associations with organizational performance among BDA-adopting large taxpayers.

RESULTS

This section presents the empirical findings regarding tacit and technical capability among BDA-adopting large taxpayers and their relationship with organizational performance. The analysis proceeds in three stages. First, descriptive statistics are reported for the main variables included in the study. Second, Spearman correlation analysis is employed to assess the bivariate relationships between the two capability dimensions and organizational performance. Finally, multiple regression analysis is used to evaluate the simultaneous associations of tacit and technical capability with organizational performance.

Table 2. Descriptive Statistics

Variable	Min	Q1	Median	Mean	Q3	Max
Tacit Capability	-2.059	-0.347	0.158	0.000	0.386	1.038
Technical Capability	-2.735	-0.195	0.388	0.000	0.388	0.388
Performance Index	1.000	2.500	2.833	2.722	3.000	3.000

Source: Author's Calculations

Table 2 presents the descriptive statistics for the main variables included in the analysis. Both capability indexes are centered at zero by construction, with negative values indicating below-average capability relative to the sample, and exhibit left-skewed distributions, with medians above the means and long lower tails. The performance index demonstrates relatively high values overall, with a mean value of 2.722 and a median of 2.833, suggesting generally positive perceptions of organizational performance among BDA adopters. Because Technical Capability was constructed from a small number of discrete system-usage indicators, a substantial share of large taxpayers attained the maximum standardized value, which explains why the median, third quartile, and maximum coincide.

Table 3. Spearman Correlation Results

Variables	rho	p-value
Tacit Capability – Performance	0.288	0.040
Technical Capability – Performance	0.310	0.027
Tacit Capability – Technical Capability	0.395	0.004

Source: Author's Calculations

As shown in Table 3, both tacit and technical capabilities are positively associated with organizational performance. Tacit Capability demonstrated a positive and statistically significant relationship with performance (rho = 0.288, p = 0.040), indicating that large taxpayers with higher analytical knowledge, accumulated experience, employee-level analytical engagement, and training investment tend to report higher performance levels. Similarly, Technical Capability also exhibited a positive and significant relationship with performance (rho = 0.310, p = 0.027), suggesting that more extensive use of organizational digital systems is associated with higher perceived organizational performance. The correlation between Tacit Capability and Technical Capability was moderate (rho = 0.395), indicating that the two dimensions are related but conceptually distinct.

Table 4. Regression Results

Predictor	Estimate	Std. Error	t-value	p-value
Intercept	2.722	0.049	55.703	<0.001
Tacit Capability	0.190	0.088	2.170	0.035
Technical Capability	0.106	0.073	1.443	0.155

Source: Author's Calculations

Model fit: $R^2 = 0.230$; Adjusted $R^2 = 0.198$; $F(2, 48) = 7.167$; $p = 0.002$

Table 4 presents the results of the multiple regression analysis examining the associations of tacit and technical capability with organizational performance. The regression model was statistically significant ($F(2, 48) = 7.167$, $p = 0.002$) and explained approximately 23% of the variance in organizational performance ($R^2 = 0.230$; Adjusted $R^2 = 0.198$). When both capability dimensions were included simultaneously, Tacit Capability retained a statistically significant unique association with organizational performance (B = 0.190, SE = 0.088, t = 2.170, p = 0.035), indicating that higher levels of tacit capability are associated with higher perceived performance, holding technical capability constant. Technical Capability, in contrast, was positively but not significantly associated with performance (B = 0.106, SE = 0.073, t = 1.443, p = 0.155). These results indicate that, once the overlap between

the two dimensions is taken into account, only tacit capability retains a unique association with organizational performance among BDA-adopting large taxpayers.

DISCUSSION AND CONCLUSIONS

The findings of this study indicate that large taxpayers adopting BDA technologies exhibit positive associations between both capability dimensions and organizational performance, with only tacit capability retaining a significant unique association once both dimensions are considered jointly. The correlation analysis demonstrated that both tacit capability and technical capability are positively associated with organizational performance. Large taxpayers characterized by higher levels of accumulated analytical knowledge, employee analytical engagement, and technological integration reported higher levels of perceived organizational performance. These findings are consistent with previous literature emphasizing that BDA capability contributes positively to organizational agility, innovation capability, and strategic responsiveness (Maroufkhani et al., 2020; Aljehani et al., 2024). The moderate correlation identified between tacit and technical capability further suggests that although the two dimensions remain conceptually distinct, they operate as interconnected components of organizational analytical maturity. However, the regression analysis revealed an important distinction between the two capability dimensions. When tacit and technical capability were examined simultaneously, tacit capability retained a statistically significant unique association with organizational performance, whereas technical capability did not retain a statistically significant unique association. These findings suggest that knowledge-related organizational capability dimensions, including analytical expertise, organizational learning, employee analytical engagement, and accumulated experience, retain a unique association with organizational performance beyond technological infrastructure. The findings reinforce the growing literature emphasizing the strategic importance of human capital and organizational knowledge in analytics-driven transformation. Previous studies suggest that organizations possessing stronger analytical and technical human capital are more capable of effectively utilizing BDA technologies and converting analytical outputs into strategic organizational value (Utami et al., 2025). Similarly, Al-Alshare et al. (2025) argue that knowledge management capability enhances firms' ability to integrate analytical insights into organizational processes and strategic decision-making. The present findings support these perspectives by showing that tacit analytical capability retains a unique association with organizational performance among BDA adopters. At the same time, the findings do not diminish the importance of technical capability. The positive bivariate association observed between technical capability and organizational performance suggests that technological infrastructure and integrated digital systems may nevertheless represent relevant organizational enablers of BDA implementation (Ooi et al., 2026). The positive bivariate association suggests that the use of ERP, CRM, HRM, and other integrated digital systems may support data-driven organizational processes, although technical capability did not retain a statistically significant unique association in the multivariate model. Nevertheless, the regression results suggest that the performance-related role of technical capability may be closely intertwined with tacit capability, including analytical expertise, organizational learning, and practical analytical engagement. The study contributes to the existing literature in several ways. First, it extends current BDA capability research by explicitly distinguishing between tacit and technical dimensions of organizational analytical capability rather than treating analytical capability as a single homogeneous construct. Second, the study provides empirical evidence from Albania, an emerging economy environment where research regarding BDA capability and organizational analytical maturity remains relatively limited (Arshad et al., 2024). Third, the findings contribute to the growing discussion regarding the role of human capital, organizational learning, and digital maturity in supporting analytics-driven organizational transformation. From a practical perspective, the findings suggest that organizations aiming to strengthen BDA capability should focus not only on technological investments but also on developing internal analytical expertise, employee analytical engagement, and organizational learning mechanisms. These findings highlight the potential value of analytical training, knowledge-sharing practices, and continuous capability development for large taxpayers seeking to strengthen the organizational value derived from BDA technologies (Cui et al., 2022).

This study has several limitations. First, the cross-sectional design and the reliance on self-reported performance perceptions preclude causal inference and may introduce common method bias. Second, the empirical analysis is based on 51 BDA-adopting large taxpayers; this relatively small sample may increase sensitivity to sampling variability and limit the precision and generalizability of the regression estimates. Third, although capability indicators were standardized prior to composite construction and the multi-item scales showed acceptable reliability (Cronbach's Alpha above 0.70), composite indexes based on mean standardized scores may not fully capture the latent multidimensionality of the tacit and technical capability constructs. Fourth, the discrete and

ceiling-affected distribution of Technical Capability, in which a substantial share of respondents attained the maximum standardized value, may have attenuated its regression coefficient independently of its substantive explanatory importance. Future research could address these limitations by employing confirmatory factor analysis on larger samples to validate the measurement structure proposed in this study, and by using finer-grained or continuous indicators of technical infrastructure use to mitigate range restriction.

Further studies could also examine additional dimensions of organizational analytical capability, including organizational culture, managerial support, digital strategy, and data governance capability, while comparative analyses across industries and countries could clarify how contextual and institutional factors shape the development of tacit and technical capability among BDA-adopting organizations.

REFERENCES

Al-Alshare, F. A., Allahham, M. I., & Alfawaerh, N. H. S. (2025). The big data analytics to digital marketing path strengthened by knowledge management. *International Journal of Data and Network Science, 10*(1), 137–150. https://doi.org/10.5267/j.ijdns.2025.10.007

Aljehani, S. B., Abdo, K. W., Alam, M. N., & Aloufi, E. M. (2024). Big data analytics and organizational performance: Mediating roles of green innovation and knowledge management in telecommunications. *Sustainability, 16*(18), 7887. https://doi.org/10.3390/su16187887

Arshad, M., Qadir, A., Ahmad, W., & Rafique, M. (2024). Enhancing organizational sustainable innovation performance through organizational readiness for big data analytics. *Humanities and Social Sciences Communications, 11*(1), 1–15. https://doi.org/10.1057/s41599-024-03424-4

Astrova, I., Koschel, A., Heine, F., & Kalja, A. (2018). Scalable Hadoop-based infrastructure for big data analytics. In A. Lupeikiene, O. Vasilecas, & G. Dzemyda (Eds.), *Databases and information systems* (Communications in Computer and Information Science, Vol. 838, pp. 233–242). Springer. https://doi.org/10.1007/978-3-319-97571-9_19

Cho, S. Y., Happa, J., & Creese, S. (2020). Capturing tacit knowledge in security operation centers. *IEEE Access, 8*, 42021–42041. https://doi.org/10.1109/ACCESS.2020.2976076

Cui, Y., Firdousi, S. F., Afzal, A., Awais, M., & Akram, Z. (2022). The influence of big data analytic capabilities building and education on business model innovation. *Frontiers in Psychology, 13*, 999944. https://doi.org/10.3389/fpsyg.2022.999944

Frenzel, J., Sastri, Y., Lehmann, C., Lazariv, T., Jäkel, R., & Nagel, W. E. (2018). A generalized service infrastructure for data analytics. In *2018 IEEE Fourth International Conference on Big Data Computing Service and Applications (BigDataService)* (pp. 25–32). IEEE. https://doi.org/10.1109/BigDataService.2018.00013

Gökalp, E., & Martinez, V. (2021). Digital transformation capability maturity model enabling the assessment of industrial manufacturers. *Computers in Industry, 132*, 103522. https://doi.org/10.1016/j.compind.2021.103522

Gupta, M., & George, J. F. (2016). Toward the development of a big data analytics capability. *Information & Management, 53*(8), 1049–1064. https://doi.org/10.1016/j.im.2016.07.003

Huang, X., Yang, S., Wang, J., Lin, F., & Jiang, Y. (2022). The influencing mechanism of big data analytics technology capability on enterprise's operational performance: The mediating role of data-tool fit. *Frontiers in Psychology, 13*, 948764. https://doi.org/10.3389/fpsyg.2022.948764

Huynh, M.-T., Nippa, M., & Aichner, T. (2023). Big data analytics capabilities: Patchwork or progress? A systematic review of the status quo and implications for future research. *Technological Forecasting and Social Change, 197*, 122884. https://doi.org/10.1016/j.techfore.2023.122884

Liu, Y., Qiao, H., Wang, J., & Jiang, Y. (2024). Influencing mechanism of the intellectual capability of big data analytics on the operational performance of enterprises. *Heliyon, 10*(3), e25032. https://doi.org/10.1016/j.heliyon.2024.e25032

Maroufkhani, P., Tseng, M.-L., Iranmanesh, M., Ismail, W. K. W., & Khalid, H. (2020). Big data analytics adoption: Determinants and performances among small to medium-sized enterprises. *International Journal of Information Management, 54*, 102190. https://doi.org/10.1016/j.ijinfomgt.2020.102190

Maymir-Ducharme, F. A., & Angelelli, L. A. (2014). Cognitive analytics: A step towards tacit knowledge? *Journal of Systemics, Cybernetics and Informatics, 12*(4), 32–38. https://doaj.org/article/cc597b6f035440b9954ddea3e46c0e79

Ooi, S. K., Balasundaram, U., & Amran, A. (2026). Leveraging big data analytics capability for firm performance: The moderating role of data governance. *Business Process Management Journal*. Advance online publication. https://doi.org/10.1108/BPMJ-07-2025-1164

Serrano, W. (2020). Big data in smart infrastructure. In K. Arai, S. Kapoor, & R. Bhatia (Eds.), *Intelligent systems and applications: IntelliSys 2020* (Advances in Intelligent Systems and Computing, Vol. 1251). Springer. https://doi.org/10.1007/978-3-030-55187-2_51

Utami, S. P., Maharsyah, A., Wibawa, B. M., Hanoum, S., & Durman, T. Y. (2025). The impact of transformational leadership and big data analytics capability on firm performance in FMCG industry. *Journal of Social Research, 5*(1). https://doi.org/10.55324/josr.v5i1.2934

Vaghani, D. (2025). Technical challenges in scaling data infrastructure. In M. M. T. Ayyalasomayajula (Ed.), *AI and the revival of big data* (pp. 81–106). IGI Global Scientific Publishing. https://doi.org/10.4018/979-8-3693-8472-5.ch004

Wamba, S. F., Gunasekaran, A., Akter, S., Ren, S. J. F., Dubey, R., & Childe, S. J. (2017). Big data analytics and firm performance: Effects of dynamic capabilities. *Journal of Business Research, 70*, 356–365. https://doi.org/10.1016/j.jbusres.2016.08.009

Yazici, I., Beyca, O. F., Gurcan, O. F., Zaim, H., Delen, D., & Zaim, S. (2022). A comparative analysis of machine learning techniques and fuzzy analytic hierarchy process to determine the tacit knowledge criteria. *Annals of Operations Research, 308*(1), 753–776. https://doi.org/10.1007/s10479-020-03697-3

Entrepreneurial Support Infrastructure and Startup Activity: Evidence from Slovak Regions

Katarína Belanová[1]

[1] Bratislava University of Economics and Business, Slovakia, e-mail: katarina.belanova@euba.sk, ORCID: 0000-0003-2634-9238

Abstract: Startups are increasingly recognised as an important source of innovation, competitiveness, and regional economic development. Their emergence and growth, however, depend not only on firm-level capabilities but also on the quality of the surrounding entrepreneurial ecosystem. This paper examines the relationship between entrepreneurial support infrastructure, represented by incubators and accelerators, and startup activity across the eight regions of Slovakia. Using cross-sectional data for 2025, the study applies an Ordinary Least Squares regression model supplemented by heteroskedasticity-robust standard errors and bootstrap estimation in order to account for the small sample size. The results indicate a statistically significant positive association between the number of incubators and accelerators and the number of startups in individual regions. Regions with more developed support infrastructure, particularly Bratislava and Košice, also display substantially higher levels of startup activity. Nevertheless, the findings should be interpreted as evidence of association rather than causality due to the cross-sectional design, the limited number of observations, and the possibility of endogeneity. The study contributes to the literature on entrepreneurial ecosystems by providing regional-level evidence from a small Central European economy and highlights the potential importance of strengthening startup support infrastructure in less developed regions.

Keywords: incubators, accelerators, start - ups

1. INTRODUCTION

Start-ups play a significant role in shaping both the current and future entrepreneurial ecosystem within the economy of every country. They represent a segment of business that is inextricably linked to innovation, technological progress and economic growth.

In Slovakia, start-ups are legally defined by Act No. 290/2016 Coll. on the support of small and medium-sized enterprises and Act No. 71/2013 Coll. on the provision of grants within the remit of the Ministry of Economy of the Slovak Republic as “commercial companies required to establish share capital, with their registered office in the Slovak Republic, which have been in existence for no more than 36 months and which are controlled by natural persons who are their founders, and which are innovative enterprises, micro-enterprises, small enterprises or medium-sized enterprises.”

A key element of a successful start-up is sustainability. This means that a start-up must have the capacity to survive and thrive in the long term. Achieving sustainability involves several key factors that need to be considered and addressed.”

Factors influencing the creation and development of start-ups can be divided into internal and external factors. Internal factors, such as the quality of the business plan, the team’s experience and capabilities, and market adaptability, are undoubtedly key to a start-up’s success. However, these factors represent only a small part of the overall picture, as external factors – particularly the business environment, government support and the availability of funding – often have a decisive influence on whether a start-up will be able to survive and grow.

It is clear that support organisations play a significant role within the start-up ecosystem, providing start-ups with invaluable assistance in their growth and development. Among the most important support organisations are incubators and accelerators, which offer start-ups not only physical workspace but also expert advice, mentoring, access to funding and networking opportunities. Whilst incubators focus on supporting fledgling firms in their early stages, accelerators provide intensive support with the aim of accelerating growth and preparing firms for further investment.

The concept of the start-up ecosystem has become central to contemporary research on entrepreneurship and regional economic development. Isenberg (2010) introduced the idea that entrepreneurship flourishes within interconnected systems comprising institutions, investors, universities, culture and support organisations. Similarly, Stam (2015) conceptualised entrepreneurial ecosystems as a set of interdependent actors and factors coordinated in such a way as to enable productive entrepreneurship.

Ács, Autio, and Szerb (2014) emphasised that the quality of national and regional ecosystems significantly determines entrepreneurial performance and innovation capacity. According to Feld (2012), vibrant start-up ecosystems are typically geographically concentrated and driven by dense networks of entrepreneurs, mentors, and investors. These findings are consistent with agglomeration theory (Porter, 1998), which suggests that geographical concentration enhances knowledge spillovers and innovation.

From a regional perspective, Audretsch and Belitski (2017) argue that local institutional frameworks and support mechanisms have a greater impact on entrepreneurial outcomes than national-level policies. This highlights the importance of examining entrepreneurship at the regional level rather than solely at the national level.

In this regard, business incubators and accelerators are widely recognised as key components of entrepreneurial ecosystems. Hackett and Dilts (2004) describe incubators as organisations designed to accelerate the growth and success of start-ups through the provision of resources, mentoring and access to networks. Bruneel et al. (2012) further differentiate between traditional incubators and more network-based models, emphasising the evolution towards value-added services.

Accelerators, as defined by Cohen and Hochberg (2014), provide time-limited, cohort-based programmes that include mentorship and educational components, often culminating in investor presentations. Empirical research suggests that accelerators improve start-up survival rates and fundraising success (Hallen, Bingham & Cohen, 2020).

Pauwels et al. (2016) identify distinct accelerator models and highlight their role in reducing information asymmetries between start-ups and investors. Furthermore, Gonzalez-Uribe and Leatherbee (2018) demonstrate that participation in accelerators can enhance innovation output and strategic orientation.

At the regional level, Fehder and Hochberg (2014) find that the establishment of accelerators has a positive impact on regional entrepreneurial activity and venture capital investment. These findings suggest that incubators and accelerators may act as catalysts for local start-up development.

Start-up formation is influenced by multiple factors, including access to finance, human capital, institutional quality, and market conditions (Acs et al., 2014; Stam, 2015). Regional characteristics such as population density, GDP per capita, and knowledge infrastructure significantly shape entrepreneurial outcomes (Audretsch & Belitski, 2017).

Research also highlights the importance of knowledge spillovers from universities and research institutions (Audretsch & Lehmann, 2005). The availability of venture capital and innovation capacity are frequently identified as strong predictors of start-up intensity (Porter, 1998; Feld, 2012).

However, whilst numerous studies analyse entrepreneurial ecosystems at national level, fewer focus on intra-country regional disparities, particularly in smaller Central and Eastern European economies.

Although the literature discusses entrepreneurial ecosystems and the role of incubators and accelerators at length, several gaps remain:

1. Geographical gap – Whilst extensive research has examined start-up ecosystems in developed economies such as the United States (Feld, 2012; Fehder & Hochberg, 2014) and Western Europe (Audretsch & Belitski, 2017), empirical evidence from Central and Eastern Europe remains limited. In Slovakia, existing analyses are predominantly descriptive (SBA, Sapie) and lack regional econometric analysis.

2. Regional-level analysis gap – Although several studies examine entrepreneurial ecosystems at the national level (Acs et al., 2014; Szerb et al., 2019), fewer studies empirically test ecosystem infrastructure at the subnational level, particularly in smaller economies such as Slovakia.

3. Quantitative relationship gap – Previous research has predominantly assessed the effectiveness of incubators and accelerators at the firm level (Hackett & Dilts, 2004; Hallen et al., 2020). However, limited attention has been paid to the aggregate regional relationship between the number of support institutions and start-up intensity.

4. Policy relevance gap – Despite the growing policy emphasis on strengthening entrepreneurial infrastructure, empirical evidence from small open economies remains insufficient to guide regional investment decisions regarding the expansion of incubators.

Therefore, this study contributes to the literature by empirically examining the relationship between the number of incubators and accelerators and startup activity across Slovak regions. By focusing on a small open economy

with significant regional disparities, it provides context-specific evidence that may inform regional innovation and entrepreneurship policy.

Building on this research gap, the aim of this article is to examine whether the regional availability of incubators and accelerators is associated with startup activity in Slovakia. Accordingly, the following research question was formulated: Does the regional availability of incubators and accelerators significantly influence startup activity in Slovakia?

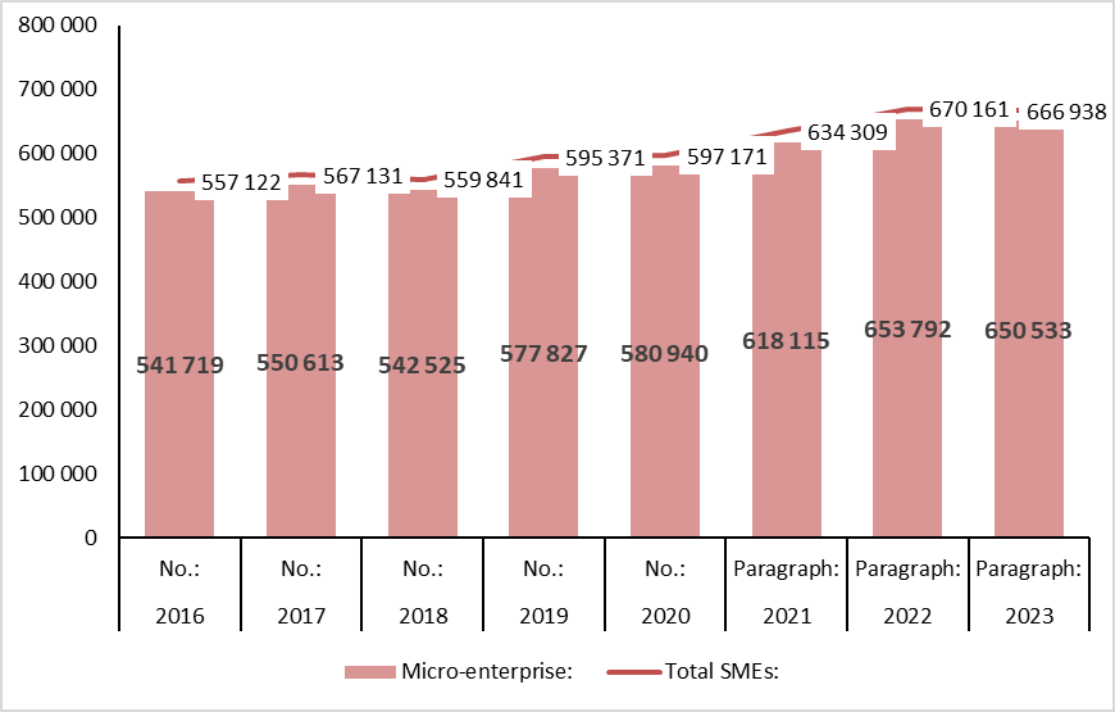
The empirical analysis indicates a statistically significant positive relationship between the availability of incubators and accelerators and the number of startups. In particular, regions with the highest concentration of support organizations, such as Bratislava and Košice, also exhibit the highest levels of startup activity.

2. MATERIAL AND METHODS

As mentioned in the Introduction to this article, start-ups in the Slovak Republic belong to the SME category.

SMEs form a very important part of our economy. Each year, they account for approximately 99.9 per cent of the total number of businesses, whilst large enterprises represent only 0.1 per cent. The importance of the small and medium-sized enterprise sector in Slovakia is greater than in other countries. According to available data from 2023, we can confirm that the number of SMEs per capita in Slovakia is one of the highest in the European Union. According to European Commission estimates from 2023, there were 99 SMEs per 1,000 inhabitants in Slovakia, which was the second-highest figure in the EU, with only the Czech Republic recording a higher number – 102 (SBA, 2023).

Figure 1: Trends in the absolute number of SMEs and micro-enterprises for the years 2016–2023



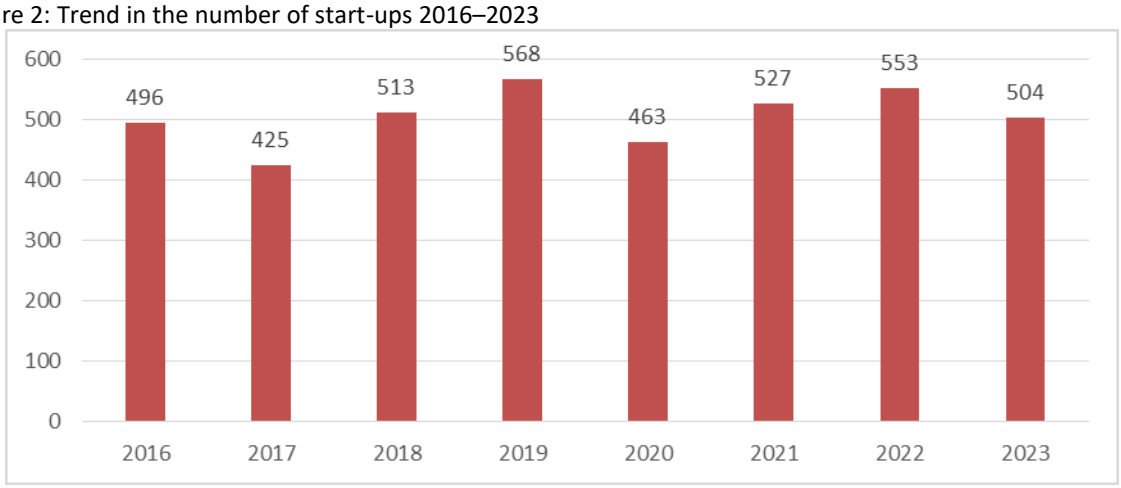
Source: Own analysis

Figure 1 illustrates the trend in the absolute number of SMEs and micro-enterprises. Micro-enterprises constitute the largest share of the sector in every year, with their number reaching 653,792 in 2022. This high proportion of micro-enterprises may be due to several factors that influence entrepreneurs' decisions. Key factors include lower risk and lower start-up costs. Micro-enterprises often operate on the basis of sole traders or small teams, which allows them flexibility and makes it easier to adapt to changing market conditions. However, although micro-enterprises make up the majority of SMEs, their growth and expansion are constrained by legislative requirements and high social security contributions. These factors can lead to a reluctance on the part of entrepreneurs to employ more people, as increasing the number of staff brings not only higher wage costs but also more complex administrative obligations.

Micro-enterprises, as the largest group within small and medium-sized enterprises, provide a significant breeding ground for the emergence of start-ups. Start-ups often share similar characteristics with micro-enterprises, particularly in terms of innovation and low start-up costs. In the early stages of their business, they have a similar level of flexibility to micro-enterprises; however, thanks to their innovative potential and ambitions, they can achieve significant growth.

Figure 2 shows the trend in the number of start-ups between 2016 and 2023.1

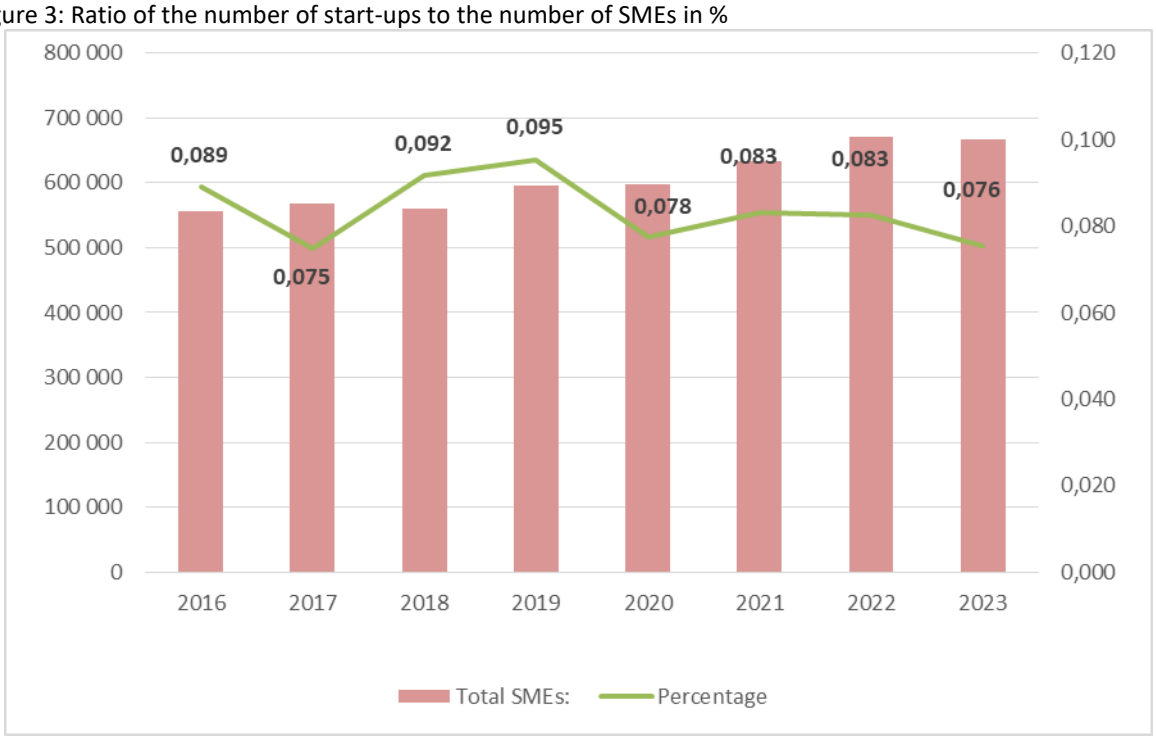
Figure 2: Trend in the number of start-ups 2016–2023



Source: Own compilation

As can be seen from Figure 2, the trend in the number of start-ups is highly volatile. The highest number was recorded in 2019, when it reached 568 start-ups, whilst the lowest number was in 2017, followed in recent years by 2020, when there were only 463 start-ups. This decline can be attributed primarily to the onset of COVID-19 and its negative impact on the business environment. Such volatility is typical for start-ups, as they are high-risk ventures. They are dependent on external sources of funding, and if they fail to secure sufficient funding, they are forced to cease operations in the early stages of their business. For this reason, start-ups do not grow at the same rate as, for example, micro-enterprises.

Figure 3: Ratio of the number of start-ups to the number of SMEs in %

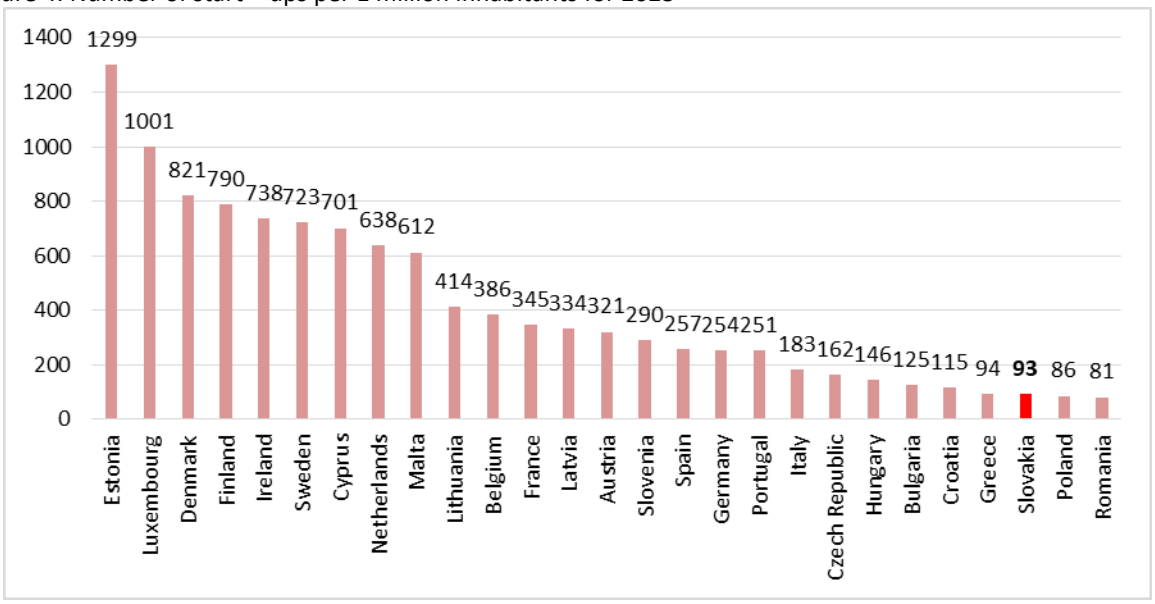


Source: own analysis

Similarly, the trend in the proportion of start-ups out of the total number of SMEs shows slight fluctuations (Figure 3). The highest proportion was recorded in 2019 at 0.095 per cent, suggesting that more start-ups were established or remained in operation during this period relative to the total number of SMEs. Conversely, the share was low in 2020, at 0.078 per cent, which may be linked to the lingering effects of the pandemic, reduced availability of venture capital, or a higher rate of start-up failure.

Generally speaking, the proportion of start-ups among SMEs hovers around 0.07–0.09 per cent, although there has been a slight downward trend in recent years. This decline may be due to various factors, such as economic conditions, legislative changes or a reduced attractiveness of the business environment for the creation of new start-ups.

Figure 4: Number of start – ups per 1 million inhabitants for 2023



Source: Own compilation based on: Prosperity and Financial Health Index. Business Environment 2023. [electronic resource]. [2023], online. [accessed 16 March 2025]. Available at: https://www.indexprosperity.cz/2024/prostredi-pro-podnikatele-2/

Compared with other EU countries, Slovakia ranks near the bottom of the table. In 2023, there were only 93 start-ups per million inhabitants in Slovakia, placing us in third-worst position within the EU. Only Poland and Romania are behind us. In contrast, Estonia achieved the best results with 1,299 start-ups, which represents almost 14 times the number per capita compared with Slovakia (Figure 4).

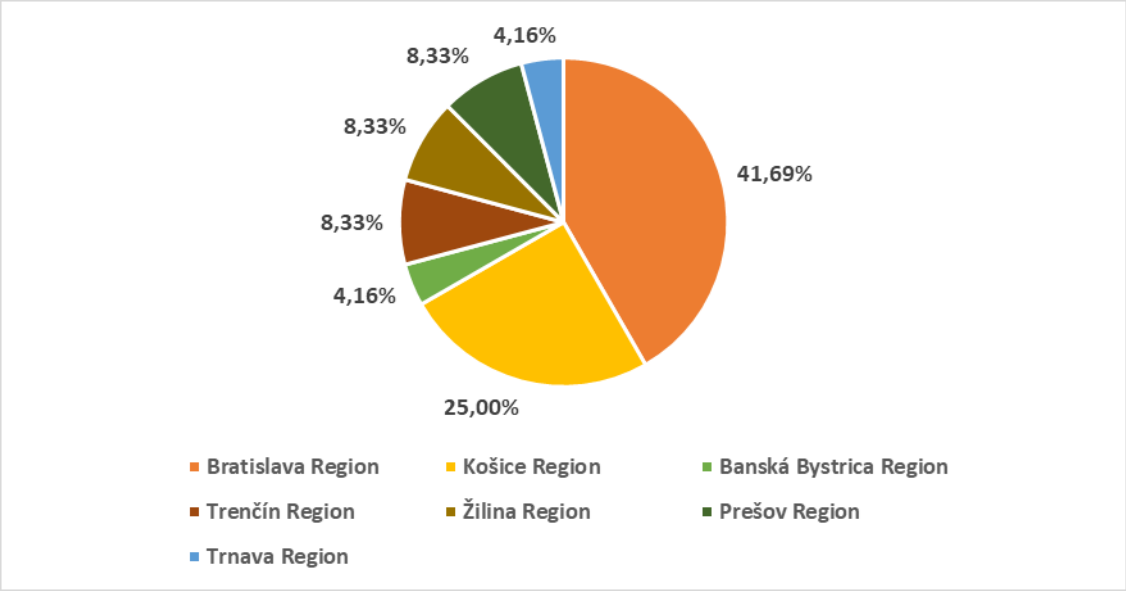
It is undeniable that a supportive business environment is essential for the creation and further development of SMEs, and therefore also of start-ups.

Support organisations, such as incubators and accelerators, play a vital role in the start-up ecosystem. These organisations provide start-ups not only with funding, but also with mentoring support, access to investor networks and other invaluable resources that facilitate their development. In mature start-up ecosystems, incubators and accelerators are an integral part of the entrepreneurial infrastructure, as they provide start-ups with access to the necessary tools and expertise that are essential for their success in the market.

The empirical section of this article examines the relationship between the number of start-ups and the number of incubators and accelerators in individual regions of the Slovak Republic.

Administratively, the Slovak Republic is divided into 8 regions.

Figure 5: Ratio of incubators and accelerators by region



Source: Author's own compilation

Figure 5 shows the proportion of incubators and accelerators by the region in which they were established. The graph clearly shows that the largest number of these organisations is concentrated in the Bratislava Region, where they account for 41.69 per cent. In second place is the Košice Region with a share of 25 per cent. In third place, with an equal share of 8.33 per cent, are organisations in the Žilina, Prešov and Trenčín regions. In last place, with a share of 4.16 per cent, are incubators and accelerators in the Banská Bystrica and Trnava regions. Identifying these shares is significant not only in terms of the geographical distribution of organisations, but also in relation to the need for further support in regions where their concentration is lower.

2.1 Data and methodology

Based on the theoretical framework and previous empirical evidence, it is expected that regions with a greater availability of incubators and accelerators will exhibit higher levels of startup activity. Accordingly, the following hypotheses were formulated:

H0: There is no statistically significant relationship between the availability of incubators and accelerators and startup activity.

H1: There is a statistically significant positive relationship between the availability of incubators and accelerators and startup activity.

The hypotheses were tested using an Ordinary Least Squares (OLS) regression model. Given the small sample size (eight regions) and the potential presence of heteroskedasticity, heteroskedasticity-robust standard errors (Huber–White estimator) were employed. In addition, a bootstrap procedure with 1,000 replications was conducted to obtain more reliable confidence intervals and p-values. Bootstrap estimation is particularly suitable for small samples because it does not rely on the assumption of normally distributed residuals.

The regression model is specified as:

$Startups_i = \beta 0 + \beta 1 Incubators_{si} + \varepsilon i$ (1)

Where:

Startups si – the number of startups in region i,

Incubators si – the number of incubators in region i,

B0 – the intercept,

B0 – captures the association between support infrastructure and startup activity,

Ei – the error term-

The empirical analysis is based on cross-sectional data for the eight Slovak regions in 2025. The dataset includes the number of startups and the number of incubators and accelerators operating in each region. These data were compiled from publicly available sources and are summarized in Table 1.

Table 1: Number of incubators/accelerators and start-ups by region in 2025

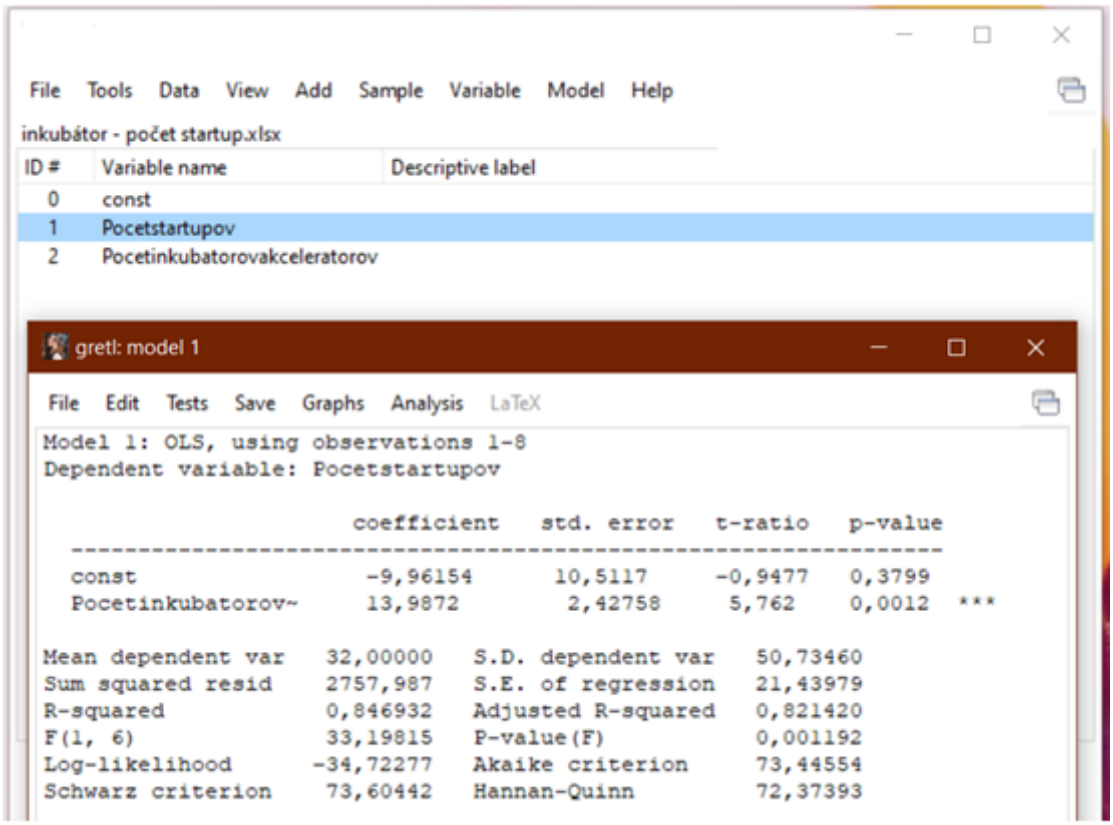
Region:	Number of start-ups:	Number of incubators/accelerators:
Banská Bystrica	5	1
Bratislava	154	10
Košice	40	6
Prešov	7	2
Nitra	8	0
Trenčín	6	2
Trnava	24	1
Žilina	12	2

Source: Own compilation

3. RESULTS AND DISCUSSION

Figure 6 represents the outcomes of the model in Gretl.

Figure 6: Outcomes from the Gretl



Source: Own compilation

The estimated intercept (β_o = -9.96) is statistically insignificant and has no meaningful economic interpretation, as a negative number of start-ups is not feasible in practice. Therefore, the focus of the interpretation is on the slope coefficient.

The estimated slope coefficient (β_1 = 13.99) is positive and statistically significant at the 5% significance level. This indicates that, on average, an additional incubator or accelerator within a region is associated with an increase of approximately 14 start-ups.

However, this result should be interpreted as a statistical association rather than evidence of causality.

The F-statistic (F = 33.19) indicates that the model as a whole is statistically significant. The associated p-value confirms that the independent variable contributes significantly to explaining regional variation in start-up activity.

The coefficient of determination (R^2 = 0.847) suggests that approximately 84.7 per cent of the variation in the number of start-ups across regions is explained by the variation in the number of incubators and accelerators. Nevertheless, given the small sample size and the simple bivariate structure of the model, this value should be interpreted with caution.

The positive relationship remains statistically significant after applying heteroscedasticity-robust standard errors, confirming the robustness of the estimated association.

4. CONCLUSION

Start-ups represent a key component of modern economies due to their innovation potential and capacity to drive economic growth. In advanced economies such as the United States, Israel and Estonia, well-developed start-up ecosystems supported by institutional infrastructure contribute significantly to entrepreneurial activity. In contrast, the development of the start-up environment in Slovakia still faces several structural challenges.

The formation and growth of start-ups are influenced by both internal and external factors. Whilst internal factors such as entrepreneurial skills, business ideas and adaptability are important, external conditions – particularly the quality of the business environment, the availability of financing and institutional support – play a decisive role in determining start-up success. In this context, incubators and accelerators represent an essential part of the entrepreneurial ecosystem, providing start-ups with access to knowledge, networks and financial resources.

The aim of this study was to examine the relationship between the number of start-ups and the number of incubators and accelerators across Slovak regions. The empirical analysis revealed a statistically significant positive association between these variables. Regions with a higher concentration of incubators and accelerators, such as Bratislava and Košice, also exhibit a higher number of start-ups. The estimated coefficient remains statistically significant even after applying heteroscedasticity-robust standard errors and bootstrap procedures, confirming the robustness of the results.

However, these findings should be interpreted with caution. Due to the cross-sectional nature of the data and the potential presence of endogeneity, particularly reverse causality, the results indicate correlation rather than causation. Furthermore, the relatively small sample size and the omission of additional explanatory variables limit the generalisability of the findings and may introduce bias into the estimated relationship.

Despite these limitations, the results highlight the importance of entrepreneurial support infrastructure in shaping regional start-up activity. From a policy perspective, strengthening the network of incubators and accelerators, particularly in less developed regions, may contribute to a more balanced development of the start-up ecosystem in Slovakia. At the same time, enhancing cooperation between the public sector, the private sector and academia appears to be crucial for fostering innovation and long-term economic competitiveness.

Future research should focus on addressing the identified limitations by incorporating panel data, additional explanatory variables and more advanced econometric techniques in order to better capture causal relationships and the dynamic nature of entrepreneurial ecosystems.

Acknowledgment

This work was supported by the Slovak Scientific Grant Agency under the contract VEGA No. 1/0723/24. The opportunities and risks arising from the growing role of non - bank financial institutions and the acceleration of the dynamics of innovation in the financial system.

ENDNOTES

1 The exact number of start-ups in Slovakia is not available in a single, consolidated database. Their number was identified on the basis of available data from various sources, such as analyses by the SBA, Sapie, Dealroom, Slovenská sporiteľňa's Seedstarter, and other articles on start-ups. Determining their number was complicated by the fact that not all start-ups are officially registered as companies; some exist solely within incubators and

may not be formally recorded in business databases. As start-ups are included in the statistics alongside SMEs, accurately determining their number in individual years is challenging for this reason too (the total number of SMEs includes not only limited companies but also sole traders, self-employed professionals and independent farmers). Furthermore, some enterprises may only be classified as start-ups some time after their establishment, which further complicates the accurate recording of such data. The number of start-ups cited in the analysis may therefore differ from the actual figure, as accurate data on them is difficult to obtain.

REFERENCES

Act No. 290/2016 Coll. on the support of small and medium-sized enterprises and Act No. 71/2013 Coll. on the provision of grants within the remit of the Ministry of Economy of the Slovak Republic.

Ács, Z. J., Autio, E., & Szerb, L. (2014). National systems of entrepreneurship. Research Policy, 43(3), 476–494. DOI: 10.1016/j.respol.2013.08.016

Audretsch, D. B., & Belitski, M. (2017). Entrepreneurial ecosystems in cities. Journal of Technology Transfer, 42, 1030–1051. DOI: 10.1007/s10961-016-9473-8

Audretsch, D. B., & Lehmann, E. E. (2005). Does the knowledge spillover theory apply to regions? Research Policy, 34(8), 1191–1202. DOI:10.1016/j.respol.2005.03.012

Bruneel, J., Ratinho, T., Clarysse, B., & Groen, A. (2012). The evolution of business incubators. Technovation, 32(2), 110–121. DOI:10.1016/j.technovation.2011.11.003

Cohen, S., & Hochberg, Y. (2014). Accelerating start-ups: The seed accelerator phenomenon. SSRN Working Paper. DOI:10.2139/ssrn.2418000

Fehder, D. C., & Hochberg, Y. V. (2014). Accelerators and the regional supply of venture capital. SSRN Working Paper. DOI:10.2139/ssrn.2518668

Feld, B. (2012). Startup Communities. Wiley.

Gonzalez-Uribe, J., & Leatherbee, M. (2018). The effects of business accelerators. Review of Financial Studies, 31(4), 1566–1603. DOI:10.1093/rfs/hhx103

Hackett, S. M., & Dilts, D. M. (2004). A systematic review of business incubation research. Journal of Technology Transfer, 29(1), 55–82. DOI:10.1023/B:JOTT.0000011181.11952.0f

Hallen, B. L., Bingham, C. B., & Cohen, S. (2020). Do accelerators accelerate? Organisation Science, 31(2), 378–414. DOI:10.1287/orsc.2019.1304

Isenberg, D. (2010). The big idea: How to start an entrepreneurial revolution. Harvard Business Review.

Ministry of Economy of the Slovak Republic (2021) Report on the state of the business environment in Slovakia.

Pauwels, C., Clarysse, B., Wright, M., & Van Hove, J. (2016). Understanding accelerator models. Technovation, 50–51, 13–24. DOI: 10.1016/j.technovation.2015.09.003

Porter, M. E. (1998). Clusters and competition. Harvard Business Review.

Slovak Business Agency. State of SMEs 2023. [electronic resource]. [2023], online. [accessed 15 March 2025]. Available at: https://www.sbagency.sk/sites/default/files/sprava_o_stave_msp_2023_final.pdf

Stam, E. (2015). Entrepreneurial ecosystems and regional policy. European Planning Studies, 23(9), 1759–1769. DOI:10.1080/09654313.2015.1061484

Why Environmental Costs Stay Invisible: Implementation Barriers to Environmental Cost Accounting in Shipping Companies and Their Strategic Consequences

Anna Giovou[1] **Stavros Kalogiannidis**[2] **Konstantinos Spinthiropoulos**[3]
Dimitrios Parris[4] **Ioannis Neveskiotis**[5]

[1] Department of Management Science and Technology, University of Western Macedonia, GR 50100 Kozani, Greece; giovouan@gmail.com; ORCID: 0009-0005-3003-6260

[2] Department of Business Administration, University of Western Macedonia, GR 51100 Grevena, Greece; skalogiannidis@uowm.gr; ORCID: 0000-0002-2337-5775

[3] Department of Management Science and Technology, University of Western Macedonia, GR 50100 Kozani, Greece; kspinthiropoulos@uowm.gr; ORCID: 0000-0003-0147-4155

[4] Department of Management Science and Technology, University of Western Macedonia, GR 50100 Kozani, Greece; dimit.parris@gmail.com; ORCID: 0000-0003-1507-9762

[5] Independent Researcher, Kozani, Greece; yiannis.neveskiotis@gmail.com; ORCID: 0009-0003-7489-1731

Abstract: Shipping has spent the past decade acquiring a price for its emissions. What it has not acquired at anything like the same pace is an internal accounting system able to tell managers where those costs actually come from. This paper reviews the literature on environmental cost accounting and its parent field, environmental management accounting, and asks a narrower question than most reviews in the area: what stops a shipping company from implementing such a system, and what follows strategically when implementation is partial or absent? Evidence is drawn from two bodies of work that rarely speak to each other, the environmental accounting literature and maritime energy-efficiency research. Implementation barriers are grouped into four families: informational, contractual, organizational and institutional. The argument is that the contractual family is what distinguishes shipping from the manufacturing settings in which environmental cost accounting was developed. Charter structures separate the party that pays for fuel from the party that owns the asset, so even a technically sound cost model may allocate a cost to someone with no ability to act on it. Three strategic consequences are then traced: distorted investment appraisal in fleet renewal, weak positions in commercial negotiation over carbon costs, and sustainability disclosure that is not anchored in internal cost data. The review closes with a short research agenda, the central item of which is that we still lack field evidence on what shipping companies actually do with carbon cost information once they have it.

Keywords: environmental cost accounting; environmental management accounting; shipping decarbonization; EU ETS; implementation barriers

1. INTRODUCTION

Until fairly recently a shipping company could treat its environmental impact as a compliance matter rather than a cost center. Fuel was expensive, but fuel was simply fuel; emissions were an engineering by-product, and whatever they cost the wider world did not appear on anyone's trial balance. That arrangement has ended. With the extension of the European Union Emissions Trading System (EU ETS) to maritime transport, and with the parallel tightening of the International Maritime Organization's technical and operational instruments, a tone of carbon dioxide released at sea now carries an invoice (Flodén et al., 2024; Psaraftis & Kontovas, 2021).

The accounting profession anticipated this kind of shift a long time ago. Environmental management accounting (EMA) emerged in the 1990s precisely in order to make environmental costs visible to internal decision-makers rather than to external auditors, and its early frameworks were explicit that the information had to be both monetary and physical if it was to be of any use (Burritt, Hahn & Schaltegger, 2002). Jasch (2003) then made the point that has framed the field ever since: most environmental costs in a typical firm are not sitting in anything labelled "environmental". They are the wasted material, the lost energy and the unproductive capacity buried inside general overhead. Environmental cost accounting (ECA), the monetary branch of that project, is the practice of pulling those costs back out of the overhead pool and attaching them to whatever caused them.

On paper, shipping should be an unusually good candidate. Its cost structure is dominated by a single input whose consumption maps almost directly onto its principal environmental impact, and the industry already measures that input obsessively for commercial reasons. Bunker consumption is metered, logged and reconciled. The distance from a bunker delivery note to a carbon cost per voyage looks, from outside, like a short one.

It has not proved short. The maritime literature is rich on abatement technologies and on the design of market-based measures (Ampah et al., 2021; Lagouvardou, Psaraftis & Zis, 2020; Mallouppas & Yfantis, 2021), and increasingly rich on the macroeconomic consequences of carbon pricing for the sector (Goyal & Llop, 2024). It is close to silent on the accounting machinery that would have to sit inside the firm for any of this to influence a decision. Where cost models for maritime carbon do exist, they are usually built by engineers or transport economists rather than by accountants, and they stop at the voyage rather than continuing into the management control system (Sun et al., 2024).

This paper takes that gap as its subject. It reviews what is known about why environmental cost accounting is difficult to implement, translates those findings into the maritime setting, and then asks what the consequences are for strategy when the translation fails. The approach is a narrative and critical review rather than a systematic one. Sources were selected from the environmental accounting literature, the maritime decarbonization literature and the smaller body of work on barriers to energy efficiency in shipping, with priority given to peer-reviewed work published since 2002 and to the small number of foundational contributions that predate it. No claim is made that the coverage is exhaustive; the aim is to connect two literatures that have developed largely in isolation from one another.

2. WHAT ENVIRONMENTAL COST ACCOUNTING IS SUPPOSED TO DO

It is worth being precise about the claim being made, because “green accounting” is used loosely enough to mean almost anything. Environmental cost accounting is not sustainability reporting, and it is not carbon foot printing. It is a costing practice. Its unit of analysis is an internal cost object — a voyage, a vessel, a trade lane, a customer contract — and its purpose is to load onto that object the environmental costs it genuinely causes, including the ones that conventional cost systems either average away or leave in overhead.

Burritt, Hahn and Schaltegger (2002) organized this into a framework that separates monetary from physical information and past-oriented from future-oriented use. The distinction matters more in practice than it looks on the page. A shipping company that can report last year’s allowance surrender cost is doing past-oriented monetary EMA. One that can tell a chartering desk what a proposed fixture will cost in allowances before the fixture is agreed is doing something quite different, and considerably harder. Christ and Burritt (2015) make a related point in their review of material flow cost accounting, which tracks the physical and monetary path of material through a process and attributes cost to the losses rather than only to the product. Applied to a vessel, the logic would treat inefficient steaming, suboptimal trim and hull fouling as loss cost rather than as a slightly worse fuel figure.

The empirical literature on whether any of this improves performance is more equivocal than advocates of the field tend to concede. Henri and Journeault (2010), in one of the more careful studies, found that eco-control had no direct effect on economic performance at all; the effect ran indirectly through environmental performance, and only in firms with high environmental exposure, high public visibility or substantial size. Gunarathne and Lee (2021) reached a comparable conclusion, positioning EMA as the mechanism that translates an environmental strategy into organizational performance rather than as a driver in its own right. The honest reading is that environmental cost accounting is an enabling condition, not a cause. That is still an argument for having it, but it is a weaker argument than the one usually presented to boards.

3. FOUR FAMILIES OF IMPLEMENTATION BARRIER

The barriers literature in environmental accounting is dominated by manufacturing settings, and the barriers literature in shipping is dominated by energy-efficiency technology. Reading them together produces four groupings. The first three appear in both literatures. The fourth is where shipping departs from the general case.

3.1. Informational Barriers: Nobody Knows What a Voyage Costs

The foundational difficulty is that environmental costs are not collected in a form that costing can use. Jasch (2003) established this for industrial firms and the finding has proved durable: the accounting system records purchases, not losses, so the cost of what was thrown away is invisible by construction. Shipping inherits this problem and adds several of its own. Fuel consumption is measured at the vessel, but allowance liability accrues at the company level and is defined by voyage geography, with the well-known asymmetry between intra-EEA

voyages and those with one leg outside (Flodén et al., 2024). A vessel calling at three ports in two jurisdictions generates a carbon liability that no single onboard system computes.

The regulatory data that does exist was not built for costing. Monitoring, reporting and verification systems were designed to produce a verified annual emissions figure for a regulator, at a level of aggregation that is close to useless for a chartering decision taken on a Tuesday afternoon. Sun et al. (2024) demonstrate what a purpose-built model looks like for liner shipping under the EU ETS, and their finding that the sailing stage accounts for the overwhelming majority of voyage emissions is precisely the kind of allocation insight that operational data alone does not surface. But their model is an external analytical construction, not a management accounting system embedded in a company.

Two further informational problems deserve mention. Carbon cost is a function of an allowance price that moves, so a carbon-inclusive voyage cost is a forecast rather than a fact, and management accounting systems are generally poor at carrying that kind of uncertainty into a reported figure. And the boundary question is unresolved: whether a shipping company should cost tank-to-wake emissions, which are what it surrenders allowances for, or well-to-wake emissions, which are what determine the actual climate outcome and what fuel-lifecycle studies use (Lee et al., 2024). The two produce materially different rankings of fuel options.

3.2. Contractual Barriers: the Cost Lands on the Wrong Desk

This is the barrier that makes shipping a special case, and the one the environmental accounting literature has no vocabulary for, because manufacturing firms generally own and operate their own assets.

A ship's fuel bill may be paid by the owner or by the charterer depending on the charter form. Under a time charter the charterer buys the bunkers and therefore captures the benefit of any efficiency improvement, while the owner bears the capital cost of making the vessel efficient. Rehmatulla and Smith (2015a) provided the first systematic analysis of this principal–agent problem in shipping, triangulating survey evidence with content analysis of charter contracts, and found the barrier to be both observed and perceived across the sector. Their companion work confirmed that a range of market failures, not merely a shortage of capital, explains why apparently cost-negative efficiency measures go unimplemented (Rehmatulla & Smith, 2015b). Their later study of split incentives in technology investment (Rehmatulla & Smith, 2020) is more optimistic, suggesting the market partially overcomes the problem, but does not dissolve it.

For environmental cost accounting the implication is uncomfortable. A cost system is supposed to attach costs to the decision-maker who controls them. In shipping, the decision rights over fuel consumption are distributed across owner, manager, charterer and master, and they shift with the contract form. Dewan, Yaakob and Suzana (2018) document how this plays out at the operational level, where crew are asked to implement energy-efficiency measures whose financial benefit accrues to a party they never meet. Building a costing system on top of that structure means choosing, more or less arbitrarily, which party the system serves. Most of the maritime carbon cost models in the literature quietly assume a fully integrated owner-operator, which is a minority case.

3.3. Organisational Barriers: the Wrong People in the Wrong Room

Burritt (2004) catalogued the roadblocks to EMA in general terms, and the one that recurs most persistently is professional: environmental information is held by technical staff, cost systems are run by accountants, and the two groups have limited incentive to collaborate. Christ and Burritt (2013), testing this through a contingency lens, found that adoption is predicted less by environmental pressure than by organizational context — size, strategy and the existing sophistication of the management accounting function.

The shipping analogue is easy to see. Technical superintendents hold the consumption data. The commercial department sets rates. Finance closes the books. In a mid-sized Greek or Cypriot operator these are three separate rooms and often three separate reporting lines, and the person who could reconcile them frequently does not exist. Gunarathne and Lee (2019) describe environmental management as passing through developmental stages, with the information requirements of each stage differing qualitatively rather than in degree; a company at a reactive stage cannot simply install the accounting system of a proactive one. Burritt, Herzig and Tadeo (2009), through a detailed case study of a single facility, showed how much groundwork is required before an EMA exercise produces anything a manager will act on, and how much of that groundwork is organisational rather than technical.

There is also a plain resource constraint. Shipping companies run lean shore offices by design. Adding a cost accounting capability that produces no revenue is a difficult proposition when the alternative is treating the allowance cost as a pass-through line and moving on.

3.4. Institutional Barriers: Too Many Regimes, None of Them Accounting

Maritime carbon regulation has arrived in layers rather than as a system. The IMO instruments, the EU ETS, the FuelEU Maritime requirements and the various disclosure regimes each define emissions slightly differently, cover different scopes and run on different reporting calendars. Gilbert and Bows (2012) warned early that sub-global policy would produce exactly this kind of fragmentation, and the concern about carbon leakage under a regional scheme has since been examined empirically for container routes by Lagouvardou and Psaraftis (2022), who show that route restructuring in response to a regional carbon price is a live possibility rather than a theoretical one.

Fragmentation has a specific accounting consequence that is rarely stated. When a firm faces multiple overlapping definitions of the same underlying quantity, the rational response is to maintain separate compliance calculations for each regime and to avoid building a single internal figure that would have to be reconciled to all of them. That is a defensible compliance strategy and a poor management accounting one. It also explains an otherwise puzzling observation: companies with sophisticated regulatory reporting capability often have no internal carbon cost per voyage at all. They have four external answers and no internal one.

Institutional pressure does, on the other hand, work. Gunarathne and Lee (2021) find that coercive and normative pressures drive EMA implementation, and the EU ETS is about as coercive as regulation gets. The expectation should therefore be that adoption accelerates. What the literature does not yet tell us is whether what gets adopted is genuine cost accounting or a compliance calculation wearing its clothes.

4. STRATEGIC CONSEQUENCES

If the four barriers above are real, the absence or weakness of environmental cost accounting is not merely an information gap. It shapes decisions. Three consequences seem to us the most significant.

4.1. Investment Appraisal for Fleet Renewal

The central strategic decision facing shipowners for the next two decades is what to order and when. That decision depends on a comparison between the lifetime cost of a conventional vessel carrying a rising carbon liability and the lifetime cost of an alternative-fueled vessel carrying a higher capital cost and a higher, more volatile fuel bill. Lee et al. (2024) show how sensitive that comparison is: under their scenarios, environmentally superior fuel pathways were not cost-effective over the study period, with the crossover year depending heavily on the carbon price trajectory assumed. Mallouppas and Yfantis (2021) and Ampah et al. (2021) reach similar conclusions from the technology side.

A firm that cannot produce a defensible internal carbon cost cannot run this comparison on its own fleet. It can read the published studies, but published studies use reference vessels on reference routes. The result is that newbuilding decisions get made on fuel price beliefs and on what competitors are ordering, which is a reasonable heuristic and a poor substitute for analysis. The strategic exposure is asymmetric, too: an owner who over-invests in an alternative fuel loses margin, while one who under-invests may end up with an asset that becomes commercially unattractive well before the end of its technical life.

4.2. Commercial Position and the Pass-Through Question

Whether carbon cost can be passed on to cargo interests is now one of the more consequential commercial questions in the sector, and it is being settled contract by contract rather than by regulation. Flodén et al. (2024) found in their interviews that commercial actors expect the cost to be passed through, but also that some segments — particularly RoRo and RoPax, where road and rail are genuine substitutes — face real modal-shift risk if they do so.

A negotiating position on pass-through requires a number. A carrier that can demonstrate the carbon cost attributable to a specific service, and can show how it varies with routing and speed, negotiates from evidence. One that applies a flat surcharge is negotiating from assertion and will be treated accordingly by a sophisticated

counterparty. The same asymmetry runs the other way: cargo owners with their own scope 3 accounting are increasingly able to interrogate a surcharge that a carrier cannot substantiate.

4.3. Disclosure Without Foundations

Sustainability disclosure requirements have arrived faster than internal systems. A firm can, and many do, satisfy an external reporting obligation using verified emissions data and a set of estimates, without ever having built the internal cost attribution that would make the disclosure managerially meaningful. This produces reporting that is technically accurate and strategically empty.

It also carries a risk that is under-discussed. As disclosure regimes tighten and assurance requirements move from limited to reasonable, the gap between what a company reports externally and what it can evidence internally becomes an audit exposure rather than merely a governance weakness. Companies that treated environmental cost accounting as optional may find it becoming a precondition for signing off their own accounts.

5. GAPS AND A RESEARCH AGENDA

Three gaps stand out from this reading of the literature, and none of them will be closed by another modelling paper.

The first is empirical. We have essentially no field evidence on what shipping companies actually do with carbon cost information. The manufacturing EMA literature is built on surveys and case studies (Burritt, Herzig & Tadeo, 2009; Christ & Burritt, 2013); the maritime literature has nothing comparable. A survey of shore-side finance and commercial functions in a defined population — Greek-controlled operators would be an obvious and accessible frame — asking what is calculated, by whom, at what frequency and for which decisions, would be more valuable at this point than any further refinement of cost models.

The second is theoretical. Environmental cost accounting assumes a firm that owns its assets and controls its operations. Shipping does not fit that assumption, and nobody has yet worked out what a cost attribution model looks like when decision rights are contractually distributed and change with each fixture. The principal–agent literature in shipping (Rehmatulla & Smith, 2015a, 2020) has identified the problem without addressing its accounting implications. This strikes us as the most interesting open question in the area.

The third is about the object of measurement. Almost all attention has gone to carbon, for the good reason that carbon now has a price. But environmental cost accounting was never a carbon-only project, and the maritime environmental cost base includes ballast water management, scrubber wash water, antifouling, air pollutants under the Sulphur regime, end-of-life recycling and spill exposure. Whether a carbon-shaped cost system can later be extended to cover these, or whether the sector will end up with a set of unconnected single-issue calculations, is worth asking now rather than in ten years.

6. CONCLUSION

The argument of this paper is straightforward. Shipping now has a price on carbon, and it has abundant technical literature on how to reduce carbon, but it lacks the internal accounting machinery that would let a manager connect the two. The barriers to building that machinery are informational, organizational and institutional in ways familiar from other industries, and contractual in a way that is close to unique to shipping. Because charter structures separate the party that pays for fuel from the party that owns the vessel, a cost system that would be straightforward in a factory becomes, at sea, a question of whose decision the system is supposed to inform.

The consequences are strategic rather than merely administrative. Fleet renewal decisions worth hundreds of millions are being taken without firm-specific carbon cost analysis. Commercial negotiations over pass-through are being conducted with surcharges that cannot be substantiated. External disclosure is running ahead of the internal data that should underpin it.

None of this means the sector will fail to adapt. Institutional pressure of the kind the EU ETS represents has driven adoption in other industries, and it will drive it here. The question that matters, and the one this review cannot answer, is whether what emerges will be a management accounting capability or a compliance function with better software. On present evidence it is too early to say, and finding out will require going into companies and asking.

REFERENCES

Ampah, J. D., Yusuf, A. A., Afrane, S., Jin, C., & Liu, H. (2021). Reviewing two decades of cleaner alternative marine fuels: Towards IMO's decarbonization of the maritime transport sector. Journal of Cleaner Production, 320, 128871. https://doi.org/10.1016/j.jclepro.2021.128871

Burritt, R. L. (2004). Environmental management accounting: Roadblocks on the way to the green and pleasant land. Business Strategy and the Environment, 13(1), 13–32. https://doi.org/10.1002/bse.379

Burritt, R. L., Hahn, T., & Schaltegger, S. (2002). Towards a comprehensive framework for environmental management accounting: Links between business actors and environmental management accounting tools. Australian Accounting Review, 12(27), 39–50. https://doi.org/10.1111/j.1835-2561.2002.tb00202.x

Burritt, R. L., Herzig, C., & Tadeo, B. D. (2009). Environmental management accounting for cleaner production: The case of a Philippine rice mill. Journal of Cleaner Production, 17(4), 431–439. https://doi.org/10.1016/j.jclepro.2008.07.005

Christ, K. L., & Burritt, R. L. (2013). Environmental management accounting: The significance of contingent variables for adoption. Journal of Cleaner Production, 41, 163–173. https://doi.org/10.1016/j.jclepro.2012.10.007

Christ, K. L., & Burritt, R. L. (2015). Material flow cost accounting: A review and agenda for future research. Journal of Cleaner Production, 108, 1378–1389. https://doi.org/10.1016/j.jclepro.2014.09.005

Dewan, M. H., Yaakob, O., & Suzana, A. (2018). Barriers for adoption of energy efficiency operational measures in shipping industry. WMU Journal of Maritime Affairs, 17, 169–193. https://doi.org/10.1007/s13437-018-0138-3

Flodén, J., Zetterberg, L., Christodoulou, A., Parsmo, R., Fridell, E., Hansson, J., Rootzén, J., & Woxenius, J. (2024). Shipping in the EU emissions trading system: Implications for mitigation, costs and modal split. Climate Policy, 24(7), 969–987. https://doi.org/10.1080/14693062.2024.2309167

Gilbert, P., & Bows, A. (2012). Exploring the scope for complementary sub-global policy to mitigate CO2 from shipping. Energy Policy, 50, 613–622. https://doi.org/10.1016/j.enpol.2012.08.002

Goyal, S., & Llop, M. (2024). The shipping industry under the EU Green Deal: An input-output impact analysis. Transportation Research Part A: Policy and Practice, 182, 104035. https://doi.org/10.1016/j.tra.2024.104035

Gunarathne, A. D. N., & Lee, K.-H. (2019). Environmental and managerial information for cleaner production strategies: An environmental management development perspective. Journal of Cleaner Production, 237, 117849. https://doi.org/10.1016/j.jclepro.2019.117849

Gunarathne, A. D. N., & Lee, K.-H. (2021). Institutional pressures, environmental management strategy, and organizational performance: The role of environmental management accounting. Business Strategy and the Environment, 30(2), 825–839. https://doi.org/10.1002/bse.2656

Henri, J.-F., & Journeault, M. (2010). Eco-control: The influence of management control systems on environmental and economic performance. Accounting, Organizations and Society, 35(1), 63–80. https://doi.org/10.1016/j.aos.2009.02.001

Jasch, C. (2003). The use of Environmental Management Accounting (EMA) for identifying environmental costs. Journal of Cleaner Production, 11(6), 667–676. https://doi.org/10.1016/S0959-6526(02)00107-5

Lagouvardou, S., & Psaraftis, H. N. (2022). Implications of the EU Emissions Trading System (ETS) on European container routes: A carbon leakage case study. Maritime Transport Research, 3, 100059. https://doi.org/10.1016/j.martra.2022.100059

Lagouvardou, S., Psaraftis, H. N., & Zis, T. (2020). A literature survey on market-based measures for the decarbonization of shipping. Sustainability, 12(10), 3953. https://doi.org/10.3390/su12103953

Lee, H., Lee, J., Roh, G., Lee, S., Choung, C., & Kang, H. (2024). Comparative life cycle assessments and economic analyses of alternative marine fuels: Insights for practical strategies. Sustainability, 16(5), 2114. https://doi.org/10.3390/su16052114

Mallouppas, G., & Yfantis, E. A. (2021). Decarbonization in shipping industry: A review of research, technology development, and innovation proposals. Journal of Marine Science and Engineering, 9(4), 415. https://doi.org/10.3390/jmse9040415

Psaraftis, H. N., & Kontovas, C. A. (2021). Decarbonization of maritime transport: Is there light at the end of the tunnel? Sustainability, 13(1), 237. https://doi.org/10.3390/su13010237

Rehmatulla, N., & Smith, T. (2015a). Barriers to energy efficiency in shipping: A triangulated approach to investigate the principal agent problem. Energy Policy, 84, 44–57. https://doi.org/10.1016/j.enpol.2015.04.019

Rehmatulla, N., & Smith, T. (2015b). Barriers to energy efficient and low carbon shipping. Ocean Engineering, 110, 102–112. https://doi.org/10.1016/j.oceaneng.2015.09.030

Rehmatulla, N., & Smith, T. (2020). The impact of split incentives on energy efficiency technology investments in maritime transport. Energy Policy, 147, 111721. https://doi.org/10.1016/j.enpol.2020.111721

Sun, L., Wang, X., Hu, Z., & Ning, Z. (2024). Carbon and cost accounting for liner shipping under the European Union Emission Trading System. Frontiers in Marine Science, 11, 1291968. https://doi.org/10.3389/fmars.2024.1291968

SME Internationalization Strategies in Kosovo: Challenges and Success Factors for Entering Foreign Markets

Prof.Ass.Dr.EDBA. Filloreta Kunoviku Demiri[1] Besë Sadikaj, PhDc[2] Leard Latifi[3]

[1] Faculty of Economics, University "Isa Boletini" in Mitrovica, Kosovo, E-mail: filloreta.demiri@umib.net, ORCID: 0000-0002-8849-4417

[2] Faculty of Economics, University "Isa Boletini" in Mitrovica, Kosovo, E-mail: bese.sadikaj@umib.net, ORCID: 0000-0001-6714-7419

[3] Faculty of Economics - Alumni, University "Isa Boletini" in Mitrovica, Kosovo, E-mail: leard.latifi@umib.net

Abstract: This study aims to analyze the main strategies, challenges, and success factors that affect the internationalization of small and medium-sized enterprises (SMEs) in Kosovo. More specifically, the paper examines SMEs' main motives for expanding abroad, their initial market-entry modes and target markets, and the influence of financial resources, regulatory requirements, international experience, business networks, digital tools, and institutional support. Since Kosovo's SMEs operate in a small domestic market and face persistent financial and institutional constraints, it is necessary to understand how these internal and external factors shape their ability to enter and compete in foreign markets. The methodology used in this study is based on primary and secondary data and an empirical quantitative approach. Primary data were collected through a questionnaire containing a total of 13 questions, administered to owners and managers of 50 micro, small, and medium-sized enterprises. The empirical findings indicate that most of the surveyed firms are active in international markets. Direct exporting is the most common initial entry strategy, while online sales and business partnerships also play an important role. Neighboring countries and European Union markets are the main destinations. Market-growth opportunities and customer demand are the principal motives for expansion, whereas limited financial resources, regulatory requirements, and insufficient international experience are the main barriers. Strong business networks and digital tools are identified as important contributors to international success. These findings show that SME internationalization in Kosovo is shaped by a combination of internal capabilities and external conditions, highlighting the importance of easier access to finance, stronger export support, regulatory simplification, international-business training, digitalization, and strategic partnerships. Finally, the study provides practical recommendations for public institutions and SME managers based on the research findings.

Keywords: SMEs; internationalization; foreign market entry; export barriers; Kosovo

1. INTRODUCTION

Small and medium-sized enterprises (SMEs) are central to employment, entrepreneurship, and local value creation, yet their long-term growth is often constrained by the size and purchasing power of the domestic market. Internationalization offers access to new customers, knowledge, technologies, and business partners. At the same time, it exposes firms to unfamiliar regulations, stronger competition, exchange-rate and payment risks, and higher demands for product quality, documentation, and delivery reliability. These opportunities and risks are especially relevant for firms in small economies, where foreign-market participation can become an important path to scale but the resources required to internationalize are not always readily available.

Kosovo provides a useful setting for examining this tension. Its business population is dominated by smaller enterprises, while the domestic market is limited and integration with regional and European markets remains a strategic development objective (Kosovo Agency of Statistics, 2021; World Bank, 2021). Previous policy assessments identify access to finance, export readiness, managerial capacity, digitalization, and the quality of business-support institutions as recurring issues for SMEs in Kosovo and the wider Western Balkans (European Investment Bank, 2016; OECD, 2022). Internationalization is therefore not only a firm-level growth decision. It is also connected with productivity, competitiveness, and the ability of the economy to participate in cross-border value chains.

SMEs can enter foreign markets through several routes. Exporting generally requires less commitment than establishing a foreign branch, while partnerships and joint ventures may reduce uncertainty by providing local knowledge and contacts. Digital platforms have further lowered some information and transaction costs by allowing firms to promote and sell products across borders without an extensive physical presence. Entry-mode choice nevertheless depends on the firm's resources, experience, product characteristics, target market, and tolerance for risk. For resource-constrained firms, the most feasible route is often gradual: initial exports to nearby markets may be followed by broader geographic expansion once knowledge and relationships accumulate.

Despite the policy importance of this topic, firm-level evidence from Kosovo remains limited. Aggregate trade figures cannot fully explain how individual SMEs choose their first entry mode, which destinations they prioritize, or which obstacles managers experience most directly. The present study addresses this gap through survey evidence from 50 micro, small, and medium-sized enterprises. It examines the international activity of the participating firms and connects their reported strategies and constraints with established perspectives on gradual, network-based, and early internationalization.

The study has four objectives: to identify the principal modes and destinations used by Kosovo SMEs when entering foreign markets, to assess their main motives and perceived barriers, to examine the contribution of networks, digital tools, innovation, and managerial capacity, and to identify the forms of support that firms consider most useful for future expansion. Correspondingly, the analysis asks: (1) how and where do surveyed SMEs internationalize, (2) what motivates their expansion and what obstructs it, (3) which capabilities are associated with perceived international success, and (4) what support could strengthen future internationalization?

The article contributes a compact, evidence-based account of SME internationalization in Kosovo. It does not seek to establish causal effects. Rather, it organizes descriptive evidence into a framework that can inform managerial decisions and public support. The remainder of the paper reviews the relevant theory and evidence, explains the research design, presents and discusses the survey results, and concludes with recommendations and directions for future research.

2. LITERATURE REVIEW

2.1. Theoretical Perspectives on SME Internationalization

The Uppsala model describes internationalization as an incremental process in which firms build market knowledge through experience and gradually increase their commitment to foreign operations (Johanson & Vahlne, 1977). Limited knowledge generates uncertainty, so firms often begin with low-commitment activities and markets that appear geographically or institutionally close. As learning accumulates, they may expand to more distant markets or adopt entry modes requiring greater investment and control. This logic is highly relevant to SMEs because scarce capital and managerial time make mistakes particularly costly.

The born-global or international-new-venture perspective challenges a strictly gradual sequence. Some firms seek foreign customers from an early stage because their products serve specialized niches, founders possess international experience, or digital technologies make rapid cross-border reach possible. Innovation, entrepreneurial orientation, and organizational capabilities can enable such firms to compensate for their small size (Knight & Cavusgil, 2004; Oviatt & McDougall, 1994). The two perspectives are not mutually exclusive: some SMEs internationalize cautiously, while others move quickly when knowledge, technology, and opportunity align.

A network perspective places relationships at the center of the process. Connections with foreign buyers, distributors, suppliers, diaspora communities, industry associations, and peer firms can provide referrals, market intelligence, legitimacy, and access to resources. Evidence from small technology firms shows that network relationships influence market selection and the pace and form of international expansion (Coviello & Munro, 1997). Networks can therefore reduce the liability of foreignness, although excessive dependence on a single intermediary may also limit bargaining power and market learning.

2.2. Foreign-Market Entry Strategies

Direct exporting gives a firm contact with foreign customers and greater control over pricing and relationships, but it also requires capabilities in market research, documentation, logistics, customer service, and payment-risk management. Indirect exporting shifts some of these responsibilities to an intermediary and may be more accessible for inexperienced firms, though the producer receives less market feedback and retains a smaller share of the margin. Exporting is commonly a first step because it permits foreign-market testing without the fixed cost of a physical subsidiary (U.S. Department of Commerce, 2021).

Strategic alliances and joint ventures offer access to local knowledge, distribution, complementary technology, and established credibility. They can be especially valuable where regulation or business practices are difficult to interpret from outside the market. The benefits depend on partner selection, compatible objectives, clear

governance, and arrangements for sharing costs, knowledge, and intellectual property. Weak alignment can introduce coordination costs and conflict, so partnership is not automatically a low-risk solution.

E-commerce and digitally supported sales have expanded the entry options available to SMEs. Websites, online marketplaces, social media, electronic payments, and digital customer-service tools can make market discovery and promotion more affordable. Digital channels do not remove all borders: firms must still address taxation, customs, consumer protection, platform dependence, cybersecurity, fulfillment, and returns. Their greatest value arises when technology is integrated with a coherent product, pricing, logistics, and customer-retention strategy (European Commission, 2020).

A foreign branch or subsidiary offers the highest degree of local presence and control among the modes considered here. It can support faster service, closer customer relationships, and adaptation to local demand, but it entails substantial financial, legal, and managerial commitments. For most micro and small firms, this mode becomes realistic only after a market has been validated through exports, online sales, or partnerships. Entry modes should thus be viewed as a portfolio that may evolve rather than as a single irreversible choice.

2.3. Barriers to Internationalization

Financial constraints affect nearly every stage of international expansion. Firms must often finance certification, product adaptation, travel, marketing, inventory, transport, and longer payment cycles before foreign revenue becomes stable. Limited collateral, short loan maturities, and high financing costs may therefore prevent otherwise viable projects from proceeding. The European Investment Bank (2016) identified material SME financing needs in Kosovo, while the OECD (2022) emphasizes the continued importance of diversified financing instruments and stronger export support across the Western Balkans.

Regulatory and administrative barriers include unfamiliar product standards, certification requirements, customs procedures, origin documentation, taxation, and contract enforcement. These requirements impose fixed costs that weigh more heavily on smaller firms because the same compliance task must be spread across a lower volume of sales. Export barriers also interact: limited finance can prevent certification, while weak information can make procedures appear more costly and uncertain than they are (Leonidou, 2004). Accessible guidance and predictable administration can therefore improve both compliance and willingness to enter a market.

A lack of international experience can lead to weak partner screening, inaccurate pricing, poor contract terms, and underestimation of cultural and communication differences. Managerial constraints are particularly acute when a small number of people must simultaneously run domestic operations and develop foreign business. Logistics can create an additional disadvantage through transport costs, delivery delays, limited shipment volumes, and difficulties managing returns. These barriers are rarely solved by a single intervention. They require complementary financial, informational, managerial, and infrastructural responses.

2.4. Digitalization, Innovation, and Networks as Success Factors

International competitiveness depends not only on entering a market but also on sustaining a clear value proposition. Product quality, differentiation, reliable delivery, and the capacity to adapt offerings to customer requirements help SMEs avoid competing solely on price. Innovation may involve new products, improved design, process efficiency, packaging, or a service model better suited to foreign buyers. Research on born-global firms connects innovative capabilities with superior international performance because they support rapid learning and opportunity recognition (Knight & Cavusgil, 2004).

Digital tools strengthen several capabilities at once. Data from websites and platforms can reveal demand patterns, social media can support low-cost experimentation, customer-relationship systems can improve follow-up, and digital collaboration tools can reduce the coordination cost of cross-border partnerships. However, adoption alone does not guarantee results. Skills, cybersecurity, data quality, consistent content, and integration with operational processes determine whether a tool creates lasting value. Public programs that combine technology adoption with training and advisory support are consequently more likely to improve international readiness than stand-alone equipment subsidies (European Commission, 2016).

Networks complement innovation and digitalization by turning information into access. Trusted relationships can identify buyers, validate product-market fit, explain standards, and provide reputational signals to new customers. Managerial competence remains the coordinating mechanism: managers must select markets, allocate scarce resources, learn from early transactions, and decide when to deepen or withdraw commitment.

Reviews of SME internationalization consistently identify planning, knowledge, innovation, and networks among the critical factors shaping success (Bose, 2016).

The literature suggests that internationalization outcomes emerge from the interaction of entry strategy, firm capability, and external conditions. In this study, entry strategy is represented by the initial mode and target region, internal drivers include motives, managerial experience, innovation, networks, and use of digital tools, and external conditions include finance, regulation, logistics, and public support. This framework guides the descriptive analysis. Because the questionnaire captures manager perceptions at one point in time, the findings are interpreted as reported patterns rather than causal relationships.

3. METHODOLOGY

3.1. Research Design and Sample

The study uses a quantitative, cross-sectional, descriptive design based on primary survey data and secondary literature. The target population consists of micro, small, and medium-sized enterprises operating in Kosovo. A random sample of 50 firms was surveyed, with responses provided by owners or managers who were expected to have direct knowledge of the firm's operations and international activities. The sample includes both internationally active and non-internationalized enterprises, allowing the analysis to describe participation as well as the experience of firms that had entered foreign markets.

Primary data were collected during 2026 through a structured questionnaire consisting of 13 questions. The instrument covered enterprise size, sector, age, international engagement, initial entry mode, motives for expansion, target markets, principal barriers, success factors, importance of digital tools, perceived international performance, three-year expansion plans, and preferred forms of support. Most questions used predefined categories to make answers comparable. Questions on motives and selected factors could generate a number of mentions different from the total number of firms, the applicable response base is therefore stated for each table.

3.2. Data Analysis

Responses were summarized using frequencies, percentages, and cross-question descriptive comparisons. Percentages for firm-profile and general-attitude questions use the full sample unless otherwise indicated. Entry-mode, target-market, and barrier results use the subgroup of 32 firms that reported international activity. Motivation shares are calculated from 54 recorded mentions, while success-factor shares are calculated from 46 valid responses. Perceived performance is based on 49 valid responses because one observation was missing. These distinctions are necessary to prevent comparisons that implicitly use incompatible denominators.

The analysis is descriptive and exploratory. No regression model or significance test is applied, and expressions such as "important," "main," or "associated" refer to the frequency of reported responses rather than an estimated causal effect. This choice is appropriate for the questionnaire structure and sample size, but it limits generalization beyond the surveyed firms.

Three limitations should be considered. First, the sample is relatively small and the available documentation does not provide a detailed sampling-frame assessment by municipality or industry, so the results should not be treated as nationally representative. Second, the measures are self-reported and may reflect managerial perception or recall. Third, the cross-sectional design cannot show how strategy and performance change over time. Nevertheless, the survey offers a coherent snapshot of entry choices, constraints, capabilities, and support needs that can guide more extensive future research.

4. RESULTS AND DISCUSSION

4.1. Profile of the Surveyed Enterprises

Table 1 shows that the sample is weighted toward smaller firms: microenterprises account for just over half of respondents, and small firms represent more than one third. Medium-sized firms are present but form a smaller group. Services are the largest sector, followed by manufacturing and trade. The firms also vary in age: more than one third have operated for five to ten years, while established firms with more than a decade of activity

provide a counterweight to younger businesses. This composition is useful for exploratory analysis because it includes firms with different levels of resources and accumulated market experience.

The distribution also cautions against treating all SMEs as identical. A service firm may internationalize digitally with relatively low physical-distribution costs, whereas a manufacturer must manage production standards, certification, inventory, and transport. Similarly, a microenterprise may depend heavily on the owner's contacts, while a medium-sized firm can assign specialized staff to export activity. The aggregate results should therefore be read as broad patterns across a heterogeneous sample.

Table 1: Profile of the Surveyed Enterprises (N=50)

Indicator	Category	n	Share (%)
Enterprise size	Micro	26	52
	Small	18	36
	Medium	6	12
Sector	Services	22	44
	Manufacturing	14	28
	Retail/wholesale	10	20
	Other	4	8
Years in operation	Less than 5	15	30
	5–10	18	36
	11–20	10	20
	More than 20	7	14

Source: Authors' survey calculations.

4.2. International Engagement, Entry Modes, and Target Markets

Thirty-two of the 50 surveyed enterprises report engagement in international business activity. This indicates substantial foreign-market participation within the sample, although the remaining firms show that internationalization is not universal. Among the internationally active firms, direct exporting is the most frequent initial mode. Online or e-commerce sales rank second, and partnerships or joint ventures rank third. Only a small number began through a foreign branch. The pattern is consistent with a resource-commitment logic: firms generally favor modes that permit market access without the fixed cost and complexity of a substantial foreign presence.

The importance of online sales is notable because it shows that the entry repertoire is broader than conventional exporting. Digital channels can help firms validate demand and reach dispersed customers, while partnerships can supply local knowledge and distribution. These routes may also be combined: a firm can promote digitally, fulfill orders through exports, and rely on a foreign partner for customer acquisition or after-sales service. The very limited use of branches suggests that high-control, high-commitment entry remains exceptional among the surveyed SMEs.

Initial market selection is concentrated in neighboring countries and the European Union. Proximity reduces transport costs and may lower language, information, and relationship barriers, supporting the gradual logic of the Uppsala model. EU markets nevertheless attract almost one third of reported initial targeting, reflecting their size and commercial appeal. Developed non-EU and emerging markets receive much less attention. This concentration can facilitate early learning, but it may also leave firms dependent on a narrow group of destinations.

Table 2: International Activity, Initial Entry Mode, and Target Region

Indicator	Category	n	Share (%)
International activity (N=50)	Yes	32	64
	No	18	36
Initial entry mode (n=32)	Direct export	15	46.9

Indicator	Category	n	Share (%)
	Online/e-commerce sales	8	25.0
	Partnership/joint venture	6	18.8
	Foreign branch	2	6.3
	Other	1	3.1
Initial target region (n=32)	Neighboring countries	18	56.3
	European Union	10	31.3
	Developed non-EU markets	2	6.3
	Emerging markets	2	6.3

Source: Authors' survey calculations.

4.3. Motives and Barriers

Market growth is the most frequently reported motive, followed by customer demand. Together, these responses portray internationalization mainly as an opportunity-led strategy rather than a reaction to competitive pressure alone. Risk diversification also matters, showing that firms view foreign revenue as a way to reduce dependence on domestic conditions. Access to resources is reported least often, which may mean that the firms primarily seek sales markets rather than foreign inputs, knowledge, or capital. Because the motive question generated 54 mentions, the percentages in Table 3 describe shares of recorded motives, not shares of firms.

Limited financial resources are the dominant barrier among the 32 internationally active firms. The finding is economically plausible because international expansion requires expenditures before revenues are assured. Certification, adaptation, promotion, working capital, transport, and delayed payment can place considerable pressure on cash flow. Regulatory requirements form the second-largest barrier, while insufficient international experience is third. Logistics and cultural differences are less frequently selected as the single hardest obstacle, but they may still affect costs and execution in particular sectors.

The barrier profile points to complementarity among interventions. Credit alone may not produce successful exporting if a firm lacks knowledge of standards or market selection. Training alone may have limited effect if the firm cannot finance certification or inventory. A practical export-readiness package would therefore connect finance with advice on compliance, contracts, pricing, logistics, and partner verification. This interpretation is consistent with policy assessments that call for both improved SME finance and stronger internationalization support in Kosovo and the Western Balkans (European Investment Bank, 2016; OECD, 2022).

Table 3: Motivations for Expansion and Most Difficult Barriers

Indicator	Category	n	Share (%)
Motivation (54 mentions)	Market growth	20	37
	Customer demand	14	26
	Risk diversification	10	19
	Competitive pressure	6	11
	Access to resources	4	7
Most difficult barrier (n=32)	Limited financial resources	16	50
	Regulatory requirements	8	25
	Insufficient international experience	5	16
	Logistics	2	6
	Cultural differences	1	3

Source: Authors' survey calculations. Note: Motivation percentages are shares of 54 recorded mentions. Barrier percentages use the 32 internationally active firms.

4.4. Success Factors, Digitalization, and Future Plans

Partnerships and business networks receive the largest share of valid success-factor responses, followed closely by digital tools. Product innovation and qualified management also receive meaningful support, whereas government export assistance is selected least often as the factor that contributed most to success. This does not necessarily imply that public support is unimportant. It may instead indicate limited reach, limited awareness, or that firms experience networks and internal capabilities more directly during market entry. The result aligns with the network perspective, which views relationships as channels for knowledge, legitimacy, and opportunity (Coviello & Munro, 1997).

Digitalization is assessed positively across the full sample. More than half of firms rate digital tools as very or extremely important, and a further group gives them moderate importance. Only a small minority assigns little or no importance. For service firms, digital tools may function as both the marketing channel and the delivery infrastructure. For manufacturers and traders, they can support promotion, customer communication, order management, and partner coordination even where physical shipment remains essential. The result supports a capability-based interpretation: technology becomes valuable when paired with market knowledge, staff skills, and reliable execution.

Perceived international performance is mixed. Among 49 valid responses, the largest group describes performance as moderately successful. Smaller groups report very successful, limited, or unsuccessful outcomes. This distribution is more informative than a simple success/failure label because it indicates that international activity frequently produces partial rather than immediate results. Market entry is a learning process, and early sales may not yet cover the fixed costs of capability building. Future studies should use objective measures such as export intensity, foreign-sales growth, profitability, and the number of sustained markets to test this interpretation.

The outlook is cautiously expansionary. More than half of the sample plans further international expansion during the next three years, while the remaining firms are evenly divided between no expansion and uncertainty. Preferred support mirrors the reported barriers: easier access to finance ranks first, followed by government export assistance and international-business training. Infrastructure and trade agreements are also recognized, while very few firms report no need for support. The internal consistency across the questionnaire strengthens the practical relevance of the findings.

Table 4: Reported Success Factors and Importance of Digital Tools

Indicator	Category	n	Share (%)
Success factor (46 valid responses)	Partnerships/business networks	14	30.4
	Digital tools	12	26.1
	Product innovation	9	19.6
	Qualified management	8	17.4
	Government export support	3	6.5
Importance of digital tools (N=50)	Extremely important	10	20
	Very important	18	36
	Moderately important	14	28
	Slightly important	6	12
	Not important	2	4

Source: Authors' survey calculations. Note: Success-factor percentages are recalculated from 46 valid responses; digital-importance percentages use the full sample.

Table 5: Perceived Performance, Expansion Plans, and Preferred Support

Indicator	Category	n	Share (%)
Perceived international performance (n=49)	Very successful	8	16.3
	Moderately successful	22	44.9
	Limited success	13	26.5

Indicator	Category	n	Share (%)
	Unsuccessful	6	12.2
Plan to expand in next three years (N=50)	Yes	26	52
	No	12	24
	Unsure	12	24
Most useful support (N=50)	Easier access to finance	20	40
	Government export assistance	12	24
	International-business training	10	20
	Infrastructure/trade agreements	6	12
	No support needed	2	4

Source: Authors' survey calculations. Note: Performance percentages are recalculated from 49 valid responses because one observation was missing. Expansion and support percentages use the full sample. Rounded shares may not sum exactly.

Taken together, the results depict a selective and mainly incremental internationalization process. Surveyed SMEs commonly start with direct exports, online sales, or partnerships, and they focus first on neighboring and EU markets. This broadly supports the Uppsala expectation that firms initially limit commitment and uncertainty, while the importance of e-commerce and rapid access to wider markets also reflects born-global mechanisms. The evidence therefore favors a hybrid interpretation: gradual learning remains important, but digital tools and networks can accelerate market access.

The central managerial challenge is to convert opportunity into repeatable capability. Growth and customer demand may prompt entry, but finance, compliance, and experience determine whether a firm can deliver consistently. Networks help bridge information gaps, while digital tools improve reach and coordination. Product innovation and qualified management help the firm sustain differentiation after entry. No single factor is sufficient, international success is more likely when market selection, financing, compliance, partnership, and operational execution reinforce one another.

For policy, the findings favor targeted and sequenced support over generic promotion. Firms at an early stage need diagnostic advice, market information, training, and small-scale financing for certification or pilot orders. Firms with validated demand need working capital, buyer connections, export-credit or guarantee instruments, and help navigating standards and customs. More mature exporters may benefit from innovation support, trade-fair participation, and assistance diversifying destinations. A staged system would allocate support according to export readiness and reduce the risk that resources are dispersed without measurable international outcomes.

5. CONCLUSION AND RECOMMENDATIONS

5.1. Conclusion

This study examined how SMEs in Kosovo approach foreign markets and which conditions shape their experience. The survey shows that international activity is common within the sample but remains concentrated in relatively accessible markets and lower-commitment entry modes. Direct exporting is the leading initial strategy, supported by online sales and partnerships. Neighboring countries and EU markets dominate initial targeting. Market growth and customer demand are the strongest motives, while finance, regulation, and insufficient international experience form the principal barriers.

The findings also highlight the importance of capability and connection. Business networks and digital tools are the most frequently identified contributors to success, followed by product innovation and qualified management. Most firms view digitalization as materially important, and many plan further international expansion. The evidence therefore supports neither a purely internal nor a purely external explanation. Internationalization depends on the interaction between firm-level skills, resources, and relationships and the accessibility of finance, regulation, infrastructure, and public support.

5.2. Recommendations

Public institutions and financial organizations should develop export-oriented finance that matches the cash-flow profile of international transactions. Credit guarantees, co-financing for certification, small grants for market validation, and working-capital products tied to confirmed orders could address the most frequently reported barrier. Eligibility and reporting rules should remain transparent so that smaller firms are not excluded by administrative cost.

Export-support services should provide a clear path from information to implementation. A single access point could combine guidance on target-market selection, customs, standards, taxation, contracts, payment security, and available financing. Training should be practical and sector-specific, covering export pricing, negotiation, cross-cultural communication, digital marketing, e-commerce operations, logistics, and risk management. Partner-search and buyer-matching services should include basic due diligence and follow-up.

SME managers should treat internationalization as a staged portfolio of experiments. Before committing substantial resources, firms should define a target-customer profile, test demand, calculate the full cost to serve, verify compliance requirements, and set measurable milestones. They should diversify relationships so that sales do not depend on one buyer or intermediary, invest in staff with international responsibilities, and use digital tools to collect market feedback and manage customer relationships. Product and process innovation should remain connected to verified foreign-customer needs.

Finally, policy evaluation should track outcomes rather than participation alone. Useful indicators include sustained exporters, repeat foreign sales, destination diversification, export intensity, jobs linked to foreign demand, and survival after support ends. Shared monitoring would help institutions identify which combinations of finance, advice, training, and networking generate the strongest additional results.

Future research should use a larger stratified sample covering sectors, municipalities, and firm-size classes. Longitudinal data would show how entry modes and outcomes evolve, while interviews could explain why firms choose specific partners or abandon particular markets. Regression analysis could then examine the relationship between international performance and finance, management experience, innovation, networks, and digital capability, provided that objective performance measures and an adequate sample are available. Comparative work with other Western Balkan economies would further distinguish Kosovo-specific constraints from regional patterns.

REFERENCES

Bose, T. K. (2016). Critical success factors of SME internationalization. Journal of Small Business Strategy, 26(2), 87–109. https://jsbs.scholasticahq.com/article/26419

Coviello, N. E., & Munro, H. J. (1997). Network relationships and the internationalisation process of small software firms. International Business Review, 6(4), 361–386. https://doi.org/10.1016/S0969-5931(97)00010-3

European Commission. (2016). Internationalisation of innovation in SMEs: Case studies, exemplary support practices and policy implications. Publications Office of the European Union. https://doi.org/10.2777/440818

European Commission. (2020). Shaping Europe's digital future. Publications Office of the European Union. https://digital-strategy.ec.europa.eu/en/policies/shaping-europes-digital-future

European Investment Bank. (2016). Kosovo: Assessment of financing needs of SMEs in the Western Balkans countries. https://www.eib.org/en/publications/econ-assessment-of-financing-needs-of-smes-in-kosovo

Johanson, J., & Vahlne, J.-E. (1977). The internationalization process of the firm—A model of knowledge development and increasing foreign market commitments. Journal of International Business Studies, 8(1), 23–32. https://doi.org/10.1057/palgrave.jibs.8490676

Knight, G. A., & Cavusgil, S. T. (2004). Innovation, organizational capabilities, and the born-global firm. Journal of International Business Studies, 35(2), 124–141. https://doi.org/10.1057/palgrave.jibs.8400071

Kosovo Agency of Statistics. (2021). Statistical yearbook of the Republic of Kosovo 2021.

Leonidou, L. C. (2004). An analysis of the barriers hindering small business export development. Journal of Small Business Management, 42(3), 279–302. https://doi.org/10.1111/j.1540-627X.2004.00112.x

OECD. (2022). SME policy index: Western Balkans and Turkey 2022: Assessing the implementation of the Small Business Act for Europe. OECD Publishing. https://doi.org/10.1787/b47d15f0-en

Oviatt, B. M., & McDougall, P. P. (1994). Toward a theory of international new ventures. Journal of International Business Studies, 25(1), 45–64. https://doi.org/10.1057/palgrave.jibs.8490193

U.S. Department of Commerce. (2021). A basic guide to exporting (11th ed.). International Trade Administration.

World Bank. (2021). Kosovo country economic memorandum: Gearing up for a more productive future. http://hdl.handle.net/10986/36896

Banking Soundness, Institutional Quality and Private-Sector Credit in the EU-27: A Panel Data Analysis

Kyriaki Efthalitsidou[1]* Eleni Zafeiriou[2] Konstantinos Spinthiropoulos[3]

Nikolaos Sariannidis[4]

[1] Department of Business Administration; Department of Accounting and Finance, University of Western Macedonia, GR50100 Kozani, Greece; email: aff01633@uowm.gr; ORCID iD: 0000-0002-7180-6752

[2] Department of Agricultural Development, Democritus University of Thrace, GR68200 Orestiada, Greece

[3] Department of Management Science and Technology, University of Western Macedonia, GR50100 Kozani, Greece

[4] Department of Accounting and Finance, University of Western Macedonia, GR50100 Kozani, Greece

* Corresponding author

Abstract: This paper investigates the relationship between banking-sector soundness, institutional quality and private-sector credit across the European Union. Using an annual country-level panel for the EU-27 over 2014-2024, the study combines indicators of non-performing loans (NPLs) and bank capitalization with a composite institutional-quality index based on Government Effectiveness, Regulatory Quality and Control of Corruption. GDP growth, inflation and unemployment are included as macroeconomic controls. The empirical strategy compares pooled and panel specifications, with the main analysis based on two-way fixed effects with country and year effects and country-clustered standard errors. Particular attention is paid to whether institutional quality conditions the NPL-credit relationship. The static fixed-effects results show a positive and statistically significant NPL × institutional-quality interaction. However, the hypothesized mitigation mechanism is not supported because the conditional NPL slope remains positive across the observed institutional-quality range; a negative slope would arise only below the observed range of the index. The moderation result also weakens when country-specific trends, lagged banking indicators and a lagged dependent variable are introduced. In a specification using the annual change in credit-to-GDP, the direct NPL coefficient becomes negative and statistically significant, while the interaction is no longer significant. The findings therefore reveal an important distinction between structural credit depth and short-run credit adjustment. A descriptive comparison further shows that Greece combined substantially higher NPLs and unemployment with lower institutional quality than the EU-26 comparator over the sample period, while average credit-to-GDP remained relatively high. The paper contributes to the banking and finance literature by integrating banking soundness and institutional governance within a unified EU-27 framework and by demonstrating that institutional conditioning is sensitive to the empirical specification.

Keywords: Banking Soundness; Institutional Quality; Private-Sector Credit; Financial Stability; EU-27 Panel Data

1. INTRODUCTION

Bank-based financial intermediation remains central to the financing of households and firms across much of the European Union. The ability of banks to extend credit, however, depends not only on macroeconomic conditions but also on the quality of their balance sheets and on the institutional environment in which financial contracts are originated, monitored and enforced. Non-performing loans (NPLs) are particularly relevant because they can weaken bank profitability, absorb management resources, increase funding costs and constrain new lending. European evidence generally finds that elevated NPLs are associated with weaker loan growth, although the magnitude of the relationship varies across countries, banks and empirical designs (Sánchez Serrano, 2021; Tölö & Virén, 2021).

Bank capitalization provides a second key dimension of banking soundness. Better-capitalized banks may be more able to absorb losses and sustain lending, but the capital-lending relationship is not mechanically positive in every setting. European bank-level evidence indicates that the lending effect of capital depends on other balance-sheet conditions such as liquidity, while a recent meta-analysis documents an overall positive relationship between capital ratios and credit growth together with substantial heterogeneity across regulatory and empirical settings (Malovaná et al., 2024; Thornton & Di Tommaso, 2020).

A further dimension is institutional quality. Effective governments, credible regulation and control of corruption can improve the environment in which financial intermediation operates by strengthening regulatory credibility, contract enforcement and information quality. Cross-country research links higher-quality governance to

financial-sector development and efficiency, although the effect varies across governance dimensions and samples (Atanga Ondoa & Seabrook, 2022; Cooray, 2011). Institutional quality can also condition the effect of financial standards and reforms on domestic credit, illustrating that the same financial arrangement may produce different outcomes in different institutional environments (Tawiah & Gyapong, 2023).

This paper brings these strands together by examining banking soundness, institutional quality and private-sector credit in the EU-27 over 2014-2024. Its contribution is threefold. First, it integrates country-level banking indicators and governance measures within one panel framework. Second, it tests whether institutional quality moderates the relationship between NPLs and private-sector credit through an explicit interaction term. Third, it distinguishes results for the level of credit-to-GDP from stricter specifications that account for country-specific trends, persistence and short-run changes in credit depth. This distinction is important because a level relationship can reflect persistent structural differences, legacy balance-sheet effects and movements in the GDP denominator rather than a short-run credit-supply response.

The empirical evidence is deliberately interpreted conservatively. In the static fixed-effects model, the NPL × institutional-quality interaction is positive and statistically significant, but the conditional NPL slope remains positive throughout the observed institutional-quality range. Thus, the data do not display the hypothesized mechanism in which stronger institutions attenuate an adverse NPL-credit relationship. Moreover, the interaction loses conventional significance in several stricter robustness checks. By contrast, when the dependent variable is the annual change in credit-to-GDP, NPLs are negatively and significantly associated with credit adjustment, which is more consistent with the dominant European lending literature. These results indicate that structural credit depth and short-run credit dynamics should not be conflated.

2. LITERATURE REVIEW AND HYPOTHESES

2.1. Non-Performing Loans and Private-Sector Credit

The conventional banking channel suggests that high NPL ratios impair lending capacity through several mechanisms. Problem loans reduce interest income, increase provisioning needs, weaken profitability and may erode regulatory capital. They can also increase perceived bank risk and funding costs. Using European bank data, Sánchez Serrano (2021) reports that higher NPL ratios are associated with lower growth in performing loans. Tölö and Virén (2021) similarly find that NPLs hinder loan growth in Europe and identify profitability, funding costs and capital as relevant transmission channels. Thornton and Di Tommaso (2021) show that the effect of NPLs on credit expansion depends on bank capital and profitability, highlighting the relevance of interaction effects rather than purely additive models.

H1: Higher non-performing loans are associated with lower private-sector credit.

2.2. Bank Capitalization and Lending

Capital can support lending by increasing banks' loss-absorbing capacity and reducing the probability that balance-sheet constraints bind. At the same time, increases in regulatory requirements may induce short-run deleveraging when banks adjust through assets rather than retained earnings. Thornton and Di Tommaso (2020) show for European banks that capital has a more positive lending effect when liquidity is sufficient. Malovaná et al. (2024), synthesizing more than 1,600 estimates, report an overall positive association between capital ratios and credit growth while also documenting substantial heterogeneity across empirical settings.

H2: Stronger bank capitalization is associated with higher private-sector credit.

2.3. Institutional Quality and Financial Intermediation

Institutional quality can affect financial intermediation by shaping regulatory credibility, contract enforcement, information quality and incentives for both lenders and borrowers. Cooray (2011) finds that government quality positively influences financial-sector size and efficiency in a cross-country setting. Atanga Ondoa and Seabrook (2022) also report that governance dimensions are associated with financial development, although effects differ across indicators. Tawiah and Gyapong (2023) show that institutional quality can alter the relationship between financial-reporting standards and domestic bank credit, which directly motivates a moderation framework.

H3: Higher institutional quality is associated with higher private-sector credit.

H4: Stronger institutional quality attenuates an adverse relationship between NPLs and private-sector credit.

3. DATA AND METHODOLOGY

3.1. Data and Variables

The empirical dataset is an annual panel of the 27 European Union member states covering 2014-2024. The maximum balanced sample contains 297 country-year observations. After combining the banking, institutional and macroeconomic variables, the baseline complete-case sample contains 281 observations, corresponding to 94.6% of the theoretical maximum. The panel is therefore treated as unbalanced, with the remaining missingness concentrated mainly in banking indicators for a small number of country-years.

The dependent variable is domestic credit to the private sector by banks as a percentage of GDP. Banking soundness is captured by the ratio of bank non-performing loans to total gross loans and bank capital to assets. Institutional quality is measured as the arithmetic mean of three Worldwide Governance Indicators: Government Effectiveness, Regulatory Quality and Control of Corruption. These governance estimates share a common scale and are combined with equal weights to summarize the institutional environment. The 2025 WGI revision recalculates the historical series consistently through 2024; the indicators should nevertheless be interpreted as broad perception-based measures rather than precise short-run policy indicators (World Bank, 2025). GDP growth, consumer-price inflation and unemployment are included as macroeconomic controls. The banking and macroeconomic series are downloaded from World Development Indicators; the NPL and bank-capital indicators draw on the IMF Financial Soundness Indicators, while the institutional variables are taken from the Worldwide Governance Indicators (International Monetary Fund, 2026; World Bank, 2025, 2026).

3.2. Descriptive Statistics

Table 1. Descriptive statistics

Variable	N	Mean	SD	Min	Median	Max
Private-sector credit (% GDP)	281	74.385	37.486	22.728	66.195	251.710
NPL ratio (%)	281	5.824	7.900	0.304	3.115	47.748
Bank capital/assets (%)	281	7.955	2.236	4.142	7.624	15.049
Institutional Quality Index	281	1.015	0.599	-0.079	0.912	2.161
GDP growth (%)	281	2.673	3.794	-10.940	2.572	24.624
Inflation CPI (%)	281	2.752	3.720	-2.097	1.672	19.705
Unemployment (%)	281	7.439	4.003	2.015	6.500	26.708

Note: Statistics refer to the baseline complete-case sample used in the main regressions.

Table 1 shows substantial heterogeneity in credit depth and banking stress across the EU-27. Private-sector credit averages 74.4% of GDP, with a wide range from 22.7% to 251.7%. The NPL ratio averages 5.82% but reaches almost 48% in the most stressed country-year observation. Institutional quality averages 1.02 on the WGI estimate scale and also varies materially across countries and time. The macroeconomic variables capture both severe downturns and strong rebounds, including the pandemic period.

3.3. Greece in the EU-27 Context

Table 2. Greece versus the EU-26 comparator, 2014-2024 averages

Variable	Greece	EU-26 comparator
Private-sector credit (% GDP)	81.575	74.092
NPL ratio (%)	26.433	4.985
Bank capital/assets (%)	9.140	7.907
Institutional Quality Index	0.298	1.044

Variable	Greece	EU-26 comparator
GDP growth (%)	1.414	2.724
Inflation CPI (%)	1.268	2.813
Unemployment (%)	17.897	7.013

Note: Unweighted country-year means calculated from the baseline complete-case sample. The EU-26 comparator excludes Greece.

Greece provides an informative descriptive illustration of the structural-versus-dynamic distinction developed in the paper. Over 2014-2024, the Greek NPL ratio averaged 26.4%, more than five times the EU-26 comparator, while unemployment was also substantially higher and institutional quality lower. Yet average private-sector credit-to-GDP remained above the EU-26 mean. This combination is consistent with the presence of legacy credit stocks and crisis-related balance-sheet deterioration and helps explain why a country-level level specification can yield a positive contemporaneous NPL-credit association without implying that NPLs stimulate new lending.

3.4. Econometric Specification

The baseline empirical model is estimated with country and year fixed effects. Let Credit_it denote domestic private-sector credit as a share of GDP in country i and year t. The preferred interaction specification is: Credit_it = β0 + β1NPL_it + β2Capital_it + β3InstQ_it + β4(NPL_it × InstQ_it) + γX_it + μ_i + λ_t + ε_it, where X_it contains GDP growth, inflation and unemployment, μ_i denotes country fixed effects and λ_t denotes year fixed effects. NPL and institutional quality are mean-centered before constructing the interaction, so the main NPL coefficient is interpreted at the sample-average level of institutional quality.

Pooled OLS, fixed-effects and random-effects specifications are examined. A correlated-random-effects/Mundlak-Hausman test is used to assess the random-effects exogeneity assumption. Because diagnostic tests indicate heteroskedasticity and within-country serial correlation, inference in the preferred fixed-effects models is based on country-clustered standard errors. Cross-sectional dependence is assessed using the Pesaran CD statistic, and variance inflation factors are calculated to evaluate multicollinearity. Robustness checks replace the composite institutional index with each WGI component, add country-specific linear trends, lag the core banking and institutional regressors, include lagged credit, and use the annual change in credit-to-GDP as an alternative dependent variable.

4. EMPIRICAL RESULTS

4.1. Model Selection and Diagnostics

The correlated-random-effects/Mundlak-Hausman test rejects the hypothesis that the unobserved country effect is uncorrelated with the regressors ($\chi^2(6) = 15.676$, $p = 0.016$), supporting country fixed effects for the main interpretation. The Breusch-Pagan test strongly rejects homoskedasticity (LM = 205.713, $p < 0.001$), while the Wooldridge serial-correlation test also rejects the null of no first-order serial correlation (test statistic = 9.713, $p < 0.001$). The Pesaran CD statistic is -1.863 with $p = 0.062$, so cross-sectional dependence is not rejected at the 5% level, although the result is borderline at 10%. The maximum VIF among the substantive regressors is 2.84, indicating no serious multicollinearity concern.

Table 3. Diagnostic and model-selection tests

Test	Statistic	p-value	Decision
Breusch-Pagan heteroskedasticity	205.713	<0.001	Reject homoskedasticity
Wooldridge serial-correlation test	9.713	<0.001	Reject no serial correlation
Pesaran CD	-1.863	0.062	Not rejected at 5%
Mundlak-Hausman / correlated effects	15.676	0.016	Reject RE exogeneity

Implication: country fixed effects with country-clustered standard errors are used for the main interpretation.

4.2. Baseline Fixed-Effects Results

Table 4. Two-way fixed-effects estimates for private-sector credit (% GDP)

Variable	FE M1	FE M2	FE M3: Interaction
NPL	2.144 (0.108)	2.065* (0.087)	2.872** (0.011)
Capital	-0.587 (0.615)	0.341 (0.761)	-0.298 (0.733)
InstQ	-	32.022 (0.164)	17.176 (0.172)
NPL × InstQ	-	-	2.397** (0.036)
GDP growth	-0.334 (0.137)	-0.296 (0.114)	-0.827** (0.016)
Inflation	0.457 (0.361)	0.574 (0.265)	-0.009 (0.981)
Unemployment	1.733 (0.184)	1.936 (0.120)	2.921** (0.025)

Notes: p-values in parentheses; *** p < 0.01, ** p < 0.05, * p < 0.10. All models include country and year fixed effects and use country-clustered standard errors. Within R^2 = 0.531 (M1), 0.560 (M2) and 0.684 (M3).

The results in Table 4 show that H1 is not supported when private-sector credit is modeled in levels. In the preferred interaction model (M3), the NPL coefficient at the mean level of institutional quality is positive and statistically significant (β = 2.872, p = 0.011). Bank capital is statistically insignificant (β = -0.298, p = 0.733), providing no support for H2 in this country-level level specification. Institutional quality is positive but not significant at conventional levels (β = 17.176, p = 0.172), so H3 is also not supported as an independent effect. GDP growth enters with a negative coefficient (β = -0.827, p = 0.016), inflation is insignificant, and unemployment is positive and significant (β = 2.921, p = 0.025). The signs on GDP growth and unemployment require caution because the dependent variable is credit divided by GDP and because structural and cyclical mechanisms can operate simultaneously.

4.3. Institutional Quality as a Moderator

The central interaction term between NPLs and institutional quality is positive and statistically significant in M3 (β = 2.397, p = 0.036). A positive interaction would be directionally consistent with attenuation if the underlying NPL-credit slope were negative. In the present estimates, however, the conditional NPL slope is already positive at low institutional quality and becomes more positive as institutional quality rises. H4 is therefore not supported in its hypothesized economic sense: the data do not show stronger institutions weakening an adverse NPL-credit association within the observed institutional range.

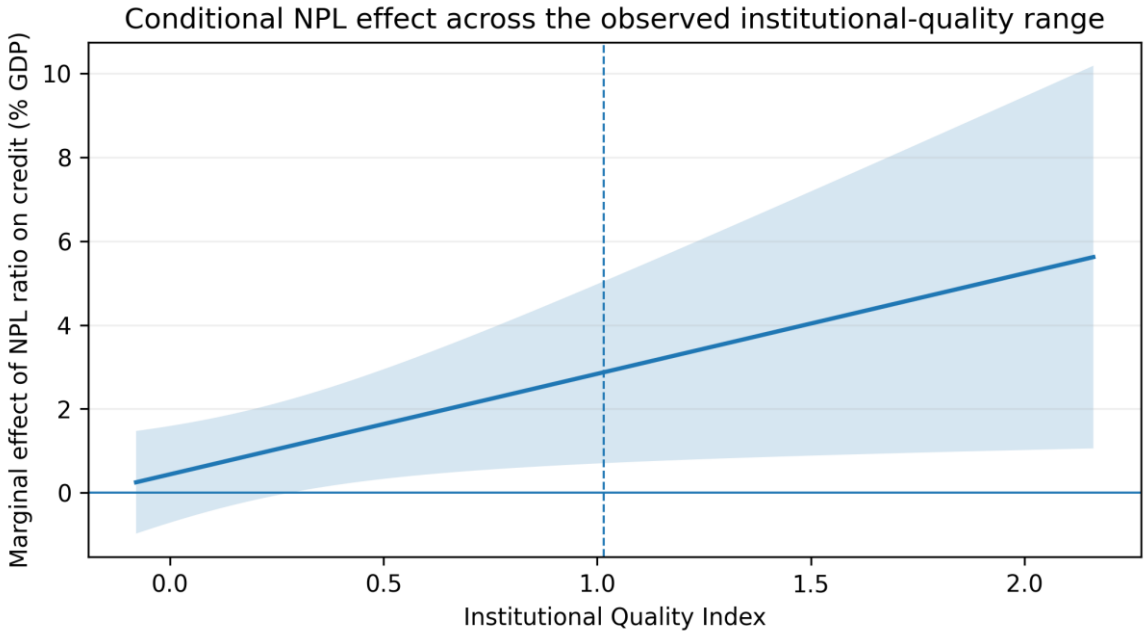
Table 5. Marginal effect of NPLs at different levels of institutional quality

Institutional quality	NPL marginal effect	SE	p-value
Low (-1 SD)	1.436	0.589	0.022
Mean	2.872	1.054	0.011
High (+1 SD)	4.308	1.649	0.015

Note: Marginal effects are calculated from FE M3 using country-clustered covariance estimates.

The marginal-effect calculations reinforce this interpretation. At one standard deviation below the mean of institutional quality, the estimated NPL effect is 1.436 (p = 0.022); at the mean it is 2.872 (p = 0.011); and at one standard deviation above the mean it rises to 4.308 (p = 0.015). Based on the point estimates, the NPL slope would cross zero at an Institutional Quality Index of approximately -0.183, below the observed sample minimum of -0.079. Thus, the estimated static model does not contain an empirically observed range in which NPLs have a negative conditional slope that is subsequently mitigated by institutional quality.

Figure 1. Conditional marginal effect of NPLs across the observed institutional-quality range



Note: Solid line shows the estimated NPL marginal effect from FE M3; shaded area represents the 95% confidence interval. The dashed vertical line marks the sample mean of the Institutional Quality Index.

Figure 1 makes the interaction transparent: the estimated conditional NPL effect increases over the observed range of institutional quality. These coefficients are within-country conditional associations, not causal effects. A plausible explanation is that the level specification captures persistent credit depth and legacy balance-sheet effects. Countries with deeper banking systems can simultaneously exhibit high credit-to-GDP and periods of elevated NPLs following adverse shocks, while stronger institutions may facilitate the recognition and management of problem assets without mechanically removing the contemporaneous association between the outstanding credit stock and impaired loans.

5. ROBUSTNESS ANALYSIS

Table 6. Robustness checks for the NPL and interaction coefficients

Specification	NPL coef.	p-value	Interaction coef.	p-value	N
Government Effectiveness	2.800	0.007	2.369	0.012	281
Regulatory Quality	2.790	0.013	2.444	0.052	281
Control of Corruption	2.953	0.027	2.094	0.078	281
Country-specific trends	1.255	0.158	1.383	0.246	281
One-year-lagged predictors	2.226	0.043	1.976	0.100	254
Lagged dependent variable	0.282	0.603	0.302	0.566	258
Annual change in credit/GDP	-0.341	0.003	-0.197	0.197	258

Notes: All specifications retain country and year effects. Inference uses country-clustered standard errors with cluster-robust t inference. For the first three rows, the composite index is replaced by the named WGI dimension. The final row changes the dependent variable to the annual change in credit-to-GDP.

The static interaction result is broadly similar when the composite institutional index is replaced by individual governance dimensions. The NPL × Government Effectiveness interaction is positive and significant (β = 2.369, p = 0.012), while the interactions with Regulatory Quality (β = 2.444, p = 0.052) and Control of Corruption (β = 2.094, p = 0.078) remain positive but are only marginally significant. This indicates that the static moderation pattern is not generated by a single institutional component.

The interaction is substantially less robust once stronger controls for dynamics and country trajectories are introduced. With country-specific linear trends, its coefficient falls to 1.383 and becomes insignificant (p = 0.246).

Using one-year-lagged banking and institutional predictors weakens the result to p = 0.100. Once lagged credit is included, the interaction is close to zero and clearly insignificant (β = 0.302, p = 0.566). These results indicate that persistence in credit depth and country-specific trajectories account for an important part of the static interaction.

The short-run specification provides the sharpest contrast. When the dependent variable is the annual change in credit-to-GDP, the interaction becomes negative but insignificant (β = -0.197, p = 0.197), whereas the direct NPL coefficient is negative and statistically significant (β = -0.341, p = 0.003). This finding is consistent with European evidence that deteriorating asset quality is associated with weaker credit dynamics (Sánchez Serrano, 2021; Tölö & Virén, 2021). Taken together, the results suggest that NPLs can coexist with high structural credit depth in level models while still being associated with weaker short-run credit adjustment.

6. DISCUSSION

The empirical findings require a distinction between statistical interaction and the hypothesized economic mechanism. The positive and significant interaction in the static fixed-effects model establishes that institutional quality changes the observed within-country relationship between NPLs and credit depth. It does not show that stronger institutions causally transform NPLs into higher lending, nor does it provide evidence of mitigation in the observed sample because the conditional NPL slope is positive across the institutional-quality range. The result is more plausibly interpreted as a structural association reflecting the joint evolution of financial depth, recognition of impaired assets and institutional capacity.

The Greece-EU comparison offers an intuitive illustration. Greece entered the sample with exceptionally high legacy NPLs and maintained a high outstanding credit stock relative to GDP during the early years, while its institutional-quality score remained well below the EU-26 comparator. Over time, NPLs fell sharply and credit-to-GDP also declined. Such trajectories can generate positive level associations even when deteriorating asset quality constrains marginal lending. This interpretation is reinforced by the annual-change model, where the NPL coefficient becomes negative and significant.

The robustness results further strengthen the cautious interpretation. Once persistent credit dynamics or country-specific trends are controlled for, the interaction loses conventional significance. This helps reconcile the country-level findings with prior bank-level research. Bank-level studies are better positioned to identify short-run supply responses, whereas a country-level credit-to-GDP ratio combines bank lending behavior with structural financial depth, loan demand, legacy stocks and GDP movements. The findings therefore do not imply that NPLs are benign. Instead, they show that the empirical sign of the NPL coefficient depends critically on the outcome variable and time dimension being modeled.

For policymakers, the results imply that asset-quality improvement remains important for credit dynamics, while institutional reforms should be evaluated alongside banking-soundness measures rather than treated as a simple offset to NPL-related constraints. For researchers, the findings underline the value of distinguishing credit levels from credit growth and of accounting explicitly for persistence when interpreting interaction effects in macro-financial panels.

7. CONCLUSIONS

This study examines banking soundness, institutional quality and private-sector credit in the EU-27 over 2014-2024. Using an unbalanced panel of 281 complete country-year observations, it combines NPLs and bank capitalization with a composite measure of Government Effectiveness, Regulatory Quality and Control of Corruption. The main two-way fixed-effects model identifies a statistically significant positive interaction between NPLs and institutional quality. However, because the conditional NPL slope remains positive throughout the observed institutional-quality range, the hypothesized mitigation mechanism is not supported. Bank capitalization and institutional quality also do not display statistically significant independent effects in the preferred static model.

The key conclusion is that the interaction is specification-sensitive. It weakens when country-specific trends, lagged predictors or lagged credit are introduced. Moreover, when the analysis shifts from the level of credit-to-GDP to its annual change, NPLs are negatively and significantly associated with credit adjustment, while the interaction becomes insignificant. This suggests that the static level relationship captures structural financial-

depth and persistence effects that differ from the short-run lending channel documented in the European banking literature.

The paper has several limitations. Country-level aggregates cannot fully separate credit supply from credit demand; credit-to-GDP is affected by movements in the denominator; the WGI are broad perception-based indicators with measurement uncertainty; and the relatively short time dimension constrains dynamic-panel inference. Future research could extend the analysis using EBA or ECB bank-level data, richer measures of profitability and liquidity, and identification strategies designed to address endogeneity more directly. Nevertheless, the study provides a useful EU-wide framework linking banking soundness and institutional governance and demonstrates why institutional interactions should be interpreted jointly with model dynamics and robustness evidence.

REFERENCES

Atanga Ondoa, H., & Seabrook, A. M. (2022). Governance and financial development: Evidence from a global sample of 120 countries. International Journal of Finance & Economics, 27(3), 3405-3420. https://doi.org/10.1002/ijfe.2327

Cooray, A. (2011). The role of the government in financial sector development. Economic Modelling, 28(3), 928-938. https://doi.org/10.1016/j.econmod.2010.11.001

International Monetary Fund. (2026). Financial Soundness Indicators (FSI) [Data set]. IMF Data. Accessed September 2026.

Malovaná, S., Hodula, M., Bajzík, J., & Gric, Z. (2024). Bank capital, lending, and regulation: A meta-analysis. Journal of Economic Surveys, 38(3), 823-851. https://doi.org/10.1111/joes.12560

Sánchez Serrano, A. (2021). The impact of non-performing loans on bank lending in Europe: An empirical analysis. The North American Journal of Economics and Finance, 55, 101312. https://doi.org/10.1016/j.najef.2020.101312

Tawiah, V., & Gyapong, E. (2023). International financial reporting standards, domestic debt finance and institutional quality: Evidence from developing countries. International Journal of Finance & Economics, 28(3), 2915-2936. https://doi.org/10.1002/ijfe.2575

Thornton, J., & Di Tommaso, C. (2020). Liquidity and capital in bank lending: Evidence from European banks. Finance Research Letters, 34, 101273. https://doi.org/10.1016/j.frl.2019.08.021

Thornton, J., & Di Tommaso, C. (2021). The effect of non-performing loans on credit expansion: Do capital and profitability matter? Evidence from European banks. International Journal of Finance & Economics, 26(3), 4822-4839. https://doi.org/10.1002/ijfe.2042

Tölö, E., & Virén, M. (2021). How much do non-performing loans hinder loan growth in Europe? European Economic Review, 136, 103773. https://doi.org/10.1016/j.euroecorev.2021.103773

World Bank. (2025). Worldwide Governance Indicators, 2025 Revision [Data set]. Accessed September 2026.

World Bank. (2026). World Development Indicators [Data set]. Accessed September 2026.

The Role of Spokespersons in Strategic Communication Management: A Case Study of Slovakia

Mgr. Helena Boškajová[1] **prof. Ing. Ivana Butoracová Šindleryová, PhD.[2]**

[1] University of St. Cyril and Methodius in Trnava, boskajova1@ucm.sk, ORDIC-ID: 0009-0005-0727-4519

[2] University of St. Cyril and Methodius in Trnava, ivana.butoracova.sindleryova@ucm.sk, ORCID-ID: 0000-0001-8261-7490

Abstract: Strategic communication represents an important component of public management, particularly in the process of preparing and communicating organizational decisions. In this context, spokespersons may perform not only an executive communication role but also an advisory function by identifying communication and reputational risks and providing recommendations to organizational leadership. This study examines the role of spokespersons in strategic communication management through a case study of Slovak ministries. The aim is to identify their position in the process of preparing and communicating decisions, with particular attention to their relationship with organizational leadership, involvement in decision-making processes, and ability to influence the communication of adopted decisions. The study is based on a quantitative survey conducted among spokespersons of the ministries of the Slovak Republic. The findings indicate that the position of spokespersons combines executive and advisory functions, although the extent of their involvement in decision-making varies across ministries. The results also suggest that communication recommendations are taken into account by organizational leadership, highlighting the importance of communication expertise in public management. The study contributes to understanding the position of strategic communication within the management processes of public organizations.

Keywords: strategic communication, communication management, public management, spokesperson, Slovakia

1. INTRODUCTION

The communication of decisions represents an integral part of public administration. The way in which an adopted decision is communicated may significantly influence its interpretation, the level of public acceptance, as well as the credibility of the ministry. Spokespersons are among the actors who play an important role in shaping the way in which such decisions are communicated to the public. Communication therefore does not represent merely the subsequent presentation of decisions that have already been adopted. In many cases, it may enter the process at an earlier stage and become part of the preparation of decisions themselves. In this context, a ministry spokesperson acts primarily as an actor responsible for the external communication of the institution. However, their role does not necessarily have to be limited solely to providing information to the public and the media. Depending on the internal organisational structure of the ministry, spokespersons may also participate in preparing the communication of decisions, provide communication advice to senior management, identify potential communication and reputational risks, or propose appropriate communication approaches. The extent to which spokespersons are involved in decision-making processes may differ across individual ministries. Their position may depend on whether they participate in senior management meetings, at what stage of the decision-making process they become involved, and to what extent they are able to influence the way in which adopted decisions are subsequently communicated. At the same time, this aspect of the spokesperson's role has not been sufficiently empirically examined in the context of Slovak public administration.

The aim of this study is to identify the position of spokespersons of ministries of the Slovak Republic in the process of decision-making and the communication of decisions. Through a questionnaire survey, the study examines their participation in senior management meetings, the stage of the decision-making process at which they become involved, their opportunities to influence the way in which adopted decisions are communicated, and their perception of their own professional position within the ministry.

2. LITERATURE REVIEW

Decisions made by the ministries of the Slovak Republic are inextricably linked to their communication with the public. The manner in which these decisions are presented influences not only citizens' awareness but also the interpretation of the measures adopted, the credibility of public institutions, and the degree of their social acceptance. Communication, therefore, cannot be viewed merely as a subsequent presentation of decisions that have already been made. It is an integral part of public administration, through which the state conveys its

decisions, explains their content, and creates an environment for building public trust. In this process, the ministry spokesperson plays a significant role; the professional status of this position has gradually shifted over the past decades from that of a traditional information broker to a profession with a substantially broader scope of communication tasks (Martela and Rott, 2011; Chudinová and Tušer, 2013; Constantin and Petrucă, 2019).

The theoretical foundations of the spokesperson's role are based primarily on the concept of public relations, which is grounded in the systematic development and maintenance of relationships between an organization and its public. Public relations, therefore, cannot be reduced to creating a positive media image of the organization, but rather encompasses long-term communication management, building trust, protecting reputation, and fostering mutually beneficial relationships. Media relations—focused on communicating with the media and establishing professional relationships with journalists—are a natural part of this. While public relations represent a comprehensive system of an organization's communication with various public groups, media relations focus on conveying information through the media. However, these two areas cannot be separated, as in the context of public administration they complement one another and form the foundation of ministries' external communication (Chudinová and Tušer, 2013; CIPR, 2022; ONMA, 2022; Lesensky.cz, 2022). The nature of communication by public institutions thus depends not only on the content of the information communicated but also on the quality of relationships with the media and the public that have been built over the long term.

The spokesperson plays a role in carrying out these communication processes; various authors define the spokesperson as the organization's official representative in relation to the media and the public. Martela and Rott (2011) emphasize the spokesperson's authority to speak on behalf of the organization, Chudinová and Tušer (2013) highlight the spokesperson's role as a mediator of communication between the organization's leadership, the media, and the public, while Constantin and Petrucă (2019) emphasize the spokesperson's importance in shaping the organization's reputation and credibility. Despite the differing emphases of individual authors, their approaches are united by the understanding of the spokesperson as a representative of the organization, whose role is not only to provide information but also to ensure consistent, credible, and professional communication with the external environment. The differences among the authors do not lie in the definition of basic communication tasks, but primarily in the scope of competencies they attribute to this profession. The question of whether a spokesperson primarily fulfills an operational or also a strategic function is one of the most debated aspects of their professional status and provides a theoretical basis for examining their role in the decision-making processes of ministries.

A spokesperson's organizational placement is one of the factors that influence the scope of their professional activities. In the context of ministries, a spokesperson is typically part of the communications department responsible for the ministry's external communications, though their specific position depends on the internal structure of the organization. However, organizational placement alone does not reflect the spokesperson's actual standing or the extent of their involvement in internal processes. Konečná Bernáthová (2013) points out that the effectiveness of a communications department is contingent upon its position within the organizational structure, while Tomandl (2011) emphasizes the need for a direct link between the communications department and top management. An organization's communication cannot be based solely on relaying information that has already been received; rather, it requires ongoing coordination and timely exchange between the organization's leadership and the communications department. The importance of a spokesperson's organizational standing is closely linked to their access to information. Tomandl (2011) points out that high-quality external communication is possible only if the spokesperson has access to a sufficient amount of up-to-date information about the organization's upcoming activities. Adamus-Matuszyńska (2018) expands on this perspective by highlighting the importance of trust from management, the degree of autonomy, and the opportunity to participate in internal communication processes. A spokesperson's actual standing, therefore, is determined not only by their job title but, above all, by the extent to which they participate in the organization's internal flow of information. A spokesperson who receives information only after decisions have been made fulfills a different role than a spokesperson involved in their preparation, who can draw attention to potential reputational or communication risks even before they are made public. It is precisely the extent of access to information that represents one of the key distinctions between the operational and strategic understandings of this profession.

An integral part of the spokesperson's role is also collaboration with other organizational units within the ministry. External communication is the result of coordination among several specialized units that provide content for communication with the public. Švehla and Kašík (2014) point out that an organization's successful communication depends on well-functioning internal communication, a clear division of responsibilities, and coordinated action among individual organizational units. Building on this, Chudinová and Kučera (2014)

emphasize the need for the spokesperson's professional preparedness and their ability to transform often complex technical or legislative information into a form that is understandable to the public. The quality of external communication therefore depends not only on the spokesperson's communication skills, but also on the level of cooperation between the communications department, the specialized divisions, and the ministry's leadership.

Two basic approaches to the role of the spokesperson within an organization can be identified in the literature. The first views the spokesperson primarily as a communicator whose role is to convey decisions that have already been made to the media and the public. The second approach expands the spokesperson's scope to include an advisory and strategic dimension, within which the spokesperson participates in the preparation of communication strategies, the identification of reputational risks, and the formulation of recommendations for the organization's leadership (Tomandl, 2011; Adamus-Matuszyńska, 2018; Valentini, 2018). The difference between these approaches does not lie in the communication itself, but in the moment at which the spokesperson enters the communication process. While in the executive model the spokesperson responds only after decisions have been made, the strategic model assumes the spokesperson's involvement already during the decision-making process. It is precisely this distinction that forms the decisive theoretical framework of this study, the aim of which is to identify the role played by spokespersons for ministries of the Slovak Republic in the process of decision-making and communication.

The evolution of the spokesperson profession indicates a gradual shift from the traditionally understood media role toward a broader application in the field of strategic communication. While older approaches associated the practice of this profession primarily with providing information to the media and organizing media appearances, more recent studies highlight the growing importance of communication consulting, coordinating communication activities, protecting an organization's reputation, and identifying communication risks (Tomandl, 2011; Adamus-Matuszyńska, 2018; Valentini, 2018). This understanding naturally broadens the scope for a spokesperson's involvement in an organization's internal processes, with the extent of their role determined not only by professional qualifications but also by the organization's leadership's approach to communication as an integral part of management.

The expansion of the spokesperson's professional role also increases the demands on the professional competencies necessary to perform this function. Although individual authors differ in which prerequisites they consider crucial, they agree that serving as a spokesperson requires a significantly broader set of competencies than merely the ability to communicate with the media. Adamus-Matuszyńska (2018) emphasizes the importance of professional knowledge, experience, values, and interpersonal skills, Chudinová (2014) points to general knowledge, mental resilience, responsibility, and ethical conduct, while Szyska and Wojciechowski (2018) highlight communication skills, awareness of social developments, and linguistic proficiency. Machalík (2018) notes the value of journalistic experience in building professional relationships with the media; Maruška (2009) emphasizes fairness and professionalism in dealings with journalists; and Chudinová and Kučera (2014) point to the need for a thorough understanding of the ministry's specialized issues. Cohen et al. (2015) add to this the importance of building professional contacts through networking, while Plenković (2018) highlights the ability to manage conflict situations, psychological resilience, and the readiness to communicate even under conditions of heightened public pressure. In the context of public administration, Gaule (2018) also highlights the specific role of the spokesperson, who is obligated to represent the organization's decisions even in situations where he or she may not personally agree with them. These approaches paint a picture of a profession that combines professional, communication, managerial, and ethical competencies while placing high demands on the ability to navigate the political and social environment.

Although the professional literature devotes considerable attention to the competencies of spokespersons and their role in organizations' external communication, significantly less attention is paid to their actual position in the decision-making process. Most authors focus on describing the professional prerequisites or organizational aspects of the role, while the question of the extent to which spokespersons are involved in decision-making processes remains open. Particularly within the context of the ministries of the Slovak Republic, there is a lack of empirical evidence regarding whether spokespersons are involved in the preparation of decisions as they are being formulated, or whether their role is limited to ensuring external communication only after the decisions have been adopted.

3. METHODOLOGY

This study examines the role of ministry spokespersons in the Slovak Republic in the process of decision-making and communication. The research is based on the assumption that the professional status of spokespersons cannot be assessed solely on the basis of their formal job classification, but primarily according to the extent of their involvement in decision-making processes, their access to information, and their ability to influence the communication of adopted decisions. The aim of this paper is to identify the status of spokespersons for ministries of the Slovak Republic in the process of decision-making and communication. The study further examines their involvement in decision-making processes, their relationship with ministry leadership, and their ability to influence how adopted decisions are communicated.

RQ1: What role do spokespeople for the ministries of the Slovak Republic play in relation to the ministry's leadership?

RQ2: To what extent are spokespeople for the ministries of the Slovak Republic involved in the decision-making process?

RQ3: What role do spokespersons for ministries of the Slovak Republic play in shaping how decisions are communicated?

A standardized questionnaire survey was used to answer the research questions. The research sample consists of spokespersons from all fifteen ministries of the Slovak Republic. The questionnaire was distributed electronically via the official email addresses of the individual spokespersons. Ten respondents participated in the study, representing a response rate of 66.7%. Given the precisely defined target population, the achieved response rate provides a sufficient basis for identifying the basic characteristics of the study sample.

The questionnaire consists of six factual questions. The questions focus on the perception of the professional status of spokespersons, their participation in ministry leadership meetings, the stage of the decision-making process at which they receive information about pending decisions, their ability to influence how adopted decisions are communicated, and the extent to which the ministry leadership takes their communication recommendations into account. The final question identifies the competencies that respondents consider most important for performing the role of spokesperson. The questionnaire's design is based on the theoretical foundations of this study. The individual questions operationalize the professional status of spokespersons through three analytical dimensions: involvement in decision-making processes, the relationship with ministry leadership, and the ability to influence the communication of adopted decisions. A supplementary question focused on professional competencies provides a broader interpretive context for the findings. The collected data are analyzed using descriptive analysis. The results are interpreted in relation to the research questions formulated and the theoretical framework of the study.

4. THE SPOKESPERSON IN THE PROCESS OF DECISION-MAKING AND COMMUNICATION

The results of the questionnaire survey provide an empirical perspective on the role of ministry spokespersons in the Slovak Republic in the decision-making and communication process. The individual findings are interpreted in relation to three analytical dimensions defined in the research methodology—the position of spokespersons in relation to ministry leadership, their involvement in decision-making processes, and their ability to influence the communication of adopted decisions.

The first question focused on how spokespersons perceive their professional status in relation to the ministry's leadership. Most respondents (66.7%) described their position as a combination of executive and advisory roles. The remaining third of respondents (33.3%) view themselves primarily as performers of communication tasks. Not a single respondent described their position as predominantly advisory or as an advisor to the ministry's leadership. The result suggests that ministry spokespersons do not view their professional role solely as conveying information to the media and the public. At the same time, however, it does not confirm the existence of a clearly strategic position for spokespersons within the organizational structure of ministries. The predominance of responses indicating a combination of executive and advisory roles rather points to an overlap between the two functions, the specific scope of which may depend on the internal structure of individual ministries, the minister's management style, or the scope of the communications department's responsibilities. The fact that no respondent perceives their position as predominantly advisory also suggests that decision-making authority remains at the level of the ministry's leadership, and that spokespersons act primarily as expert consultants in the field of communication, rather than as actors involved in the actual decision-making process.

This finding is consistent with theoretical approaches that describe a gradual shift in the profession of spokesperson from a traditional model based on providing information toward a broader role in the field of strategic communication (Tomandl, 2011; Adamus-Matuszyńska, 2018; Valentini, 2013).

Another question examined the spokespersons' participation in ministry management meetings. Half of the respondents (50.0%) stated that they occasionally participate in management meetings. One-third of respondents (33.3%) reported regular participation in management meetings, and one respondent (16.7%) stated that they do not participate at all. The results point to significant variability in the organizational status of spokespersons across individual ministries. If participation in management meetings were a natural part of a spokesperson's role, one would expect a higher proportion of respondents to report regular participation. The findings therefore suggest that the involvement of spokespersons in internal deliberations is not systematically uniform but depends on the organizational structure of the specific ministry. At the same time, it can be assumed that the varying frequency of participation in meetings also reflects differing perceptions of the importance of communication on the part of the senior management of individual ministries. Ministries that regularly involve spokespersons in management meetings likely view communication as an integral part of organizational management. Conversely, sporadic or absent participation may indicate that the communications department does not become involved in the process until after a decision has been made. This interpretation is consistent with the findings of Tomandl (2011), who argues that effective external communication requires the spokesperson to have timely access to information and to collaborate continuously with top management. Similarly, Adamus-Matuszyńska (2018) emphasizes that the extent of the communications department's involvement in internal processes is one of the main indicators of its strategic position within the organization. Participation in meetings, therefore, is not merely an organizational matter but also reflects the degree of trust that the ministry's leadership places in the communications department.

These findings are followed by a question focusing on the stage of the decision-making process at which spokespersons obtain information about pending decisions. Half of the respondents (50.0%) stated that they learn about pending decisions while they are still being prepared. The same proportion of respondents receives information only after the decision has been approved, but before it is made public. No respondent indicated that they were informed of the decision only when communication materials were being prepared. This is one of the most significant findings of the study. The results point to the parallel existence of two models of how spokespersons operate within ministries. In the first model, the spokesperson becomes involved in the process as early as the decision-making stage, thereby gaining the opportunity to highlight potential communication or reputational risks even before the decision is adopted. In the second model, the spokesperson is informed of the decision only after it has been approved, and their role consists primarily of managing subsequent external communication. The difference between the two models lies not only in the timing of information provision but, above all, in the opportunities to influence how the decision under preparation is communicated. The fact that not a single respondent reported receiving information only during the preparation phase of press releases or media statements can be viewed positively. It suggests that ministry spokespersons are not limited to purely administrative communication tasks but have some leeway to prepare communication activities. At the same time, however, it cannot be concluded from these results that spokespersons have a real influence on the content of the decisions made. The research captures their position from the respondents' perspective and does not provide information on the extent to which their recommendations are actually taken into account in the decision-making process. The results support the theoretical distinction between the executive and strategic models of the spokesperson's role, as described by Tomandl (2011) and Adamus-Matuszyńska (2018) in their work. At the same time, they suggest that within Slovak ministries, there is no uniform model for organizing communication processes, but rather various approaches to involving spokespersons in the decision-making process. This finding represents an important empirical contribution of the study, as domestic academic literature has thus far addressed this issue primarily at the theoretical level.

Another part of the study focused on the ability of spokespersons to influence how decisions are communicated. Respondents were asked whether, in their professional practice, they had encountered a situation in which, following their intervention, a decision was postponed, modified, or communicated differently due to potential communication or reputational risks. One-third of the respondents (33.3%) stated that they had encountered such a situation multiple times. The same proportion of respondents reported that it had occurred once or twice. One respondent (16.7%) selected the answer "I cannot say." No respondent stated that they had never encountered a similar situation. The results suggest that ministry spokespersons do not merely act as intermediaries for decisions that have already been made, but to a certain extent have the ability to alert ministry leadership to the communication implications of measures under preparation. The fact that most respondents

reported personal experience with modifying or postponing the manner in which a decision was communicated points to the practical application of communication advice within the ministry environment. At the same time, it is necessary to distinguish between influencing the manner of communication and influencing the actual content of the decision. The results do not allow us to conclude that spokespersons interfere with the substantive content of the measures being prepared. Rather, they suggest that their role consists of identifying communication risks and recommending an appropriate form for presenting the adopted decision. This finding supports the view of strategic communication as an integral part of organizational management. Valentini (2013) points out that the role of communication professionals in the public sector is not only to ensure the flow of information to the public but also to provide expert advice on communication decisions. Similarly, Tomandl (2011) emphasizes that communication risks must be identified before a decision is made public, since subsequent corrections may no longer be able to eliminate negative reputational consequences. The results suggest that this approach is also applied to some extent within Slovak ministries.

These findings lead to a question regarding the extent to which ministry leadership takes the spokespersons' communication recommendations into account. All respondents (100%) stated that if they disagreed with the proposed communication approach, ministry leadership would take their professional opinion into account. This is the most unequivocal result of the entire study. The unanimity of the responses suggests that ministry leadership attaches significant weight to the spokespersons' professional recommendations when deciding how to communicate the measures being adopted. At the same time, however, this result cannot be interpreted as evidence of their direct influence on the substance of the decision-making process. The question focused exclusively on the communicative aspect of decisions, not on their substantive or political aspects. The result therefore points primarily to the existence of professional trust between ministry leadership and spokespersons in the area of external communication. At the same time, it is necessary to take into account the methodological limitations of interpreting this finding. The research is based on self-assessments by respondents who evaluated their own professional experiences. It is therefore not possible to rule out a certain influence of subjective evaluation or social desirability in the responses. Nevertheless, the unanimity of the respondents represents a significant empirical finding, suggesting that the communication recommendations of spokespersons are generally respected by ministry leadership. This conclusion is also supported by Adamus-Matuszyńska (2018), who argues that trust between top management and the communications department is one of the fundamental prerequisites for effective strategic communication. Without mutual trust, the communications department cannot fulfill its advisory role, and its activities remain limited to performing administrative communications tasks. The findings also suggest a certain discrepancy between the formal involvement of spokespersons in decision-making processes and their actual professional influence on the communication of adopted decisions. Although the participation of spokespersons in management meetings and the timing of their involvement in the decision-making process vary across ministries, respondents agree that their professional recommendations in the area of communication are respected by management. This finding suggests that the strategic importance of spokespersons cannot be assessed solely on the basis of their organizational status or participation in management meetings, but also on the extent to which their professional recommendations are taken into account in the preparation of communications regarding decisions.

The final question focused on identifying the competencies that spokespersons consider most important for performing their profession. Respondents had the opportunity to select multiple competencies that, in their opinion, best reflect the requirements for the role of a spokesperson. All respondents (100%) selected the ability to communicate during a crisis. The second most frequently cited competency was the ability to collaborate with the media (66.7%). Half of the respondents consider strategic thinking and ethical behavior linked to credibility to be important (50.0% each). One-third of respondents (33.3%) cited analytical thinking and loyalty to the ministry's leadership. One respondent (16.7%) cited political orientation within the public administration environment and managerial skills, while not a single respondent cited knowledge of how public administration functions. The results suggest that spokespersons consider competencies directly related to the performance of communication activities to be of paramount importance. The dominant position of crisis communication can be interpreted as a consequence of the increasingly dynamic media environment, in which government agencies are exposed to heightened pressure from the public, the media, and social media. The ability to respond to crisis situations therefore appears to be a fundamental prerequisite for professional success. At the same time, the high prominence of cooperation with the media confirms that, despite the expansion of strategic tasks, media relations remain one of the core areas of a spokesperson's work.

It is also worth noting that half of the respondents identified strategic thinking as one of the most important professional competencies. This result can be interpreted as a sign of the gradual professionalization of the

spokesperson's role. Indeed, the communication of decisions increasingly goes beyond the scope of simply providing operational information and requires the ability to anticipate the potential communication consequences of adopted measures, identify reputational risks, and propose appropriate communication strategies. The findings thus support theoretical approaches that view strategic communication as an integral part of organizational management, not merely as a subsequent presentation of decisions that have already been made (Valentini, 2013; Tomandl, 2011). On the other hand, the low importance attributed to managerial competencies, political orientation, or knowledge of how public administration functions is surprising. The absence of the latter competency, in particular, represents an interesting finding. It can be assumed that respondents did not consider it a specific competency required for the role of spokesperson, but rather a self-evident prerequisite for working in the environment of central government agencies. An alternative explanation may be that respondents perceive their professional identity primarily through communication activities, while they view knowledge of how public administration functions as a supporting, rather than a decisive, competency.

However, the interpretation of the results must be considered in light of the limitations of the study. The research sample consisted of spokespersons from ministries of the Slovak Republic, and the results are based on the respondents' self-assessments. The data collected therefore reflect a subjective perception of their own professional standing and cannot be automatically interpreted as an objective picture of how all ministries function. Another limitation is the size of the research sample, which corresponds to the size of the professional group under study but does not allow for the application of more advanced statistical methods or the formulation of generally valid conclusions. The results therefore primarily represent an exploratory view of the status of spokespersons within the Slovak public administration.

Despite the limitations mentioned above, the research yields several significant empirical findings. The results suggest that the professional role of ministry spokespersons cannot be characterized as exclusively operational or unambiguously strategic. Spokespersons operate between these two models of professional practice, and the extent of their involvement in decision-making processes varies across ministries. At the same time, it appears that even in cases where spokespersons are not systematically involved in the preparation of decisions, they enjoy a significant degree of trust from leadership in shaping their communication strategies. The findings thus suggest that the strategic importance of spokespersons within ministries is determined not only by their formal organizational status but, above all, by the quality of their collaboration with ministry leadership, timely access to information, and the ability to provide expert communication recommendations.

5. DISCUSSION

This study expands our understanding of the professional status of spokespersons in the public administration sector by providing an empirical perspective based on statements from spokespersons at ministries of the Slovak Republic. While the existing scholarly literature focuses primarily on the competencies of spokespersons, their role in public relations, and their relationships with the media (Chudinová and Tušer, 2013; Tomandl, 2011; Adamus-Matuszyńska, 2018), considerably less attention has been given to the question of their actual involvement in decision-making processes. It is precisely this area that represents the main contribution of the present study.

The results point to the fact that the professional status of spokespersons cannot be characterized as either exclusively operational or unambiguously strategic. The findings suggest the existence of a transitional model in which the performance of communication activities overlaps with an advisory role. This role corresponds to the evolution of the spokesperson profession as described in the scholarly literature, according to which communication in the public sector is gradually becoming an integral part of an organization's strategic management and not merely a subsequent presentation of decisions that have already been made (Valentini, 2013; Tomandl, 2011). At the same time, however, the results suggest that the extent of spokespersons' strategic role varies across ministries. Differences can be attributed primarily to the internal organizational structure of ministries, management style, or leadership's approach to communication as part of the decision-making process.

A significant finding is the discrepancy between the formal involvement of spokespersons in decision-making processes and their actual influence on the communication of decisions made. Mere participation in management meetings or the moment at which a spokesperson receives information about pending decisions does not fully reflect their actual standing. The results suggest that a more significant indicator may be the level of trust on the part of the ministry's leadership and the willingness to take professional communication recommendations into account. The strategic role of a spokesperson, therefore, cannot be assessed solely on

the basis of his or her organizational position, but also on the quality of his or her collaboration with the ministry's leadership and the extent of his or her professional influence on how decisions are communicated.

It is also worth noting that respondents attach the greatest importance to competencies related to crisis communication, media relations, and strategic thinking. This finding reflects the changing landscape of public communication, in which the importance of rapid response to crisis situations, protecting an organization's reputation, and coordinating communication with various public groups is growing. At the same time, it suggests that the role of a spokesperson extends beyond the scope of traditional media relations and requires a broader set of analytical, strategic, and communication competencies.

The interpretation of the results must be considered in light of the limitations of the study. The study was conducted on a relatively small sample consisting of spokespersons from ministries of the Slovak Republic. Although the studied population represents a clearly defined professional group, the results cannot be generalized to all public administration organizations without further analysis. Another limitation is that the study is based on the respondents' self-assessments and does not capture the perspectives of ministry leaders or other employees involved in the decision-making process. The results therefore primarily reflect the spokespeople's subjective perceptions of their professional status.

This issue opens the door to further research. It would be beneficial to expand the study to include other central government agencies or local government organizations, while also supplementing the quantitative research with qualitative interviews with spokespersons and members of the organizations' leadership. Such an approach would allow for a more comprehensive identification of the factors influencing spokespersons' involvement in decision-making processes, while also verifying the extent to which their professional status varies across different types of public institutions.

6. CONCLUSION

The results indicate that the interviewees attach the greatest importance to competencies directly related to managing communication in crisis situations and to cooperation with the media. At the same time, however, they also emphasize the importance of strategic thinking and ethical professional conduct, which the professional literature considers part of modern strategic communication in the public sector (Chudinová, 2014; Szyska and Wojciechowski, 2018; Plenković, 2018). The lower representation of managerial competencies and knowledge of how public administration functions may indicate that respondents perceive the role of a spokesperson primarily through the lenses of communication, crisis management, and media relations. The results obtained allow us to answer the research questions formulated. In relation to the ministry's leadership, spokespersons do not act exclusively as executors of communication tasks; rather, their role is, in most cases, a combination of executive and advisory functions. The involvement of spokespersons in the decision-making process varies. Some respondents receive information during the decision-making process, while others receive it only after decisions have been approved. The role of spokespersons in shaping how decisions are communicated appears to be more significant than their direct involvement in the decision-making process itself, as all respondents stated that ministry leadership would take their communication recommendations into account. Overall, it can be concluded that the spokespersons for the ministries of the Slovak Republic occupy a position between the executive and strategic models of professional practice. Their role is not limited solely to conveying information to the public, yet at the same time, it cannot be said that they hold a clearly dominant advisory role in decision-making processes.

REFERENCES

Adamus-Matuszyńska, A. (2010). Rzecznik i wizerunek organizacji. In Rzecznictwo prasowe (pp. 11–21). Katowice: Wydawnictwo Naukowe UNIKAT-2. ISBN 978-83-62314-08-9.

Chartered Institute of Public Relations. (2022). About PR. [Online]. Available at: https://www.cipr.co.uk/CIPR/About_Us/About_PR.aspx

Chudinová, E. (2014). Osobnosť novinára a osobnosť hovorcu. In Otáz(ni)ky osobnosti (pp. 170–188). Žilina: EUROKÓDEX. ISBN 978-80-8155-051-5.

Chudinová, E. (2018). Posun pozície hovorcu na Slovensku. In Zborník vedeckých štúdií z oblasti histórie a teórie marketingovej komunikácie (pp. 19–23). Bratislava: Book&Book. ISBN 978-80-89652-21-1.

Chudinová, E., & Kučera, M. C. (2014). Profesionálne PR sú efektívne pre každú firmu. Finančné trhy, 4(1). [Online]. Available at: http://www.derivat.sk/files/2014%20financne%20trhy/Okt_2014_FT_

Profesionlne%20PR%20je%20efektivne_Chudinova,Kucera.pdf

Chudinová, E., & Tušer, A. (2013). Kompetentný hovorca. Žilina: Eurokódex. ISBN 978-80-8155-019-5.

Cohen, S., et al. (2015). The media and protected areas. In Protected Area Governance and Management (pp. 444–450). [Online]. Available at: https://www.jstor.org/stable/pdf/j.ctt1657v5d.22.pdf

Constantin, A., & Petrucă, I. (2019). The role of spokesperson in the process of public relations. International Journal of Communication Research, 9(3), 261–264.

Gaule, H. (2008). The job of Political Spokesperson. [Online]. Available at: https://reputationtoday.in/political-spokesperson-job/

Konečná Bernáthová, A. (2013). Špecifiká práce hovorcu v ústredných orgánoch štátnej správy Slovenskej republiky. [Online]. Available at: http://konferencie.fmk.sk/specifika-prace-hovorcu-v-organoch-ustrednej-statnej-spravy-slovenskej-republiky/

Lesensky.cz. (2022). Media relations. [Online]. Available at: https://www.lesensky.cz/media-relations

Machalík, V. (2018). Hovorca musí vedieť počúvať. [Online]. Available at: https://fphil.uniba.sk/katedry-a-odborne-pracoviska/katedra-zurnalistiky/aktuality/kalendarium/stalo-sa-na-katedre/

Maruška, M. (2009). Najlepší hovorca? Ten, čo zdvihne. [Online]. Available at: https://domov.sme.sk/c/5036566/najlepsi-hovorca-ten-co-zdvihne.html

Onma. (2022). Media Relations – ONMA Lexicon. [Online]. Available at: https://onma.de/online-marketing-lexikon/media-relations/

Plenković, M. (2018). Spokesperson – New Profession in Public Communication. Media, Culture and Public Relations, 9(1), 225–227.

Rott, D., & Martela, I. (2011). Rzecznik prasowy. Sosnowiec: Wydawnictwo Humanitas. ISBN 978-83-61911-0900.

Szyska, M., & Wojciechowski, Ł. (2018). Formovanie obrazu inštitúcií sociálnej pomoci v médiách. Trnava: Univerzita sv. Cyrila a Metoda. ISBN 978-80-8105-987-2.

Švehla, M., & Kašík, M. (2014). Tiskový mluvčí: řízená komunikace s veřejností. Praha: Vysoká škola finanční a správní. ISBN 978-80-7408-095-1.

Tomandl, J. (2011). Jak účinně oslovit média. Brno: Computer Press. ISBN 978-80-251-3457-3.

Valentini, C. (2013). Public Relations in the Public Sector: The Role of Strategic Communication in the Italian Public Administration. Sinergie – Rivista di Studi e Ricerche, 31(92), 93–115.

The Integration Of E-Government Systems Into Hellenic Social Security

Konstantinos G. Parcharidis[1]

[1] Attorney-at-law, Doctor of Tax Law and Public Law, Faculty of Law, Democritus University of Thrace, Adjunct Lecturer, Department of Public Administration, School of Economic & Public Administration, Panteion University of Social & Political Sciences, e-mail: kostasparchar1@yahoo.gr

Abstract: This study investigates the digital transformation of Electronic National Social Security Agency (e-EFKA) in Greece/Hellas, which constitutes a pivotal endeavor for ensuring the sustainability of social security in Greece. The successful integration of e-Government presupposes the prioritization of specific reform axes: (a) human resources, which serve as the decisive factor in the acceptance or rejection of reforms, requiring a transition toward a participatory culture, skill enhancement, and the cultivation of a new mindset; (b) technological infrastructure, focusing on the deployment of information systems, the digitization of archives, and interoperability among public entities; and (c) organizational structure & procedures, under which job descriptions must be redesigned, manual workflows eliminated, processes simplified, and Artificial Intelligence leveraged to accelerate administrative decision-making. Regarding resistance management and coping strategies, it becomes evident that the transition encounters obstacles stemming from the fear of uncertainty, the potential loss of control, and a digital skills deficit. In the examined case of the Social Security Agency, effective change management is achieved through transparent communication regarding target-setting to mitigate occupational stress, the implementation of certified lifelong learning programs rather than empirical training, as well as through the co-design of changes, the provision of productivity incentives, and continuous psychological and technical support. In this study, Kotter's "eight-stage" model is favored for methodical implementation due to its holistic and dynamic nature during periods of fiscal constraints. Specifically, in this context, the stages are as follows: (a) substantiating the necessity for institutional sustainability, (b) forming a coalition of executive managers, experts, and technocrats, (c) linking digitization to service delivery enhancement, (d) broad communication across all staff levels, (e) modernizing structures and eliminating bureaucratic rigidities, (f) immediate digitization of core documents to demonstrate effectiveness, (g) expanding digitization to more complex functions, and (h) anchoring digital practices as a permanent organizational standard. The study, finally, clarifies that the transition to New e-Public Administration necessitates the transmutation of the traditional bureaucratic mindset into a modern, efficient environment for the benefit of both employees and citizens.

Keywords: Electronic National Social Security Agency (e-EFKA), sustainability of social security, interoperability, effective change management, Kotter's "eight-stage" model

1. INTRODUCTION

The present study investigates the feasibility of ensuring the successful integration of e-Government systems into the Social Security system of Greece. More specifically, in Greece, e-EFKA is responsible for administering social security matters. Furthermore, the State holds a full guarantee obligation—not only for covering the national pension expenditure through taxation, but also for all social security benefits and for ensuring the sustainability of the Funds, pursuant to Article 2 of Law 4387/2016. Since January 2017, the "Unified Social Security Agency" (EFKA) has been operational. Pursuant to Article 55 of Law 4387/2016, this entity covers insured persons, pensioners, and their dependent family members, as well as public sector insured employees, pensioners, and their dependent family members. EFKA was renamed e-EFKA, i.e., "Electronic National Social Security Agency," as of March 1, 2020, under the provision of Article 1 of Law 4670/2020, which added Article 51a to Law 4387/2016.

The author proposes appropriate elements of organizational change for the Hellenic Social Security Agency (e-EFKA), prioritized according to their degree of importance (2), in order to achieve efficient resource management aimed at attaining the set objectives. Furthermore, the primary obstacles (challenges) are identified, and the most suitable ways to mitigate them are proposed (3). Finally, an appropriate "change implementation model" is applied to achieve the aforementioned integration of a modern e-governance system (4).

2. ORGANIZATIONAL CHANGES: ELEMENTS AND DEGREE OF IMPORTANCE

In this chapter, the proposed reforms are examined and categorized based on their degree of importance. Specifically, within the framework of Change Management, reforms are proposed whose management by the Social Security Agency must be executed in the most effective manner to achieve the desired goals of e-Government (Mixiotis et al., 2023, p. 118 [1]; Apostolakis et al., 2008, p. 45 [2]; World Bank, 2002, p. 1 [3]).

Based on the above, the primary element of organizational change proposed in this study is human resources (employees/executives) (encompassing managerial, organizational, learning, and psychological dimensions). This is because the human factor ultimately executes reforms or rejects them; even if modern technological/information systems are implemented, they remain a "dead letter" without acceptance from end-user employees. Thus, it is proposed, on the one hand, to transition to a more participatory workplace culture while enhancing the competencies of existing personnel, and on the other hand, to shift employee mindsets toward innovation. Consequently, its degree of importance should be classified as "highest/critical."

Subsequently, a highly significant element of change is the introduction and effective operation of new technologies/information systems (technical and managerial dimensions). This entails installing and configuring the new information system, digitizing physical archives, and, most importantly, establishing substantive interconnection with other public service electronic platforms within the framework of interoperability (Pombortsis, 2025, p. 405 [4]). This element is substantial, following human resources in sequence; thus, its degree of importance is "very high."

Equally important is the reform of the Social Security Agency's organizational structure regarding job descriptions (organizational and managerial dimensions). These descriptions have remained unrevised for a considerable period, rendering their update imperative, primarily due to modern socioeconomic and technological shifts. Consequently, redesigning these descriptions and broadening their span of control is essential. Although significant, they play a supporting role in the overall reform, given that human resources and new technologies take precedence. Therefore, its degree of importance is classified simply as "high."

Procedures (managerial, technical, and organizational dimensions) also fall within the same level of importance ("high"). As an element of organizational change in this context, procedures must be simplified (streamlined digital workflows) and made more accessible (remote access for insured individuals to electronic platforms), primarily by abolishing manual paper processes and replacing them with digital equivalents. Reference must also be made to the introduction of innovative Information and Communications Technology (ICT) systems (Pombortsis, 2025, pp. 237 et seq. [4]) and Artificial Intelligence into administrative procedures (Moukiou, 2025, p. 27 [5]; Inglezakis, 2024, pp. 311 et seq. [6]). This implies faster (Boukouvala, 2025, p. 388 [7]) and more accurate administrative decision-making, as more complex criteria and parameters are accounted for, despite inherent risks (Mixiotis et al., 2023, p. 118 [1]; Apostolakis et al., 2008, p. 45 [2]; Pombortsis, 2025, pp. 241 et seq. [4]).

3. OBSTACLES AND WAYS OF ADDRESSING THEM

Parallel to the aforementioned reforms, corresponding obstacles, reactions, and challenges emerge that warrant appropriate mitigation. This represents a case of "major change management" (Johnson et al., 2008, pp. 15, 477 [8]; Apostolakis et al., 2008, p. 45 [2]), encountering obstacles and "resistance to change" (Johnson et al., 2008, pp. 518, 538–539 [8]; Balogun et al., 2004, pp. 56 et seq. [9]; Apostolakis et al., 2008, p. 45 [2]).

Primarily due to the Social Security Agency's prolonged stagnation regarding organizational change, the author considers the human factor (employees) itself to be the chief obstacle. This is because "humans generally tend to resist anything that alters their habits and existing work patterns" (Apostolakis et al., 2008, p. 45 [2]). Public Administration theorists elaborate on this scholarly position, noting that it stems from fear and uncertainty—feelings typically experienced by employees when conditions in their work environment shift, altering the previously stable workplace status quo and leading them to anticipate potential demotion or a reduced level of basic need satisfaction (Apostolakis et al., 2008, p. 46 [2]). Concurrently, another source of fear and uncertainty is the effort required of employees to undergo training in new technological systems and modern work practices, which often diverge significantly from traditional methods (Apostolakis et al., 2008, p. 46 [2]). Consequently, the fear of failure, the perceived loss of control previously possessed, and a lack of adequate digital skills act as impediments to the entire modernization process.

To overcome these obstacles, various measures are proposed, the primary being information dissemination and communication with employees (a) and employee training (b). Specifically, communication serves as a core tool for driving change, as it reduces employee anxiety, fear, and insecurity; employees are reassured when informed about exact objectives and operational plans, preventing speculation or catastrophic assumptions (e.g., risk of dismissal). Effective communication must be substantive to yield full information benefits; indeed, the absence of clear communication and detailed goal-setting is a major driver of occupational stress and anxiety.

Another pivotal solution is structured employee training, delivered through modern lifelong learning and executive training programs rather than informal "on-the-job" instruction. All personnel involved in the upcoming reforms should undergo formal training, transitioning from empirical learning to structured programs and seminars on new information systems.

Furthermore, employees must understand the drawbacks of the status quo alongside the benefits of reform within the organization's strategic scope. Through clear and specific targets, they will recognize the necessity of adopting ICT in their daily operations to facilitate their workload. Additionally, introducing performance rewards/productivity bonuses can serve as an incentive for staff to accept rather than reject organizational changes.

Moreover, negotiation and co-designing reforms alongside employees can mitigate these challenges. Participatory change and negotiation between staff and leadership foster a perception that management regards employees as "partners" rather than "pawns." Through this psychological approach, management may even engage in strategic persuasion ("manipulation"), convincing staff that they are co-decisive in impending changes (even if nominally so), thereby neutralizing pushback.

Finally, management must reassure personnel of its continuous support, underscoring that any operational issues arising from changes will be absorbed flexibly by the administration rather than individual employees, thereby instilling technical and psychological support.

4. THE PROPOSED "CHANGE IMPLEMENTATION MODEL"

Various "change implementation models" exist, including the Lewin-Schein model, the Kotter model, the Robbins model, the Balogun & Hope model, the Cook & Hunsaker model, and the planned change model. In this case, Kotter's model is selected. This choice is made because the model offers greater clarity and precision through its discrete "8 stages" (Kotter, 2007, p. 99 [10]), thereby mitigating employee anxiety and uncertainty. Regarding modernization efforts, Kotter's model targets the Social Security Agency holistically rather than in isolation. Furthermore, its dynamic nature makes it particularly suitable during periods of financial distress and fiscal recession.

Specifically, the aforementioned model comprises 8 stages, namely:

In Stage 1 (Kotter, 2007, pp. 97–98 [10]), the need for reform is recognized, establishing that change is not only necessary but urgent. In this scenario, Social Security Agency must remain viable amid new economic realities (fiscal crisis/economic recession/debt crisis) and in light of the World Bank mission report.

In Stage 2 (Kotter, 2007, p. 98 [10]), the guiding coalition is formed. In this case study, it consists of board members, professional chamber executives, and technocrats.

In Stage 3 (Kotter, 2007, pp. 98–100 [10]), strategy and vision are formulated. Here, digitization will be tied to servicing sector professionals (engineers), highlighting the benefits of achieving the proposed objectives.

In Stage 4 (Kotter, 2007, p. 100 [10]), the reform vision is communicated to all stakeholders. Specifically, the vision is conveyed individually to each of the organization's employees, actively involving them in the impending changes.

In Stage 5 (Kotter, 2007, pp. 100–102 [10]), broad-based empowerment is enabled. Bureaucratic obstacles are eliminated across the institution, and all job descriptions are updated.

In Stage 6 (Kotter, 2007, p. 102 [10]), short-term wins are generated. For example, digitizing frequently issued social security documents for automated distribution demonstrates immediate practical value, persuading staff of the modernization's efficacy.

In Stage 7 (Kotter, 2007, pp. 102–103 [10]), gains are consolidated, enabling the digitization of more complex administrative functions in Social Security Agency following successful initial implementations.

In Stage 8 (Kotter, 2007, p. 103 [10]), a new organizational culture is anchored. The e-EFKA firmly embeds change into its culture to prevent reversion to legacy practices, establishing digitization as the new baseline.

5. CONCLUSION

In conclusion, comprehensive reform across hellenic social security system is an imperative necessity to ensure modernization, financial viability, and proper operational performance amidst economic recession and in response to the World Bank report. Specifically, these objectives encompass employee skill and knowledge development, the adoption of ICT systems through new information infrastructure, organizational restructuring, administrative procedure refinement, culture transformation (primarily shifting employee mindsets), and leadership practices. Ultimately, the core of this transformation requires shifting traditional employee skepticism toward innovative practices and technological advancement. This supports efficient institutional operation, directly benefiting both public servants and citizen-clients within the framework of New (Electronic) Public Management.

REFERENCES

Apostolakis, I., Loukis, E., & Chalaris, I. (2008). *Electronic Public Administration – Organization, Technology, and Applications*, Series: Society & Informatics (4). Athens: Papazisis Publications [=in Greek: Αποστολάκης, Ι., Λούκης, Ε., Χάλαρης, Ι. (2008). *Ηλεκτρονική Δημόσια Διοίκηση – Οργάνωση, Τεχνολογία και Εφαρμογές*, Σειρά: Κοινωνία & Πληροφορική (4). Αθήνα: εκδ. Παπαζήση]. [2]

Balogun, J., Hope Hailey, V. (2004). *Exploring Strategic Change*. Harlow: Prentice Hall. [9]

Boukouvala, V. (2025). The Use of Algorithms in Administrative Procedures and the Judicial Review of Legality by Administrative Judges. *Administrative Justice*, 3, 385–398 [=in Greek: Μπουκουβάλα, Β. (2025). Η χρήση των αλγορίθμων στη διοικητική διαδικασία και ο έλεγχος νομιμότητας του διοικητικού δικαστή. *Διοικητική Δικαιοσύνη* 3, 385-398]. [7]

Inglezakis, I. (2024). *Digital Economy Law*. Athens: Sakkoulas Publications [=in Greek: Ιγγλεζάκης, Ι. (2024). *Το Δίκαιο της Ψηφιακής Οικονομίας*. Αθήνα: εκδ. Σάκκουλα]. [6]

Johnson, G., Scholes, K., & Whittington, R. (2008). *Exploring Corporate Strategy*. Harlow: Prentice Hall. [8]

Kotter, J. (2007). Leading Change. Why Transformation Efforts Fail. *Harvard Business Review* 1, 96-103. [10]

Mixiotis, A., & Rossidis, I. (2023). The Evolution of Electronic Governance in Greece through the Impact of Digital Transformation. *Public Administration Review*, 3(1), 116–140 [=in Greek: Μιχιώτης, Α., Ρωσσίδης, Ι. (2023). Η Εξέλιξη της Ηλεκτρονικής Διακυβέρνησης στην Ελλάδα μέσα από την Επίδραση του Ψηφιακού Μετασχηματισμού. *Επιθεώρηση Δημόσιας Διοίκησης* 3(1), 116-140]. [1]

Moukiou, C. (2025). *Algorithms and Administrative Law*. Athens: Sakkoulas Publications [=in Greek: Μουκίου, Χ. (2025). *Οι αλγόριθμοι και το Διοικητικό Δίκαιο*. Αθήνα: εκδ. Σάκκουλα]. [5]

Pombortsis, A. (2025). *Introduction to E-Government*. Thessaloniki: Tziola Publications [=in Greek: Πομπότσης, Α. (2025). *Εισαγωγή στην Ηλεκτρονική Διακυβέρνηση (e-government)*. Θεσσαλονίκη: εκδ. Τζιόλα]. [4]

World Bank (2002). *The E-government Handbook for Developing Countries. A Project of InfoDev and The Center for Democracy & Technology*. Washington: Centre for Democracy and Technology. [3]

Assessing Public Sector Innovation Capacity in Romania: Institutional Conditions, Organizational Capabilities and Digital Transformation

Maria Cristina Achim[1] **Maria Amorina Stoian**[2]

[1] National University of Political Studies and Public Administration (Romania), maria.achim98@yahoo.com

[2] National University of Political Studies and Public Administration (Romania), negru.amorina@yahoo.ro

Abstract: Public sector innovation increasingly depends on the capacity of public organizations to mobilize institutional, organizational, human, and technological resources in response to complex societal and administrative challenges.

In Romania, digital transformation has intensified the modernization of public administration, while simultaneously revealing persistent differences in the capacity of public institutions to initiate, implement, and sustain innovation.

The paper contributes to the literature by integrating institutional and organizational dimensions into an analytical framework for assessing public sector innovation capacity and discusses its implications for strengthening innovation-oriented public governance in Romania

Keywords: public sector innovation; innovation capacity; institutional capacity; public administration; Romania

1.INTRODUCTION: INVESTING IN THE MODERNIZATION OF PUBLIC ADMINISTRATION

At the European level, investments in public administration are directed towards the continuous enhancement of the cost-effectiveness, quality, and efficiency of public services.

The modernization and transformation of public administration primarily seek to increase citizens' confidence in state institutions, reinforce social cohesion, and improve the attractiveness of the public sector as a major employer (Gottschall et al., 2015).

Significant reforms in public administration continue to emphasize improved performance, stronger coordination, and compliance with sustainable governance indicators, including the consolidation of executive capacity and the strengthening of participatory and oversight mechanisms.

Within this context, the transformation of the state and public administration takes place at the intersection between constitutional, institutional, and cultural continuity, on the one hand, and the need for adaptation and change in response to economic, social, and political crises and pressures, on the other (Pierre and Ingraham, 2010, p. 4).

The challenges currently confronting public administrations at both national and European levels are therefore closely linked to the need to adapt public services to demographic, technological, social, and economic developments. This adaptation is essential in order to ensure standards of quality, equity, and efficiency while maintaining low costs and accessibility for all citizens (Durant, 2020; Liou, 2001; Caiden, 1991, 1999).

This article argues that overcoming the effects of economic and social crises, which have slowed down the development and modernization of states, requires the provision of higher-quality public services capable of strengthening social cohesion while fostering innovation and competitiveness.

In this context, the rapid digitalization of public administration and the adoption of smart solutions provide an important opportunity to reduce regulatory burdens and to broaden the forms of interaction among clients, service providers, and beneficiaries of public services.

The digitalization of the 2022 Population and Housing Census represents an initial and relevant step in this direction, highlighting both the potential of citizens' digital competences and the capacity of public administration to adapt to change and introduce innovative solutions.

We argue that the transformation of public administration cannot be achieved without an accurate assessment of existing conditions and without institutional mechanisms and practices aligned with the moral, democratic, and contemporary principles of good governance (Raiu, 2013, 2015).

Administrative culture and ethics play an essential role in shaping and guiding the processes of reform and modernization. Therefore, an orientation towards results and performance should be complemented by

incentives and instruments that foster integrity, professionalism, and commitment to fulfilling both legal and ethical duties and responsibilities.

In the Romanian context, the transformation of public administration must be simultaneously aligned with standards of legality, ethical conduct, and managerial performance (Blackman, Buick and O'Donnel, 2021, p. 294).

2. RESEARCH FRAMEWORK AND STUDY APPROACH

2.1. Rationale and Context

The horizontal dimension of public administration underlines the importance of developing and effectively using human capital, with one of the major challenges consisting in attracting and retaining highly qualified personnel (Christensen, 2012; Beck, 2021).

In the Romanian context, we consider that the emerging dimensions of the transformation process require the principles of good governance to be integrated into the institutional architecture in an equitable and efficient manner. Such an approach is essential for improving the quality of public services and institutions, while also ensuring the optimal management of available resources (Raiu, 2013, 2015).

As an important driver of economic growth, the transformation of public administration at both central and local levels must also respond to developments in the global economy, as well as to current health and security challenges (Liou, 2001; Lampropoulou, 2018).

Managing payroll and carrying out the continuous assessment of employees within public institutions and authorities require substantial financial and time resources.

These processes also involve a significant responsibility to make effective use of professional expertise and of the extensive and complex potential of human resources.

Applying integrity and performance standards to more than 1,200,000 public-sector employees, according to data reported by the Ministry of Finance in July 2022, with over 60% working in central public administration, entails a considerable and sustained institutional effort.

To support the continuous professional development of human resources and encourage career advancement based on merit, public institutions need clear, predictable, and transparent mechanisms and instruments capable of promoting both professional performance and integrity.

The quality of public services and their capacity to respond effectively to emerging opportunities and challenges are closely connected to economic growth and improvements in national living standards (Pollit and Bouckaert, 2011).

In this regard, the continued modernization and Europeanization of public administration represent essential conditions for sustainable development and can also encourage private-sector progress by promoting an administrative model centered on performance, innovation, accountability, and compliance with both legal and ethical responsibilities.

For Romania, a key priority is to make fuller use of the opportunities created by digital transformation across both urban and rural areas. This involves expanding the digitalization of public services through e-government, strengthening the integration of human capital into the digital economy, and further developing the necessary technologies and infrastructure (European Commission, 2022).

The National Recovery and Resilience Plan (NRRP) currently represents one of the most significant development frameworks for Romania within the European green and digital transition. In order to strengthen the resilience of public administration, improve preparedness for crisis situations, and enhance its capacity for adaptation, innovation, and growth, the NRRP is built around several key principles: a balanced allocation of resources aimed at reducing territorial disparities; the advancement of decentralization in response to the specific needs of local communities; and greater proximity to citizens and service beneficiaries through a stronger involvement of local authorities.

On the basis of these priorities, reform measures should be implemented consistently at both central and local levels, in a predictable, well-founded, and participatory manner.

Such measures should reflect the needs of citizens and businesses and be supported by investments in effective human resource management, with the objective of developing a professional and highly qualified civil service. In this context, the transformation of public administration occupies a central position among the opportunities available to Romania as a Member State of the European Union through the NRRP.

2.2. Research Hypotheses and Strategic Objectives

The central hypothesis of this study emphasizes the importance of a coherent, consistent, and predictable approach at both central and local levels in order to support a comprehensive transformation of public administration according to high standards. Such a transformation should encourage performance and contribute to improving the quality, efficiency, and overall effectiveness of public services.

In the case of Romania, we argue that stronger interconnection and interdependence among the four main pillars of public administration reform are essential for addressing the dysfunctions and disparities that have affected the development and modernization of public institutions and services.

Accordingly, the priorities and objectives guiding public administration transformation over the next decade should be structured around four key areas: (1) improving the mechanisms used for the recruitment, motivation, evaluation, and promotion of civil servants; (2) advancing the decentralization process; (3) enhancing the efficiency and quality of public policies; and (4) expanding digitalization while diversifying and developing alternative instruments designed to better capitalize on emerging opportunities

The secondary hypothesis emphasizes the sequential character of public administration reform and modernization, which has often developed as a response to successive economic, social, and political crises, as well as to emerging challenges and opportunities.

At present, this predominantly reactive approach should be complemented by a clearly defined strategic vision capable of strengthening the administration's ability to anticipate change and accurately assess, at all levels, both its current stage of development and its future trajectories.

The analysis of strategic documents, together with the case study of public administration transformation in Romania from 1990 to the present, seeks to capture the qualitative dimension of the complex process through which public institutions and the administrative system have evolved and modernized.

By examining, at the macro level, the successive changes introduced in response to crises and new challenges, the study aims to provide relevant insights for policymakers, practitioners, and researchers. These developments have underlined the need for a more effective allocation and use of human, financial, and institutional resources in order to ensure efficient and equally accessible public services at both central and local levels.

The analysis also seeks to identify the essential and irreversible changes required in the organization and functioning of public administration so as to generate positive effects for citizens, businesses, civil servants, and public and political elites alike.

Within this framework, particular attention is given to the internal capacity of public administration to ensure predictability, coherence, and rational management of available resources.

2.3. Methodological Approach and Research Limitations

Assessing the transformative capacity of public administration requires a methodological framework capable of examining institutional practices, as well as changes in institutional design and functionality over time, at both central and local levels (Rihoux and Grimm, 2006; Creswell, 2014; Brown et al., 2016).

To ensure a reliable analysis, the research was organized around the four main pillars previously identified as essential to the coherent organization and functioning of public administration. Their complexity and relevance to achieving high standards of administrative performance made it possible to conduct a macro-level evaluation of the capacities and opportunities for change, particularly in relation to institutional and legislative requirements and the adoption of good practices.

The focus on Romania allows the study to identify and explain a pattern of sequential transformation largely shaped by responses to economic, social, and political crises.

To date, external drivers have significantly influenced both the scope and intensity of administrative reforms. These transformations can be associated with several major stages, including the post-communist transition, the periods before and after accession to NATO and the European Union, the consolidation of Romania's position as an EU Member State, as well as the management of the economic crisis and the coronavirus pandemic.

The analysis of public administration transformation therefore relies predominantly on a qualitative research perspective (Miller and Yang, 2008; Ashworth, McDermott and Currie, 2019). The study combines document analysis (Bowen, 2009) with a case study approach (Garson, 2002), with particular attention given to strategies concerning the development and modernization of public administration.

For this purpose, we examined projects associated with the National Strategy for Sustainable Development, together with governmental programmatic documents aimed at strengthening and accelerating the transformation of public administration, in line with the objectives established for Horizon 2030. This methodological approach also supported an assessment of the quality of the relevant legislative framework, particularly in relation to constitutional, European, and transatlantic requirements.

The analysis of public administration transformation therefore relies predominantly on a qualitative research perspective (Miller and Yang, 2008; Ashworth, McDermott and Currie, 2019). The study combines document analysis (Bowen, 2009) with a case study approach (Garson, 2002), with particular attention given to strategies concerning the development and modernization of public administration.

For this purpose, we examined projects associated with the National Strategy for Sustainable Development, together with governmental programmatic documents aimed at strengthening and accelerating the transformation of public administration, in line with the objectives established for Horizon 2030.

This methodological approach also supported an assessment of the quality of the relevant legislative framework, particularly in relation to constitutional, European, and transatlantic requirements.

The main methodological constraints of this study are associated with the limited completeness and interoperability of the databases available for examining legislative and institutional activity in the field of public administration. As a result, it was not possible to incorporate a quantitative component into the analysis (Balnaves and Caputi, 2001; Gray et al., 2007; Groeneveld et al., 2015).

At the same time, the extensive volume of regulations adopted to address specific administrative dysfunctions and shortcomings provides a useful basis for understanding the sequential nature of the transformation and modernization process.

A rigorous and accurate assessment of the capacities and opportunities for the transformation, development, and modernization of public administration requires a more detailed examination of several key dimensions.

These include the status of civil servants, the effectiveness of decentralization, and the efficiency of public services. Such an in-depth analysis is necessary in order to reduce the methodological limitations of the present study and to obtain a more comprehensive understanding of administrative reform.

3. STRATEGIC DIRECTIONS AND OBJECTIVES FOR PUBLIC ADMINISTRATION TRANSFORMATION

3.1. Human Resources as Drivers of Administrative Change

Institutional transformation is shaped by a combination of factors, including the leadership of public authorities, internally established rules, informal practices, and the principles and values that guide organizational behavior. At the same time, civil servants play a decisive role in determining whether institutions resist change or effectively integrate new directions of reform (Thynne, 2010, p. 68). For this reason, cooperation between managers and public officials is essential. Their joint efforts should be carefully coordinated and directed towards addressing the structural dysfunctions that have continued to affect the functioning of public administration.

Improving performance and administrative efficiency requires efforts to be concentrated along two main directions.

The first concerns the formulation of clear objectives for civil servants and public administration, based on criteria such as specificity, measurability, relevance, defined timeframes, and realistic attainability, and their integration into the definition of competencies, requirements, and expected results.

The second direction focuses on motivating civil servants and ensuring their continuous professional development, in close connection with management mechanisms, preliminary and advanced assessment procedures, career development opportunities, and greater flexibility in managing working time and schedules.

For Romania, an important initial step is to make effective use of the findings and recommendations developed by the World Bank through its technical assistance for establishing a unified human resource management system in public administration.

Our document analysis also indicates that several relevant measures for limiting the risks of deprofessionalization and politicization of the civil service are included in guides and manuals co-financed by the European Union through the European Social Fund under the Administrative Capacity Operational Programme 2014–2020.

These measures include: (1) the establishment of a centralized recruitment process, planned and coordinated at national level by the National Agency of Civil Servants (ANFP), aimed at pre-selecting eligible candidates for position-specific competitions; (2) broader communication and advertising campaigns designed to increase awareness and encourage participation in recruitment procedures, thereby strengthening competition; (3) the creation of appropriate evaluation panels composed of expert assessors selected on the basis of professional experience and academic qualifications; (4) effective management of the pool of successful candidates; (5) competency development through feedback and coaching mechanisms; and (6) annual planning and assessment of professional performance, among other measures (General Secretary of Government and World Bank, 2021a, 2021b, 2021c).

Competence and effective management are essential factors in achieving an efficient public administration, together with a human resource management model based on competition, active involvement, continuous competency development, and systematic performance assessment (Raiu and Mina-Raiu, 2022). Recruitment and promotion criteria for civil servants expected to demonstrate high standards of institutional ethics should take into account professional training, work experience, career progression, integrity, and degree of involvement (Dickinson and O'Flynn, 2021, p. 163).

At the same time, assessing the performance of civil servants, advisers, and other categories of staff requires consideration of their ability to use appropriate working tools, assume individual and collective responsibilities, and deliver results in terms of efficiency, quality, and effective resource management (Dickinson and O'Flynn, 2021, pp. 159–161).

Translating strategic plans into clearly defined and differentiated responsibilities for civil servants, advisers, and other categories of personnel is essential for improving the functioning of public administration.

At the same time, merit-based criteria for recruitment and promotion, together with performance-oriented budgeting and auditing, represent important preconditions for incorporating market and marketing principles into institutional practices and instruments.

To prevent and manage administrative dysfunctions and suboptimal conditions, and especially to address the structural problems that have accompanied the transformation of public administration in Romania, it is necessary to recognize and assume the irreversible nature of the reform process. In the current governance environment, the pursuit of high-performing public services has become a common priority across OECD countries, particularly in relation to the efficient and effective management of human, financial, natural, and institutional resources (Bouckaert, 2010, pp. 54–56).

The current institutional framework requires a shift towards defining and promoting a profile of the civil servant that reflects the values and principles embedded in the Administrative Code, while also fostering professional, efficient, and appropriate institutional conduct that can earn public recognition and trust. In this respect, the behavior and professional standards of public officials should be aligned not only with formal legal requirements, but also with the ethical expectations associated with public service.

A professional body of civil servants committed to the fundamental principles of the Constitution can strengthen the capacity of public institutions and authorities to act in the public interest.

At the same time, such a civil service can serve as an important moral and professional point of reference for political actors and for society as a whole.

4. CONCLUDING REMARKS AND FUTURE PERSPECTIVES

The allocation of substantial strategic investments to the transformation of public administration represents an important condition for the modernization and sustainable development of both the state and society as a whole. By facilitating effective interaction and cooperation among public institutions, citizens, and the business sector, public administration functions as an essential and integrated component of the delivery and distribution of public services.

The scale and depth of administrative transformation can also serve as both a reference point and an incentive for citizens and businesses.

Ensuring compliance with legal requirements and limiting unfair practices depend, to a significant extent, on the examples of good practice and institutional incentives promoted by public administration through the organization, operation, and provision of public services.

For Romania, positioning public administration at the core of the country's development framework is essential for strengthening and fully capitalizing on both human and institutional capacities. Such an approach reflects the need to treat administrative transformation as a fundamental and irreversible component of broader modernization efforts.

Ensuring a coherent, predictable, and sustainable transformation of public administration requires a renewed institutional framework and a public management model oriented towards identifying, integrating, and effectively using opportunities for development and modernization. These include, among others, European Union funding for investment, recovery and resilience, as well as initiatives supporting innovation and digitalization.

The close interconnection and mutual dependence among the four main pillars of public administration transformation—human resources, decentralization, public policies, and innovation and digitalization—provide a comprehensive perspective on the conditions required for efficient administrative functioning and for achieving broad and substantial institutional change. This framework also emphasizes the distinct role and contribution of each pillar in making effective use of the development opportunities available to Romanian public administration.

At both national and European levels, financial resources and investments intended to revitalize public administration should therefore be allocated and used in a rational and pragmatic manner.

Their implementation should remain closely aligned with the needs and expectations of citizens and the business environment, while supporting the broader objectives of administrative modernization and development.

REFERENCES:

1. Ashworth, R.E., McDermott, A.M. and Currie, G., 'Theorizing from Qualitative Research in Public Administration: Plurality through a Combination of Rigor and Richness', 2019, *Journal of Public Administration Research and Theory*, vol. 29, no. 2, pp. 318–333.

2.Balnaves, M. and Caputi, P., *Introduction to Quantitative Research Methods: An Investigative Approach*, London: Sage Publications, 2001.

3. Beck, J., 'Territorial Institutionalism – Capturing a Horizontal Dimension of the European Administrative Space', 2021, *Journal of Borderlands Studies*, vol. 36, no. 3, pp. 361–38.

4. Benington, J. and Moore, M.H., *Public Value: Theory and Practice*, Basingstoke: Palgrave, 2011.

Blackman, D., Buick, F. and O'Donnell, M., 'Designing Performance Management to Be an Ethical Tool', in Blackman, D. (ed.), *Handbook on Performance Management in the Public Sector*, Cheltenham: Edward Elgar Publishing, 2021, pp. 294–307.

5. Bouckaert, G., 'New Public Leadership for Public Service Reform', in Pierre, J. and Ingraham, P.W., *Comparative Administrative Change and Reform Lessons Learned*, Montreal & Kingston: McGill-Queen's University Press, 2010, pp. 51–67.

6. Bowen, G.A., 'Document Analysis as a Qualitative Research Method', 2009, *Qualitative Research Journal*, vol. 9, no. 2, pp. 27–40.

7. Brown, J.C., Philo, R.L., Callisto, Jr. A. and Smith, P.J., *Command Transitions in Public Administration: A Quantitative and Qualitative Analysis of Proactive Strategies*, Cham: Springer, 2016.

Caiden, G.E., 'Administrative Reform – Proceed with Caution', 1999, *International Journal of Public Administration*, vol. 22, no. 6, pp. 815–832.

Caiden, G.E., *Administrative Reform Comes of Age*, Berlin: Walter De Gruyter, 1991.

8. Christensen, T., 'Post-NPM and Changing Public Governance', 2012, *Meiji Journal of Political Science and Economics*, vol. 1, pp. 1–11.

9. Creswell, J.W., *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches*, Thousand Oaks: Sage Publications, 2014.

10. Demir, F., *Innovation in the Public Sector. Smarter States, Services and Citizens*, Cham: Springer, 2022.

11. Dickinson, H. and O'Flynn, J., 'The Changing Nature of Work: Time to Return to Performance Fundamentals', in Blackman, D. (ed.), *Handbook on Performance Management in the Public Sector*, Cheltenham: Edward Elgar Publishing, 2021, pp. 152–168.

12. .Durant, R., Building the Compensatory State. An Intellectual History and Theory of American Administrative Reform, New York: Routledge, 2020.

13.European Commission, 'A Comparative Overview of Public Administration Characteristics and Performance in EU28', 2018a, [Online] available at https://op.europa.eu/en/publication-detail/-/publication/3e89d981-48fc-11e8-be1d-01aa75ed71a1/language-en, accessed on November 13, 2022.

An Integrated Framework for Risk and Cost Management in Industrial Construction Projects: Case Study Evidence from a PipeRack P-1100 Installation

Thanassis Kazanas[1] **Spiros Plomaritis**[2] **Faidon Komisopoulos**[3]

[1] Aristotle University of Thessaloniki, School of Economics, tkazanas@econ.auth.gr, ORCID: https://orcid.org/0000-0001-8860-5802

[2] Aristotle University of Thessaloniki, School of Economics, splomar@econ.auth.gr

[3] University of West Attica, Department of Business Administration, fedonk@uniwa.gr, ORCID: https://orcid.org/0000-0002-5948-4922

Abstract: The primary aim of this study is to analyze the integrated framework of project risk and cost management within complex industrial construction, specifically evaluating how technical and financial deviations emerge and are controlled during structural fabrication and installation. The research employs a qualitative case study methodology focusing on the fabrication and installation of the PipeRack P-1100 (Structure A) for an engine oil facility in Poland, executed by METEKO S.A. in synergy with the Iron Processing Center (K.E.S.). Empirical data were gathered via data triangulation, combining direct shop-floor observations, semi-structured interviews with project engineers, internal blueprint audits, and real-time financial record tracking across six project lifecycle stages. Analytical project management tools included Work Breakdown Structure (WBS), Gantt scheduling, and Earned Value Management (EVM) to monitor activity-based costs and temporal performance. Empirical findings reveal a final project cost of €1,353,393.98 compared to the €1,251,889.43 baseline (a 7.5% budget overrun) and a 5-day delivery delay beyond the 90-day contractual timeline. Expenditures peaked during Month 2 (€520,000.00) during heavy fabrication. Deviations stemmed primarily from technical incompatibilities between primary design drawings and STAAD structural models—such as elevation mismatches in column cross-sections—material quantity increases (handrail steel expanding from 14.7 to 23.5 tonnes and revamping plate additions), and procurement lags. The study concludes that while technical and financial variances are common in industrial retrofitting, active monitoring kept cost escalations within manageable limits, preventing severe daily contractual penalties under Law 3669/85. Integrating systematic risk assessment with real-time EVM tracking and ISO 9000 Quality Assurance Systems provides a strategic framework for enhancing project resilience, maintaining quality, and securing the economic viability of complex engineering ventures.

Keywords: Project Management, Risk Management, Cost Management, Industrial Construction, Earned Value Management (EVM).

1. INTRODUCTION

In the contemporary globalized industrial landscape, the management of large-scale technical projects has become increasingly complex, characterized by intense competition and the need to process vast amounts of data to achieve strategic objectives. A "project" is fundamentally defined as a temporary endeavor undertaken to create a unique product, service, or result (Project Management, PMI 2021). Within the engineering and construction sectors, the success of such endeavors is no longer measured solely by completion, but by the precise balance of the "triple constraint": time, cost, and quality. These three factors are inherently interdependent and often competitive; a delay in the project schedule inevitably impacts the budget through increased labor costs or potential penalties, while attempts to reduce costs may compromise the final quality and reliability of the infrastructure (Schwaber & Sutherland, 2020).

The inherent uniqueness of each construction project introduces significant uncertainty and risk, necessitating a robust management framework that spans the entire project lifecycle—from initiation and planning to execution, control, and closure (Verzuh, 2008; Activecollab, 2017). Risk management is not merely a defensive mechanism but a strategic tool to minimize negative impacts (threats), capitalize on potential advantages (opportunities), and drive overall project performance in the construction sector (Damnjanovic and Reinschmidt, 2020; Amoah and Pretorius, 2020; Abdulkarim and Ibrahim, 2021). As noted in the literature, a systematic approach to risk identification and assessment—utilizing both qualitative and quantitative methods—is the "cornerstone" of modern project governance, providing the necessary resilience to safeguard the project's economic viability (Copertari, 2021; Obondi, 2022).

Parallel to risk mitigation, cost management serves as a vital function to ensure that projects are delivered within the approved budgetary framework (Oyegoke et al., 2022). In recent years, industry has witnessed frequent budget overruns and schedule delays, often attributed to fragmented planning, inadequate monitoring, and

unforeseen external variables (Nuako et al., 2024; Hussein and Moradinia, 2023). Effective cost control requires the integration of advanced performance measurement tools, such as Earned Value Management (EVM), which synthesizes time, cost, and scope to provide a realistic picture of project health (Gibson and El Asmar, 2023). Furthermore, the evolution of Project Management (PM) methodologies—from the foundational Gantt charts and Critical Path Method (CPM) to contemporary Agile and AI-driven analytics—has provided engineers with the precision required to handle complex industrial installations (Santoso et al., 2025; Meabeda et al., 2025).

Despite the wealth of theoretical literature on PM, there remains a critical need for empirical evidence demonstrating the integration of these tools in specific industrial contexts, particularly in the fabrication and installation of steel structures for the energy sector. This research addresses this gap by presenting a comprehensive case study of the PipeRack P-1100 (Structure A) installation for an engine oil facility. PipeRacks are essential industrial arteries, carrying pipes, cables, and mechanical equipment, where structural integrity is paramount to prevent leaks and ensure continuous facility operation.

The primary objective of this study is to analyze the integrated framework of risk and cost management employed during the PipeRack P-1100 project. Specifically, the paper examines how initial planning deviations—such as a 7.5% budget overrun and a five-day schedule delay—emerged from design modifications and unforeseen material requirements. By utilizing a methodology that includes Work Breakdown Structure (WBS) and Gantt scheduling, the research illustrates the practical challenges of aligning theoretical PM standards with the realities of the workshop and construction site.

Ultimately, this study contributes to the field by offering a strategic framework for optimization, allowing project managers to approach industrial construction with a long-term, resilient perspective. The findings underscore that while technical and financial deviations are common, the adoption of Quality Assurance Systems (e.g., ISO 9000) and real-time monitoring can significantly enhance the success rate of complex engineering ventures.

The remainder of this paper is structured as follows: Section 2 provides a comprehensive review of the theoretical frameworks underpinning risk and cost management. Section 3 delineates the research methodology, detailing the selection of the PipeRack P-1100 as a case study and the analytical tools employed for data collection. Section 4 presents the empirical data analysis and results, focusing on the technical and financial deviations encountered during the project's execution. Finally, Section 5 synthesizes the study's conclusions, offering strategic managerial implications and identifying directions for future research.

2. LITERATURE REVIEW

The successful management of complex industrial projects necessitates a dual focus on risk and cost management, two disciplines that are inherently linked through the shared objective of ensuring project viability within a competitive environment (Project Management, PMI 2021). This section explores the theoretical frameworks and methodologies that underpin these practices, drawing from established project management standards and contemporary research.

2.1. Project Risk Management Framework

Risk in project management is defined as an uncertain event or condition that, if it occurs, has a positive or negative effect on at least one project objective. While often perceived negatively, risk encompasses both threats (negative impacts such as cost increases or quality degradation) and opportunities (positive impacts like schedule acceleration) (Damnjanovic & Reinschmidt, 2020; Noltze et al., 2021).

A robust Risk Management Plan involves a systematic cycle of identification, analysis, response, and monitoring, which directly strengthens project performance and operational delivery (Copertari, 2021; Obondi, 2022; Abdulkarim and Ibrahim, 2021). Risk identification is the foundational step, utilizing techniques such as SWOT analysis (Strengths, Weaknesses, Opportunities, Threats), brainstorming, and Ishikawa (cause-and-effect) diagrams to uncover potential vulnerabilities (Hasina and Fazil, 2021). Furthermore, risks are categorized by their origin into internal (resource and human-related) and external (political, environmental, or bureaucratic) factors (Dvorský et al., 2021).

The evaluation of risk is typically divided into two methodologies:

- **Qualitative Risk Analysis:** This involves assessing the probability of occurrence and the impact of a risk, often mapped onto a matrix to prioritize "Expected," "Hazard," "Trivial," and "Risk Management" scenarios (Kirytopoulos, 2006; Damnjanovic and Reinschmidt, 2020).
- **Quantitative Risk Analysis:** This provides a numerical estimation of risk consequences using advanced statistical tools. Key techniques include the Monte Carlo simulation, which uses random sampling to model probability distributions, and Sensitivity Analysis, which identifies which variables have the most significant impact on the project outcome (Sobieraj and Metelski, 2022; Qazi and Simsekler, 2021). Additionally, the Program Evaluation and Review Technique (PERT) allows managers to calculate the "expected duration" (Te) by factoring in optimistic (To), most likely (Tm), and pessimistic (Tp) estimates (Zaneldin and Ahmed, 2024).

To mitigate these risks, organizations employ strategies such as risk transfer (e.g., insurance), buffering (allocating financial reserves), and quality assurance systems like the ISO 9000 series, which enhance transparency and reduce the likelihood of technical failure.

2.2. Cost Management and Performance Monitoring

Cost management encompasses the processes required to ensure that a project is completed within the approved budget (Project Management Institute [PMI], 2021; Oyegoke et al., 2022). According to the Project Management Institute (PMI), this involves four critical stages: planning, estimating, budgeting, and controlling (Kerzner, 2022).

Effective cost estimation relies on various techniques, including analogous estimation (using historical data from similar projects) and bottom-up estimation (aggregating costs from individual work packages) (Zhao et al., 2024). The Work Breakdown Structure (WBS) is essential here, as it provides a hierarchical decomposition of the project scope into manageable "work packages," each with defined costs and durations (Barakchi et al., 2017).

However, projects frequently suffer from cost overruns, driven by factors such as inaccurate initial planning, market price fluctuations, and delays in decision-making (Nuako et al., 2024). To combat this, Earned Value Management (EVM) serves as a vital performance measurement tool. EVM integrates the triple constraints by comparing the Planned Value (PV) and the Actual Cost (AC) with the Earned Value (EV)—the value of work actually performed. Key performance indicators derived from EVM include:

- **Cost Performance Index (CPI):** Measures the financial efficiency of the project.
- **Schedule Performance Index (SPI):** Indicates whether the project is ahead of or behind the baseline schedule.

The literature emphasizes that cost and time are interdependent; any deviation in the project schedule inevitably results in increased daily overheads and labor costs, while budget constraints may lead to the use of inferior materials, impacting long-term quality (Schwaber and Sutherland, 2020; ElSahly et al., 2023). Therefore, continuous monitoring through S-curves and real-time data analytics is required to maintain the "economic balance" of the venture (Meabeda et al., 2025).

3. METHODOLOGY

This section delineates the methodological framework employed to investigate the integration of risk and cost management in industrial construction. The research adopts a case study approach, focusing on the fabrication and installation of a PipeRack P-1100 (Structure A). The methodology is designed to bridge the gap between theoretical project management standards and empirical practice within the volatile engineering sector.

3.1. Research Context: The Greek Construction Sector and Strategic Shifts

The rationale for this study is rooted in the broader economic landscape of the Greek construction industry. Historically, this sector has been a primary driver of the national economy, stimulating investment and financial flows. However, since the 2010 financial crisis, the industry has faced significant stagnation. This recession is attributed to three interlocking factors:

- **Economic Factors:** Difficulty in liquidating capital, fluctuating property prices, and reduced national income.

- **Institutional Factors:** Chronic bureaucratic hurdles and delays in the issuance of necessary permits and administrative approvals.
- **Structural Factors:** Issues related to labor productivity and technical execution.

These domestic challenges have compelled Greek engineering firms to seek opportunities in international markets to maintain viability. This research analyzes a project executed under these competitive conditions, where the precision of cost, time, and quality is paramount for securing international contracts and maintaining organizational reputation.

3.2. Research Design: The Case Study Approach

The study utilizes a qualitative case study methodology, which is recognized as an effective tool for the in-depth analysis of complex, real-world phenomena within their specific contexts. A case study allows for the examination of the intricate details of project execution that quantitative surveys often overlook, such as the specific technical failures and the immediate management responses required on-site.

To ensure a comprehensive analysis, the research integrates several analytical tools:

1. **Work Breakdown Structure (WBS):** Used to decompose the project into manageable work packages, facilitating a granular analysis of costs and tasks (Barakchi et al., 2017).
2. **Gantt Charting:** Employed to visualize the project schedule, track the sequence of activities, and identify the critical path.
3. **Data Triangulation:** The findings are derived from multiple sources of evidence to ensure validity and reliability.

3.3. Project Selection: The PipeRack P-1100 (Structure A)

The subject of this case study is the PipeRack P-1100, specifically the "Structure A" section, designed for an engine oil facility (Motor Oil). The project involved the renovation and reinforcement of steel structures in an industrial plant located in Poland.

Technical Significance of the Selection: PipeRacks serve as the "arteries" of industrial plants, supporting essential infrastructure including pipes, cables, and walkways. The selection of this specific project was based on several critical factors:

- **Structural Integrity Requirements:** The project necessitated high-level engineering to ensure the structure could withstand gravity, lateral loads, and potential seismic activity.
- **Operational Continuity:** A primary goal was to perform the installation and renovation while ensuring the uninterrupted operation of the facility, a common challenge in heavy industry.
- **Risk Mitigation:** The project aimed to minimize environmental hazards, specifically oil leaks, through the implementation of advanced anti-corrosion systems and structural reinforcements.

The project focuses on the replacement and strengthening of steel components that had suffered from corrosion and wear, particularly at the base of columns and bolted/welded joints. Analyzing this project provides realistic data that reinforces the theoretical bibliography regarding risk and cost management.

3.4. Data Collection Procedures

The empirical data presented in this study were collected through a multi-faceted approach involving direct collaboration with the executing firms, METEKO S.A. and the Iron Processing Center (K.E.S.).

1. **Direct Field Observation:** Physical presence at the manufacturing plant—both in the administrative offices and on the production floor—was required to understand the production processes and the actual flow of materials.
2. **Semi-Structured Interviews:** Consultations with the project engineers were conducted to gather qualitative insights into the daily difficulties, unforeseen risks, and technical nuances of the fabrication phase.

3. **Document Analysis:** The research utilized internal company documents, including computerized blueprints (double-line format), detailed cost tables, and electronic correspondence (e-mails) between the project stakeholders.
4. **Financial Records:** Access to real-time budgetary data allowed for a comparison between the initial budget (Planned Cost) and the final expenditure (Actual Cost), facilitating a robust analysis of budget overruns.

3.5. Analytical Framework

The analysis follows the project's lifecycle across six key stages: Design & Engineering, Procurement, Fabrication, Surface Treatment, Assembly & Welding, and Transport & Delivery. By tracking the deviations in cost and time across these stages, the study evaluates the effectiveness of the risk management strategies employed. The integration of Earned Value Management (EVM) principles allowed for the calculation of the 7.5% budget increase and the five-day delay, providing a clear empirical basis for the study's conclusions.

4. DATA ANALYSIS AND RESULTS

The following section presents a comprehensive empirical analysis of the PipeRack P-1100 (Structure A) project, focusing on technical specifications, detailed activity-based costing, and the impact of design modifications on the project's triple constraints. The data presented herein are derived from real-world industrial metrics and the organizational records of the executing firms, METEKO S.A. and the Iron Processing Center (K.E.S.).

4.1. Detailed Project Description and Budgetary Variance

According to Table 1, the PipeRack P-1100 project was executed with a final budget of €1,353,393.98 (including VAT), reflecting a 7.5% increase over the initial estimated cost of €1,251,889.43. This variance is categorized by specific work packages (ITEMs), revealing the technical challenges encountered during the procurement and fabrication phases.

The core structural components comprised the majority of the project's scope. The Main Steel Structures (ITEM 1810.01F), initially budgeted for 200 tonnes, required an additional 6.9 tonnes, leading to a final cost of €589,678.77 (a 3.45% increase). Similarly, Structure A (ITEM 1815.01F) saw a weight increase from 153 to 160.8 tonnes, resulting in a 5.1% budgetary deviation.

The most significant percentage deviation occurred in the handrails (ITEM 1850.01F). While the initial projection was 14.7 tonnes at €86,730.00, the final installation required 23.5 tonnes, pushing costs to €139,210.44, nearly 60% over the baseline. In contrast, the project achieved cost optimization in ladders (ITEM 1850.03F); by condensing vertical access points and optimizing layout, the final weight dropped from 2.9 to 2.25 tonnes, reducing the cost from €17,169.00 to €13,272.70.

Table 1: Product Pricing and Budget Deviation Analysis

ITEM	Description	U.M.	Unit Price (€/kg)	Budget Qty (kg)	Budget Cost (€)	Final Qty (kg)	Final Cost (€)
1810.01F	Steel Structures – Pipe Racks	kg	2.85	200,000	570,000.00	206,904.83	589,678.77
1815.01F	Steel Structures – Structure A	kg	2.85	153,000	436,050.00	160,823.24	458,346.23
1850.01F	Handrails	kg	5.90	14,700	86,730.00	23,594.99	139,210.44
1850.03F	Ladders	kg	5.90	2,910	17,169.00	2,249.61	13,272.70
1850.05F	Gratings	kg	3.85	38,000	146,300.00	38,490.53	148,188.54
1850.08F	Steps	kg	3.00	780	2,340.00	832.30	2,496.90
1850.09F	Steel Plates for Revamping	kg	2.00	0	0.00	1,100.20	2,200.40
TOTAL				**409,390**	**1,258,589.00**	**434,000.00**	**1,353,393.98**

Source: Authors' calculations

Furthermore, the "revamping" nature of the project necessitated the unplanned addition of steel plates (ITEM 1850.09F) for structural reinforcement and local repairs. These additions added 1.1 tonnes and €2,200.40 to the final total. Despite these deviations, the 7.5% total increase is considered technically justified within industry norms for complex industrial retrofitting projects.

4.2. Activity-Based Costing and Processing Logic

To understand the financial dynamics of the PipeRack P-1100, the research analyzes the project's cost structure across four primary categories: Main Steel, Handrails/Ladders (Hr + Lad), Gratings, and Steps. Table 2 presents the project's cost structure. The project leveraged a unique organizational synergy, where initial processing occurred at the Iron Processing Center (K.E.S.) before final fabrication and logistics were handled by METEKO S.A..

Table 2: Costing of Individual Project Activities

Activity / Cost Item	Steel (€)	Hr + Lad (€)	Gratings (€)	Steps (€)
Material Cost	970.00	1,000.00	2,000.00	2,200.00
Sandblasting	25.00	25.00	-	-
Priming	20.00	20.00	-	-
Cutting-Drilling	50.00	80.00	-	-
Assembly	250.00	1,000.00	-	-
Welding	300.00	1,500.00	-	-
Painting	90.00	120.00	-	-
KES to METEKO (Transport)	15.00	15.00	-	-
METEKO to Destination (Transport)	50.00	50.00	50.00	50.00
Bolts/Screws	70.00	70.00	1,000.00	70.00
Paints	200.00	800.00	-	-
Consumables	100.00	100.00	-	-
Design & Engineering	220.00	220.00	220.00	220.00
Contingencies	-	-	-	-
FOB	-	-	-	-
Financial Cost	100.00	100.00	50.00	50.00
TOTAL UNIT COST	**2,460.00 €**	**5,100.00 €**	**3,270.00 €**	**2,540.00 €**

Source: Authors' calculations

- **Fabrication Drivers:** For the main steel structures, the raw material cost was approximately €970.00 per unit, whereas labor-intensive components like steps and gratings required material investments between €2,000.00 and €2,200.00.
- **Welding and Assembly:** This stage represented the highest variable cost for specialized components. Welding for handrails and ladders was priced at €1,500.00 per unit, compared to €300.00 for standard steel structures, reflecting the complexity of industrial safety joints.
- **Surface Protection:** To ensure structural integrity against corrosion, all steel components underwent sandblasting (€25.00) and priming (€20.00), followed by professional painting (ranging from €90.00 to €120.00).
- **Logistics and Engineering:** Transport involved a two-stage process (K.E.S. to METEKO and METEKO to the Polish facility), with final delivery costs estimated at €50.00 per unit. Fixed costs for design and engineering remained consistent across components at €220.00 per unit.

This granular breakdown illustrates that the final "price to client" includes not only the base cost but also contingency reserves, profit margins, and unexpected "revamping" expenses.

4.3. Design Modifications and Technical Impact Analysis

A critical finding of the data analysis is the impact of design discrepancies on the project timeline. Although the contractual agreement stipulated a 90-day delivery period, the project was completed in 95 days. This five-day delay was primarily attributed to errors discovered in the initial engineering models provided by the client.

Three major technical issues were identified through visual and structural audits:

1. **STAAD Model Incompatibility:** Discrepancies were found between the central design drawings and the STAAD structural analysis models. Specifically, there were elevation differences in column cross-sections, which threatened the static stability of the PipeRack and necessitated immediate redesign.
2. **Sizing and Material Errors:** Significant differences were noted in material thickness and cross-sectional dimensions. In some instances, critical structural elements were entirely missing from the blueprints, leading to incorrect load distribution.
3. **Procurement Delays:** The late discovery of these errors during the fabrication phase meant that the necessary additional materials were not immediately available. This resulted in the postponement of several work packages until new supplies could be procured.

While the delay led to increased labor costs (extra daily wages), it remained within the 3% limit of the total contract value, thus avoiding the severe contractual penalties (15% of average daily value per day) defined under Article 49 of Law 3669/85.

4.4. Work Breakdown and Scheduling Analysis (Gantt)

The temporal progression of the project is visualized through a specialized Gantt Schedule, as it is presented in Table 3, which breaks the project lifecycle into six distinct, interdependent phases:

1. **Design & Engineering (Days 1–10):** Focus on technical blueprints, soil studies, and machinery selection.
2. **Procurement (Days 11–31):** A 20-day phase for ordering high-quality steel and specialized equipment.
3. **Fabrication (Days 31–61):** The longest phase (30 days), involving CNC cutting, drilling, and time-intensive milling.
4. **Surface Treatment (Days 61–71):** Sandblasting and priming to prevent moisture damage.
5. **Assembly & Welding (Days 71–91):** The most complex phase (20 days), requiring highly skilled welders to ensure joint integrity.
6. **Transport & Delivery (Days 91–95):** Logistics to Poland and the secondary facility in Komotini.

Table 3: Gantt Schedule Table

Task	Start Day	Duration (Days)	End Day
Design & Engineering	1	10	11
Procurement	11	20	31
Fabrication	31	30	61
Surface Treatment	61	10	71
Assembly & Welding	71	20	91
Transport & Delivery	91	4	95

Source: Authors' calculations

The Cash Flow Analysis, in Table 4, reveals that project spending peaked in Month 2 (€520,000.00) during the height of fabrication and assembly, followed by a decline to €383,393.98 in Month 3 as the project reached the delivery and closure phases.

Table 4: Scheduled Cash Flow Table

Month	Planned Cost (€)
Month 1	450,000.00 €
Month 2	520,000.00 €

Month 3	383,393.98 €
Total	**1,353,393.98 €**

Source: Authors' calculations

The analysis concludes that while the project faced technical headwinds, the balance between the planning phase and execution was maintained. By dedicating sufficient time to initial design (10 days) and fabrication (30 days), the team managed to prevent the 7.5% budget increase from escalating into a catastrophic project failure.

5. CONCLUSIONS

The present research conducted an extensive investigation into the multifaceted processes of project management, specifically focusing on the critical integration of risk and cost management within industrial construction. By utilizing a comprehensive synthesis of both Greek and international literature, the study established that while theoretical frameworks are well-developed, there remains a significant empirical gap regarding case studies that employ alternative organizational and contractual philosophies in real-world technical environments. This paper addressed this gap by providing a granular analysis of the PipeRack P-1100 (Structure A) installation, a project centered on the fabrication of high-specification steel structures for safe oil transport.

5.1. Synthesis of Empirical Findings

The analysis of the PipeRack P-1100 project serves as a vital validation of the theoretical models discussed in the preceding sections. The study demonstrated that the evolution of such complex technical projects is susceptible to various internal and external pressures, which often manifest as deviations from the initial project baseline. Specifically, the project experienced a 7.5% budget increase and a five-day schedule delay.

However, a core conclusion of this research is that these deviations—while present—were technically justified and strategically managed so as not to compromise the project's overall integrity or operational success. The findings emphasize that in the context of industrial "revamping" and retrofitting, a certain level of variance is inherent due to the discovery of unforeseen structural wear or design discrepancies during the active production phase. The alignment between the case study's empirical results and the theoretical literature suggests that risk management is not a static planning requirement but a dynamic tool for operational resilience.

5.2. The Strategic Imperative of Continuous Monitoring

A primary insight derived from this study is the indispensable role of continuous monitoring and control mechanisms. The data confirms that inadequate initial planning and fragmented organizational structures are the leading causes of significant financial failure and catastrophic budget overruns in the construction sector. In the case of METEKO S.A. and the Iron Processing Center (K.E.S.), the presence of integrated monitoring systems allowed for the early detection of design errors—such as elevation discrepancies in column cross-sections—enabling the management team to implement corrective measures before the fabrication reached an irreversible stage.

Furthermore, the research underscores that cost and time are intrinsically linked components of project success. The five-day delay, while minimal, directly impacted the budget through increased labor costs and daily wages, reinforcing the principle that protective mechanisms aimed at schedule control simultaneously safeguard the project’s economic viability. Therefore, real-time data acquisition and cross-departmental communication are identified as the "cornerstones" of successful risk mitigation.

5.3. Managerial Implications and Future Sustainability

The findings of this research offer several strategic recommendations for project managers and engineering firms operating in competitive international markets:

1. **Preventive Risk Management:** Risk assessment should be treated as a preventive tool that begins at the idea conception stage and persists through to project closure.

2. **Leveraging Experience:** The study highlights that the utilization of organizational experience and historical data (e.g., risk catalogs and past WBS templates) significantly reduces the probability of repeating past technical failures.
3. **Investment in Quality:** The adoption of organized methods, such as the ISO 9000 series, enhances transparency and quality, which ultimately reduces the long-term costs associated with rework and structural failure.

Ultimately, the successful delivery of the PipeRack P-1100 proves that sustainable and successful project pathways are achievable through the evolution of management processes and the assimilation of modern project governance tools. By reducing deviations in cost and time, firms can enhance their market reputation and ensure the delivery of high-quality industrial infrastructure.

5.4. Limitations and Directions for Future Research

While this study provides a detailed roadmap for managing steel fabrication projects, it is limited to a specific case study in the energy sector. Future research should aim to explore the application of these integrated frameworks across a broader range of industrial sectors, such as renewable energy infrastructure or large-scale civil works, to further validate the universality of these findings. Additionally, the role of Artificial Intelligence (AI) and Building Information Modeling (BIM) in automating the detection of design-to-fabrication discrepancies remains a promising frontier for enhancing project precision and reducing human-induced planning errors.

Declaration of generative AI and AI-assisted technologies in the manuscript preparation process

During the preparation of this work, the authors used Google Gemini and generative AI-assisted technologies to assist with structural refinement and linguistic polishing. Following the use of these tools, the authors thoroughly reviewed and edited the content and take full responsibility for the final published article.

REFERENCES

Abdulkarim, A. B., & Ibrahim, U. A. (2021). Investigating the impact of risk management on project performance in construction industry: Evidence from Nigeria. *Science Journal of Business and Management*, *9*(3), 224–230.

ActiveCollab. (2017, May 17). *Traditional project management*. ActiveCollab Blog. https://activecollab.com/blog/projectmanagement/traditional-project-management

Amoah, C., & Pretorius, L. (2020). Evaluation of the impact of risk management on project performance in small construction firms in South Africa: The case study of construction systems. *Journal of Engineering, Design and Technology*, *18*(3), 611–634.

Barakchi, M., Torp, O., & Belay, A. M. (2017). Cost estimation methods for transport infrastructure: A systematic literature review. *Procedia Engineering*, *196*, 270–277. https://doi.org/10.1016/j.proeng.2017.07.199

Copertari, L. F. (2021). Project risk management: A review of an institutional project life cycle. *International Journal of Project Management*.

Damnjanovic, I., & Reinschmidt, K. (2020). *Data analytics for engineering and construction project risk management*. Springer Nature Switzerland AG.

Dvorský, J., Belas, J., Gavurova, B., & Brabenec, T. (2021). Business risk management in the context of small and medium-sized enterprises. *Journal of Risk and Financial Management*.

ElSahly, O. M., Ahmed, S., & Abdelfatah, A. (2023). Systematic review of the time-cost optimization models in construction management. *Sustainability*, *15*, 5578. https://doi.org/10.3390/su15065578.

Gibson, G. E., El Asmar, M., et al. (2023). Novel earned value management system maturity framework and its relation to project performance. *Journal of Construction Engineering and Management*.

Hasina, P. T., & Fazil, P. (2021). Risk management in commercial building construction using PESTEL and SWOT analysis. *International Journal of Engineering Research and Technology*.

Hussein, A. R., & Moradinia, S. F. (2023). Mitigating time and cost overruns in construction projects: A questionnaire study on integrating earned value management and risk management. *Journal of Studies in Science and Engineering*, *3*(2), 37–51. https://doi.org/10.53898/josse2023323.

Kerzner, H. (2022). *Project management: A systems approach to planning, scheduling, and controlling*. Wiley.

Kirytopoulos, K. (2006). *Project Risk Management Handbook*. Kleidarithmos Publications.

Meabeda, E. S. M., Mahfouza, S. Y., & Alhadyb, A. (2025). Modified critical chain scheduling for construction projects. *HBRC Journal*, *21*(1), 127–143.

Noltze, M., Köngeter, A., Römling, C., & Hoffmann, D. (2021). Monitoring, evaluation and learning for climate risk management. *OECD Development Co-operation Working Papers*, No. 92.

Nuako, F., Ghansah, F. A., & Adusei, T. (2024). Critical success factors for cost overrun minimization in public construction projects in developing countries: The case of Ghana. *Construction Innovation*.

Obondi, K. C. (2022). The utilization of project risk monitoring and control practices and their relationship with project success in construction projects. *Journal of Project Management*, *7*(1).

Oyegoke, A. S., Powell, R., Ajayi, S., Godawatte, G. A. G. R., & Akenroye, T. (2022). Factors affecting the selection of effective cost control techniques in the UK construction industry. *Journal of Financial Management of Property and Construction*, *27*(2), 141–160.

Project Management Institute. (2021). *A guide to the project management body of knowledge (PMBOK guide)* (7th ed.).

Qazi, A., & Simsekler, M. C. E. (2021). Risk assessment of construction projects using Monte Carlo simulation. *International Journal of Managing Projects in Business*, *14*(5), 1202–1218.

Santoso, F. W., Handayani, F. S., & Setiono. (2025). A comparative analysis of the CPM and PERT methods in project time management for a high-rise building construction project in Yogyakarta. *Sustainable Civil Building Management and Engineering Journal*, *2*(2), 13. https://doi.org/10.47134/scbmej.v2i2.3927.

Schwaber, K., & Sutherland, J. (2020). *The Scrum Guide: The Definitive Guide to Scrum: The Rules of the Game*. ScrumGuides.org. https://www.scrumguides.org/scrum-guide.html

Sobieraj, J., & Metelski, D. (2022). Project risk in the context of construction schedules—Combined Monte Carlo simulation and time at risk (TaR) approach. *Automation in Construction*.

Verzuh, E. (2008). *The fast forward MBA in project management* (3rd ed.). John Wiley & Sons.

Zaneldin, E., & Ahmed, W. (2024). A generic framework for managing schedule and cost risks of construction activities using PERT and the EV technique. *Buildings*, *14*(7), 1918.

Zhao, L., Wang, J., & Zhang, S. (2024). Critical factors influencing cost estimators' judgements on cost contingencies in highway construction projects: An empirical study in the UK. *PLoS One*.

Wind Energy Development in Türkiye: Current Status, Policy Framework and Future Challenges

Fatih Çolakoğlu[1] **Matej Švigelj**[2]

[1] University of Ljubljana, School of Economics and Business, fatihcolakoglu1995@gmail.com

[2] University of Ljubljana, School of Economics and Business, matej.svigelj@ef.uni-lj.si; ORCID: https://orcid.org/0000-0001-6625-9208

Abstract: Türkiye has experienced substantial growth in renewable energy deployment over the past two decades, with wind energy becoming an increasingly important component of the national electricity system. This paper examines the development and current position of wind energy in Türkiye within the broader context of the country's energy transition. Particular attention is given to the structure of the Turkish energy sector, the evolution of wind power capacity, energy import dependency, and the policy and climate framework influencing further renewable energy deployment. The findings indicate that Türkiye possesses considerable wind energy potential and has established itself as one of the important wind markets in Europe. At the same time, growing electricity demand, continued dependence on imported fossil fuels, infrastructure requirements, and the need to align energy security with decarbonization objectives remain important challenges. The paper argues that further expansion of wind power can contribute not only to Türkiye's climate objectives but also to greater energy diversification and reduced exposure to external energy supply risks. The future development of the sector will therefore depend on the interaction between investment, regulatory policy, grid development, technological progress, and long-term energy planning.

Keywords: wind energy, renewable energy, energy transition, energy policy, energy security

1. INTRODUCTION

Wind energy links the decarbonization of electricity supply with efforts to reduce dependence on imported fuels. Once a wind farm is operating, its electricity production requires no continuing purchases of coal or natural gas. This characteristic is particularly relevant to Türkiye, where electricity demand has grown alongside policies intended to strengthen domestic energy supply. Wind development can diversify the generation mix and limit exposure to international fuel markets, provided that new plants can connect to the network and their output can be used effectively.

The International Energy Agency (IEA, 2021) identifies energy security and market reform as central features of Turkish energy policy and describes substantial dependence on imported oil and natural gas. Alodalı et al. (2020) likewise emphasize supply security, regional cooperation, and the effective use of domestic renewable resources in Türkiye's energy policy. In this setting, renewable electricity has implications for the cost and security of energy supply as well as its environmental effects. These objectives are related but are not automatically achieved together. Expanding domestic coal use, for example, can serve a domestic-supply objective while maintaining a carbon-intensive electricity system. Wind is relevant because it can contribute to both diversification and decarbonization.

The aim of this paper is to examine the development and current position of wind energy in Türkiye and identify the main policy drivers and challenges affecting its future growth. It addresses the following research question: What are the main developments, policy drivers, and challenges shaping the future growth of wind energy in Türkiye? The central argument is that substantial wind resources and supportive policy objectives create an opportunity for further expansion, but realization of that opportunity depends on converting potential into financeable projects with permits and effective grid connections.

The paper combines descriptive analysis of secondary statistics with qualitative analysis of policy documents. Global and European capacity data come from the Global Wind Energy Council (GWEC) and WindEurope, while the International Renewable Energy Agency (IRENA) provides the international cost evidence. Historical Turkish electricity data are drawn from KPMG and APLUS Enerji, and recent national statistics and resource assessments from the Ministry of Energy and Natural Resources (MENR). Official energy plans and climate strategies provide the policy evidence.

Section 2 establishes the global and European context. Section 3 examines Türkiye's electricity system, wind development, and policy framework. Section 4 discusses the main implementation challenges and future

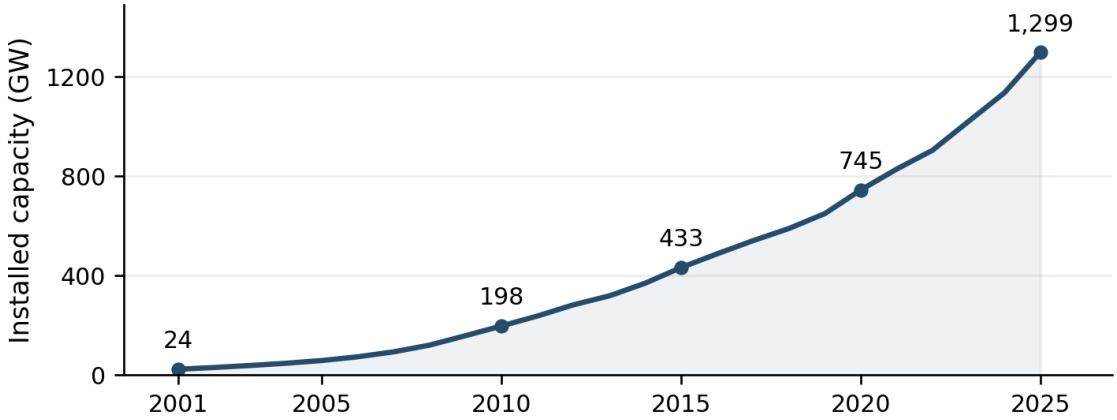
prospects. Section 5 concludes by considering the relationship between wind expansion, energy diversification, and decarbonization.

2. WIND ENERGY DEVELOPMENT: GLOBAL AND EUROPEAN CONTEXT

2.1. Global Wind Energy Development

Global wind capacity increased from approximately 24 GW in 2001 to 1,136 GW in 2024 (GWEC, 2025). The expansion continued in 2025, when GWEC reported 165 GW of new installations and cumulative capacity of 1,299 GW (GWEC, 2026). Figure 1 presents this long-term development. The long-term increase shows how wind has moved from a relatively small generation option to a technology deployed at substantial scale across electricity systems.

Figure 1: Global installed wind capacity, 2001–2025 (GW)



Source: GWEC (2025, 2026).

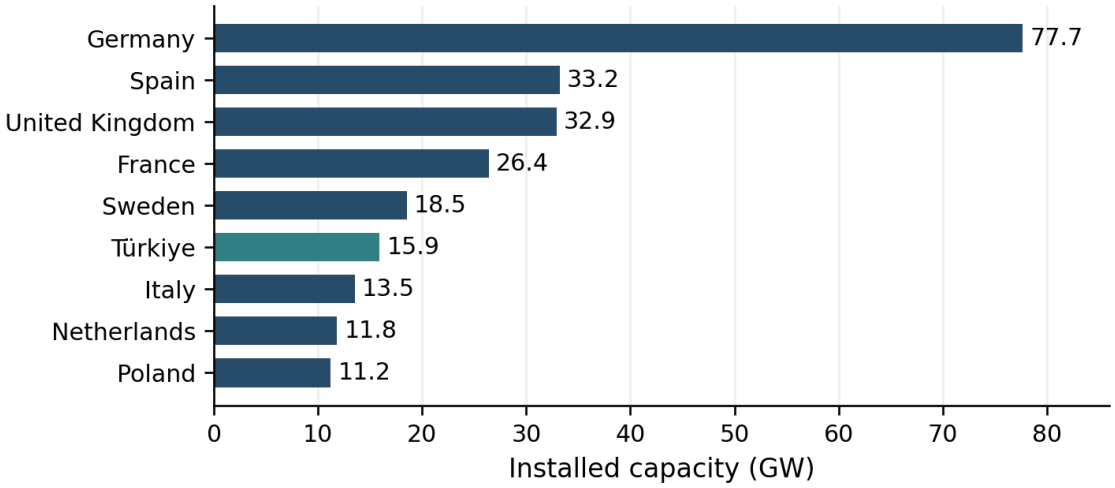
Onshore wind remains the larger segment. In 2024, approximately 1,052 GW of installed capacity was onshore and 83 GW offshore (GWEC, 2025). This distinction matters for Türkiye because its established wind market is onshore, whereas offshore development requires a separate investment and infrastructure pathway. Experience in the larger onshore market can support further growth, but it does not eliminate the additional requirements associated with marine construction and electricity export from offshore sites.

Cost competitiveness provides an additional reason for this expansion. IRENA (2026) reports a global weighted-average levelized cost of electricity of USD 33/MWh for onshore wind projects commissioned in 2025. This international benchmark indicates the generation-cost potential of the technology; it is not an estimate of Turkish project costs or a guaranteed sales price. Project economics remain sensitive to the wind resource, investment cost, financing terms, and the amount of electricity delivered. The international market therefore offers a mature technology base, while national conditions determine which projects can be financed and built.

2.2. European Wind Energy Landscape

Europe had 304 GW of wind capacity at the end of 2025, comprising 265 GW onshore and 39 GW offshore. Of the 19.1 GW installed during that year, 90% was onshore. Türkiye added approximately 2.1 GW, the second-largest annual addition in Europe after Germany's 5.7 GW (WindEurope, 2026). These figures refer to Europe as covered by WindEurope, which includes Türkiye and the United Kingdom, rather than only the European Union.

Figure 2: Installed wind capacity in selected European countries, 2025 (GW)



Source: WindEurope (2026).

Figure 2 compares the nine largest European fleets in WindEurope's 2025 dataset, in which Türkiye ranks sixth with 15.9 GW (WindEurope, 2026). This exceeds MENR's national total of 14.774 GW for the same year (MENR, 2026a). The regional comparison uses WindEurope consistently, while the national analysis and target comparison use MENR's series.

European experience highlights the importance of implementation alongside resource quality. WindEurope (2025) identifies grid bottlenecks, permitting difficulties, and financing conditions as constraints on deployment. Their relevance to Türkiye lies in the questions they raise about project delivery and system investment. The severity of a particular obstacle, however, depends on national institutions and market conditions. The Turkish discussion below therefore distinguishes observed investment programmes and policy changes from wider European experience.

3. WIND ENERGY DEVELOPMENT IN TÜRKIYE

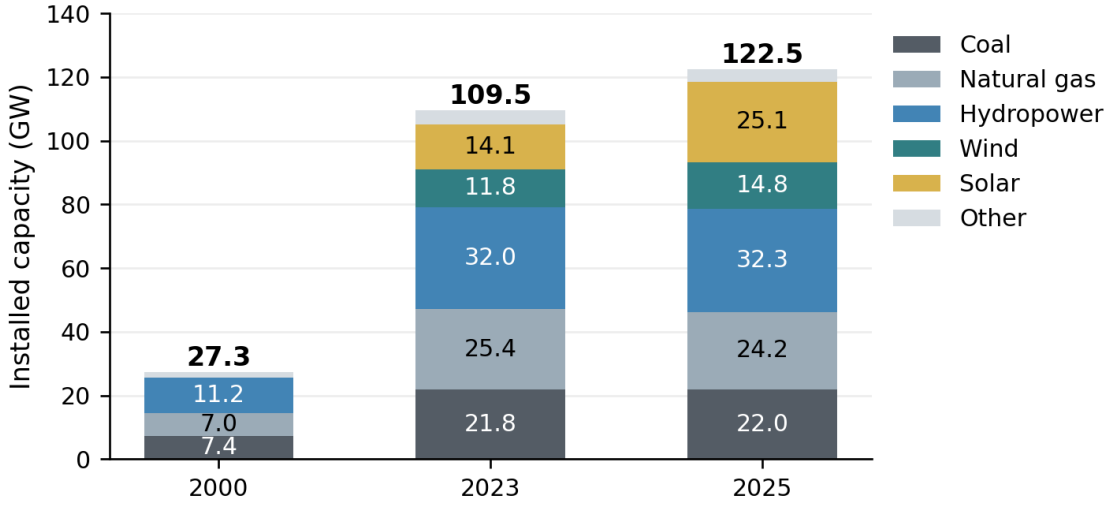
3.1. Türkiye's Energy Landscape

Türkiye's electricity system has expanded and diversified considerably. Total installed capacity increased from approximately 27.3 GW in 2000 to 109.5 GW in 2023. Figure 3 shows selected years from this development, including the growing contribution of wind and solar alongside hydropower and thermal generation (KPMG & APLUS Enerji, 2024). The historical increase is relevant because new wind projects enter an expanding and increasingly diverse system, rather than replacing a fixed quantity of existing generation one-for-one.

At the end of 2025, national installed capacity reached 122.519 GW. Renewable sources represented 62.3% of this total, while wind accounted for 14.774 GW, or 12.1%, and solar for 25.109 GW (MENR, 2026a). These are capacity indicators. In the ministry's updated annual generation figures, wind supplied 10.9% of electricity in 2025, while coal and natural gas supplied 33.6% and 23.0%, respectively (MENR, 2026c). The different distributions demonstrate why a high renewable share of installed capacity should not be interpreted as an equivalent renewable share of annual generation.

Demand remains an important part of the expansion problem. Gross electricity consumption reached approximately 360.9 TWh in 2025, 2.1% above the previous year (MENR, 2026c). Additional wind output may therefore serve growing consumption as well as displace output from other plants. The balance between these effects depends on demand growth and the operation of the rest of the system. Consequently, increasing renewable capacity does not by itself demonstrate an absolute reduction in fossil-fuel consumption or emissions.

Figure 3: Installed electricity capacity by source in Türkiye, selected years (GW)



Source: KPMG and APLUS Enerji (2024); MENR (2026a).

Energy security also extends beyond electricity. Oil use in transport and other non-electric applications cannot be displaced directly by connecting a wind farm. Wind contributes most immediately by providing domestic electricity without fuel purchases; a wider contribution depends on electrification and changes in final energy use. This distinction prevents the electricity transition from being equated with a complete solution to economy-wide import dependence. The IEA's (2021) assessment of Türkiye also highlights the need to align domestic resource policies with longer-term decarbonization objectives, particularly where domestic coal is involved.

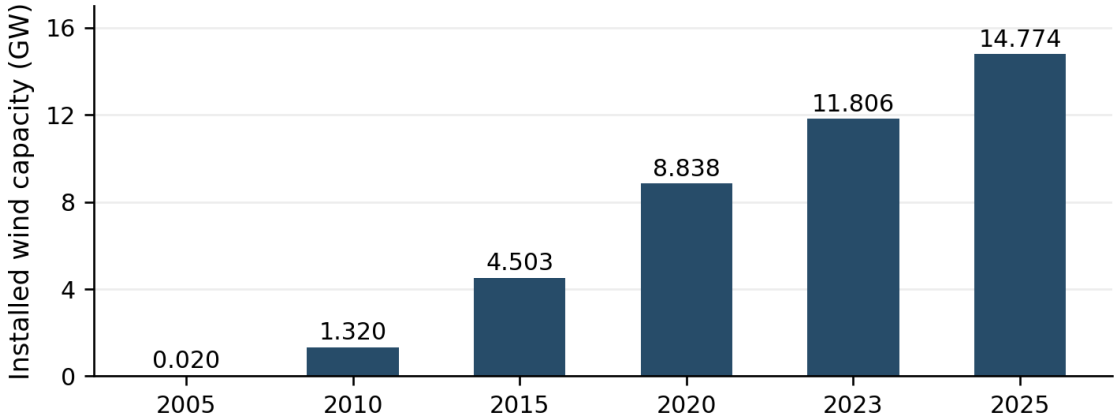
These characteristics make grid integration central to the contribution of new wind projects. In its review of Türkiye, the IEA (2021) recommends preparing the electricity system for more variable renewable generation through network expansion, storage, smart grids, and demand response. The World Bank's (2025) transmission project likewise links network modernization to the integration of additional wind and solar capacity. Generation and network planning therefore need to proceed together, while energy efficiency can moderate the growth in supply requirements (IEA, 2021).

3.2. Development of Wind Energy in Türkiye

The national series illustrates the change in scale of the Turkish wind sector. Installed wind capacity rose from about 20 MW in 2005 to 1.320 GW in 2010, 4.503 GW in 2015, 8.838 GW in 2020, and 11.806 GW in 2023 (KPMG & APLUS Enerji, 2024). The 2025 national total of 14.774 GW extends this trajectory (MENR, 2026a). Figure 4 shows these selected observations. The sector's current significance therefore reflects sustained accumulation of capacity over two decades, rather than only the most recent year of construction.

Generation developed alongside capacity. The IEA (2021) reports an increase in wind electricity generation from below 1.5 TWh in 2009 to 21.8 TWh in 2019, when wind supplied 7.2% of national electricity generation. The approximately 11% share reported for 2025 indicates its greater role in the electricity mix (MENR, 2026c). The comparison describes a structural change across years; it does not imply that output rises proportionately with installed capacity every year, since wind conditions and commissioning dates also influence annual production.

Figure 4: Development of installed wind capacity in Türkiye, selected years (GW)



Source: KPMG and APLUS Enerji (2024); MENR (2026a).

Resource conditions support further development, particularly in western Türkiye and the Aegean region. The ministry's Wind Energy Potential Atlas, REPA, estimates 57.786 GW of land-based potential under specified assumptions, including average wind speeds above 6.5 m/s at 100 metres and suitable land at elevations up to 3,000 metres. It separately estimates 20.788 GW offshore under its stated wind-speed and water-depth assumptions (MENR, 2024). These estimates are screening results, not inventories of permitted or commercially viable projects. The ministry explicitly requires site investigation and reliable wind measurements before investment decisions.

Converting this resource base into operational projects requires site-level decisions. Wind measurements establish expected output, environmental and land-use assessments determine site suitability, and connection studies establish how electricity will reach the network. Access and construction requirements also affect investment costs. Accordingly, the distance between installed capacity and the REPA estimate is best understood as a development opportunity subject to these conditions. It cannot be interpreted as a volume of projects already available for construction. This need for site-specific assessment is consistent with MENR's (2024) guidance on the use of REPA.

Onshore wind provides the immediate basis for expansion. Offshore wind represents a prospective additional segment: in May 2026, MENR identified four offshore areas around Saros, Gökçeada, Bozcaada, and Edremit and stated an ambition of 5 GW by 2035, with a first offshore YEKA tender to follow permitting (MENR, 2026b). This announcement is evidence of a development intention, not commissioned offshore generation. Offshore projects should accordingly be considered alongside, rather than substituted for, the near-term delivery requirements of the established onshore sector.

3.3. Climate and Energy Policy Framework

Türkiye's policy framework combines investment support with longer-term energy and climate planning. In their comparative analysis of Türkiye and European Union countries, Altürk and Zaimoğlu (2020) relate renewable-energy development to supply diversification and climate-policy objectives. YEKDEM, the Renewable Energy Sources Support Mechanism, has supported renewable investment through electricity purchase arrangements. YEKA, the Renewable Energy Resource Areas model, organizes larger projects through competitive allocation and connects renewable deployment with domestic industrial development (Presidency of Climate Change, 2024b). Their economic roles differ: purchase support addresses revenue conditions, while resource-area tenders organize a project pipeline and the allocation of development opportunities. Table 1 summarizes these instruments alongside the main planning documents.

The January 2025 YEKA RES-2024 competition allocated 1.2 GW of wind connection capacity across five areas, with applications from 40 companies (MENR, 2025). This provides evidence of investor interest in the opportunities offered. From a policy perspective, the subsequent completion of the projects is equally important: awarded capacity must obtain finance and pass through the remaining development stages before it supplies electricity. Tender outcomes should therefore be assessed through both allocation and commissioning, with attention to the time between them.

Planning targets have also evolved. The 2022 National Energy Plan set out 29.6 GW of wind capacity for 2035, including 24.6 GW onshore and 5 GW offshore, alongside 52.9 GW of solar capacity (MENR, 2022). Table 3 of the 2053 Long-Term Climate Strategy subsequently presented 43.1 GW of wind and 76.9 GW of solar for 2035 (Presidency of Climate Change, 2024b). Their sum is the 120 GW combined wind-and-solar ambition reiterated by MENR in 2026 (MENR, 2026b). The older 29.6 GW figure remains relevant to the evolution of planning, but should not be presented as the sole current reference for wind expansion.

Table 1: Main instruments and planning references for wind development

Instrument / document	Role and relevant reference
YEKDEM	Purchase support for renewable generation; revenue arrangements support investment.
YEKA	Competitive allocation of renewable resource areas; links project development with domestic industry.
National Energy Plan (2022)	2035 planning figures: 29.6 GW wind and 52.9 GW solar.
Mitigation Strategy and Action Plan (2024–2030)	Actions on wind capacity, YEKA, storage and demand-side participation.
2053 Long-Term Climate Strategy (2024)	Net-zero direction; 43.1 GW wind and 76.9 GW solar for 2035.
Second NDC (2025)	Economy-wide 2035 emissions objective, alongside the 2053 net-zero ambition.

Source: MENR (2022); Presidency of Climate Change (2024a, 2024b); Republic of Türkiye (2025).Authors' synthesis.

The Climate Change Mitigation Strategy and Action Plan 2024–2030 includes actions to increase wind capacity, expand YEKA applications, and develop storage and demand-side participation (Presidency of Climate Change, 2024a). The 2053 strategy places renewable electricity within a wider transformation involving electrification and energy efficiency (Presidency of Climate Change, 2024b). More recently, Türkiye's Second Nationally Determined Contribution set a 2035 net greenhouse-gas emissions objective of 643 Mt CO_2 equivalent, including land use, land-use change, and forestry, representing a reduction of 466 Mt relative to its business-as-usual scenario (Republic of Türkiye, 2025). This is a comparison with a projected baseline, not an equivalent reduction from present emissions.

Taken together, the documents establish direction but leave an implementation task. Investment mechanisms must produce projects at a pace consistent with the capacity ambitions, and the electricity system must be able to use their output. The relationship with climate policy should also be assessed through generation and emissions outcomes. A domestic energy source can improve supply security without necessarily reducing emissions, as the example of domestic fossil fuels illustrates. Wind can serve both objectives when its output replaces more carbon-intensive generation and supports the electrification of energy use.

4. KEY CHALLENGES AND FUTURE PROSPECTS

4.1. Key Challenges

Network development is a concrete requirement in the Turkish case. In August 2025, the World Bank approved financing for the Transforming Power Transmission System Project, including a €625 million loan from the International Bank for Reconstruction and Development (IBRD). The project supports transmission expansion and modernization, grid management, and institutional capacity at the Turkish Electricity Transmission Corporation (TEİAŞ) (World Bank, 2025). MENR also announced approximately US$30 billion of planned investment in transmission infrastructure by 2035 (MENR, 2026b). These initiatives demonstrate recognition of the integration requirement; they do not show that all planned reinforcement is already available.

The practical challenge is to deliver network capacity at the locations and times required by new generation. Resource quality and connection availability need not coincide geographically. If a wind farm is completed before the necessary network reinforcement, expenditure can precede the expected electricity revenues. The analysis therefore points to coordinated schedules for capacity allocation, substations, and transmission lines. Expanding

wind and solar together increases the importance of planning their combined network requirements, including periods when output is simultaneously high. The IEA (2021) similarly identifies network expansion and system flexibility as priorities for integrating more variable renewable generation in Türkiye.

Permitting is a second implementation issue. WindEurope (2026) reports that Türkiye's 2025 permitting reforms are expected to shorten preliminary licensing considerably. This is an expected effect, rather than evidence that the reduction has already been achieved across the sector.

Faster authorization also requires coordination with environmental assessment and local land-use decisions. Removing uncertainty about procedures can help investors plan expenditure, but a shorter timetable does not establish that a site is appropriate. Effective policy should clarify the information required, institutional responsibilities, and the sequence of decisions. The objective is to reach defensible decisions predictably, allowing viable projects to proceed while unsuitable proposals are identified before substantial capital is committed.

Financing connects administrative predictability with project economics. Because wind projects require substantial expenditure before electricity sales begin, delays can increase financing costs and postpone revenue generation. IRENA (2026) identifies financing conditions as an important influence on renewable generation costs. For Türkiye, the implication is that a good wind resource and an internationally competitive technology do not by themselves establish an investable project. Expected revenues, construction and connection schedules, and the allocation of risk must also support the financing arrangement.

YEKDEM and YEKA can address parts of this problem through revenue arrangements and a visible sequence of investment opportunities. Their effectiveness depends on the terms applying to each project and on delivery of the associated infrastructure. Stable rules can reduce uncertainty over future cash flows, while predictable tender schedules can support planning by developers and equipment suppliers. IRENA (2026) identifies stable revenue arrangements as a means of reducing financing risk.

Finally, a larger wind fleet increases the importance of flexibility and coordinated system operation. Periods of low wind require other available supply or an adjustment in demand; periods of abundant output require sufficient network capacity and a use for the electricity. Storage and demand-side participation feature in the 2024–2030 mitigation plan as complementary measures (Presidency of Climate Change, 2024a). Their contribution depends on operating characteristics and location. The appropriate combination should be evaluated using generation and demand profiles, rather than inferred from installed-capacity totals alone.

4.2. Future Prospects

Türkiye has an established onshore sector from which further expansion can proceed. The immediate task is to sustain a flow of viable projects and coordinate their financing, authorization, construction, and connection. Monitoring these stages separately would make the development pipeline more informative. A growing volume of applications can indicate interest, while a growing volume of commissioned projects demonstrates delivery. Differences between the two provide a basis for identifying where policy or infrastructure requires adjustment.

An illustrative calculation indicates the scale of delivery required. Increasing capacity from the national year-end 2025 total of 14.774 GW to the long-term strategy's 43.1 GW figure would require approximately 28.3 GW of net additions by 2035, or an average of 2.8 GW annually over 2026–2035 (MENR, 2026a, and Presidency of Climate Change, 2024b). This benchmark does not assume an even construction schedule or predict that the target will be achieved. Any retirements would also increase the gross construction needed. It indicates the sustained investment and infrastructure delivery implied by the planning ambition.

Near-term policy should support continuity in onshore development while preparing offshore projects according to their distinct requirements. Offshore preparation should address site information, permitting, marine infrastructure, and grid connections before the capacity ambition is treated as deliverable supply. For both segments, publishing the relationship between planned projects and network investment would improve the transparency of the development pathway. Such information would also help distinguish projects awaiting connection from projects that have not secured finance or completed authorization.

Progress should be evaluated through commissioned capacity, electricity generated and delivered, project completion times, and changes in fossil generation. Each measure addresses a different part of the transition. Together, they would show whether investment is increasing the productive asset base, whether the network is using it effectively, and whether development procedures are delivering projects predictably. Assessing import

and emissions effects would then require analysis of the generation displaced and the demand served. This would connect the sector's growth to the energy-security and climate objectives used to justify public support.

Long-term alignment also requires attention to demand. Efficiency can moderate the volume of additional generation required, while electrification can increase electricity use and reduce fossil-fuel consumption elsewhere. Wind planning should therefore be connected to scenarios for industrial activity, transport, and heating, rather than evaluated only against a capacity target. The policy challenge is to sustain investment in wind while ensuring that its output contributes to a reliable electricity system and measurable progress toward climate and energy-security objectives. These priorities are consistent with the long-term strategy's combined emphasis on renewable electricity, electrification, and energy efficiency (Presidency of Climate Change, 2024b).

5. CONCLUSION

Türkiye has developed a substantial wind sector and occupies an important position within the European market. Its national wind capacity reached approximately 14.8 GW at the end of 2025, and wind supplied around 11% of annual electricity generation. The expansion reflects a sustained increase in the scale of the sector, supported by renewable investment mechanisms and a policy emphasis on domestic energy resources. At the same time, the continued contribution of coal and natural gas shows that renewable capacity growth has not completed the electricity transition.

The answer to the research question rests on the interaction of demand growth, domestic resource availability, investment support, and evolving energy and climate ambitions. YEKDEM and YEKA address important parts of the investment process, while national plans provide a longer-term direction. Their effectiveness ultimately depends on the delivery of projects and the infrastructure needed to connect and operate them. Resource estimates and policy targets cannot be interpreted as equivalent to available generation.

Further growth therefore requires coordinated transmission development, predictable authorization, and financing arrangements suited to project delivery. Its contribution to energy security and decarbonization should be assessed through actual electricity output and the fossil energy it displaces. The evidence supports the conclusion that wind can contribute to diversification and reduced exposure to external fuel supply risks when expansion is integrated with the wider electricity system and long-term energy planning.

REFERENCES

Alodalı, M. F. B., Kocaoğlu, M., & Usta, S. (2020). Türkiye'de enerji politikaları ve bölgesel işbirliğinin önemi. *Paradoks Ekonomi Sosyoloji ve Politika Dergisi, 16*(2), 189–202. https://dergipark.org.tr/tr/pub/paradoks/article/786216

Altürk, O., & Zaimoğlu, Z. (2020). Türkiye ve Avrupa Birliği devletlerinde enerji ve iklim politikalarının analizi. *Çukurova Üniversitesi Fen ve Mühendislik Bilimleri Dergisi, 39*(7), 115–123. https://fbe.cu.edu.tr/storage/fbeyedek/makaleler/2020/T%C3%9CRK%C4%B0YE%20VE%20AVRUPA%20B%C4%B0RL%C4%B0%C4%9E%C4%B0%20DEVLETLER%C4%B0NDE%20ENERJ%C4%B0.pdf

Global Wind Energy Council. (2025). *Global wind report 2025.* https://www.gwec.net/reports/globalwindreport/2025

Global Wind Energy Council. (2026). *Global wind report 2026.* https://www.gwec.net/reports/globalwindreport

International Energy Agency. (2021). *Turkey 2021: Energy policy review.* https://www.iea.org/reports/turkey-2021

International Renewable Energy Agency. (2026). *Renewable power generation costs in 2025.* https://www.irena.org/Publications/2026/Jul/Renewable-Power-Generation-Costs-in-2025

KPMG & APLUS Enerji. (2024). *Enerji sektör raporu 2024.* https://assets.kpmg.com/content/dam/kpmgsites/tr/pdf/2026/sekt%C3%B6rel-bak%C4%B1%C5%9F-2024/kpmg-aplus-enerji-sekt%C3%B6r-raporu.pdf

Ministry of Energy and Natural Resources. (2022). *Türkiye national energy plan.* https://enerji.gov.tr/Media/Dizin/EIGM/tr/Raporlar/TUEP/T%C3%BCrkiye_National_Energy_Plan.pdf

Ministry of Energy and Natural Resources. (2024, December 26). *Wind.* https://www.enerji.gov.tr/bilgi-merkezi-enerji-ruzgaren

Ministry of Energy and Natural Resources. (2025, January 28). *YEKA RES-2024 yarışması sonuçlandı.* https://www.enerji.gov.tr/haber-detay?id=21442

Ministry of Energy and Natural Resources. (2026a, January 21). *Elektrik üretim ve tüketiminde rekor.* https://enerji.gov.tr/haber-detay?id=31716

Ministry of Energy and Natural Resources. (2026b, May 12). *2026 will be the year of wind.* https://enerji.gov.tr/news-detail?id=31825

Ministry of Energy and Natural Resources. (2026c, September 18). *Electricity.* https://www.enerji.gov.tr/infobank-energy-electricity

Presidency of Climate Change. (2024a). *Climate change mitigation strategy and action plan 2024–2030.* https://iklim.gov.tr/db/turkce/icerikler/files/CLIMATE%20CHANGE%20MITIGATION%20STRATEGY%20AND%20ACTION%20PLAN%20_EN(1).pdf

Presidency of Climate Change. (2024b). *Türkiye's 2053 long-term climate strategy.* https://iklim.gov.tr/db/english/dokumanlar/turkiye----8230-3142-20241113112451.pdf

Republic of Türkiye. (2025). *The second nationally determined contribution of Türkiye.* https://unfccc.int/sites/default/files/2025-11/The%20Second%20NDC%20of%20T%C3%BCrkiye.pdf

WindEurope. (2025). *Wind energy in Europe: 2024 statistics and the outlook for 2025–2030.* https://windeurope.org/data/products/wind-energy-in-europe-2024-statistics-and-the-outlook-for-2025-2030/

WindEurope. (2026). *Wind energy in Europe: 2025 statistics and the outlook for 2026–2030.* https://windeurope.org/data/products/wind-energy-in-europe-2025-statistics-and-the-outlook-for-2026-2030/

World Bank. (2025, August 4). *World Bank and Clean Technology Fund support Türkiye's renewable energy goals with power transmission project.* https://www.worldbank.org/en/news/press-release/2025/08/04/world-bank-and-clean-technology-fund-support-turkiye-s-renewable-energy-goals-with-power-transmission-project

Identification of the Optimal Crop Production Structure in Slovakia's Production Regions under Uncertainty

Jozef Repiský[1] **Denisa Lakatová[2]**

[1] Department Statistics, Operation Research and Mathematics, Faculty of Economics and Management, Slovak University of Agriculture in Nitra, jozef.repisky@uniag.sk, ORCID: 0000-0002-3053-6784

[2] Semikron Danfoss s.r.o., Šteruská 3, Vrbové, denisa.lakatova@gmail.com

Abstract: This study examines the potential to improve the economic performance of crop production by optimizing the allocation of land among individual crops. The aim is to identify an appropriate crop production structure for four production regions of Slovakia under conditions of uncertainty. In this context, decision-making under uncertainty refers to situations in which the probabilities of possible states of nature are unknown. The analysis applies specific game-theoretic models in which nature, represented by its possible states, acts as the decision maker's opponent. The objective functions of the linear programming models are based on three decision criteria named after their authors: Wald, Savage, and Agrawal–Heady. Each criterion adopts a different approach to uncertainty and therefore offers the decision maker a distinct perspective on the selection of the optimal alternative. The constraints arise both from the methodologies underlying these models and from requirements concerning the minimum shares of individual crops in the crop rotation. Consequently, only approximately 15% of the total arable land can be allocated without being subject to minimum crop-rotation constraints.

Alternative solutions are estimated both with and without subsidies included in the revenues generated by individual commodities. The economic efficiency of individual crops under each criterion is evaluated using the surplus variables from the primal solution, which indicate the extent to which the minimum required area of a particular crop is exceeded, as well as the corresponding dual prices. The results indicate that the optimal crop production structure depends on the applied decision criterion. For each criterion, optimal production structures and the corresponding objective-function values are identified both with and without subsidies. Crop efficiency also differs across production regions and decision criteria. For each production region and each criterion, the analysis identifies market crops that are economically beneficial to cultivate beyond their required minimum area and crops for which cultivation above this threshold is not economically advantageous. These effects are quantified by determining the extent to which it is beneficial to exceed the prescribed minimum area and by measuring the change in the value of the relevant criterion resulting from a 1% change in the area allocated to a given crop. The effects of a potential 1% increase or decrease in the total area of arable land are also quantified.

The applied models provide a useful decision-support tool for crop production planning under uncertainty because they enable the systematic evaluation of alternatives without requiring knowledge of the probabilities of future states of nature. The appropriate criterion depends on the decision maker's attitude towards uncertainty. A conservative decision maker is likely to prefer the Wald criterion; a decision maker seeking to minimize the potential regret associated with an incorrect decision may prefer the Savage criterion; and one seeking to maximize relative profit compared with the worst possible outcome may prefer the Agrawal–Heady criterion.

Keywords: game theory models, Wald's, Savage's, and Agrawal-Heady's criteria, linear model

1. INTRODUCTION

Effective decision-making regarding the structure of crop areas is a crucial tool for ensuring the economic stability of agricultural enterprises. The proper configuration of the production structure can significantly influence profitability, risk levels, and the long-term sustainability of farming operations. However, business entities constantly face situations where they lack complete information about future developments, which significantly impacts the quality of their decisions. This issue is particularly pronounced in agriculture, as production is heavily dependent on external factors such as climatic conditions, commodity price trends, and subsidy policies. In this context, decision-making methods applicable under conditions of uncertainty play a vital role, enabling the systematic evaluation of various alternatives without requiring knowledge of the probabilities of future outcomes. Decision-making under uncertainty occurs in situations where the decision-maker knows the possible outcomes of various alternatives but cannot determine the probability of their occurrence. Knight (1921) highlighted the distinction between risk and uncertainty; according to him, risk can be quantified using probabilities, whereas uncertainty cannot be precisely measured. Consequently, decision-making under uncertainty is more complex and often relies on experience, intuition, or estimates of future developments.

The efficiency of the production structure of various types of crops under conditions of uncertainty can be evaluated using a specific game theory models against nature based on the contribution margin per hectare (CM). CM helps to identify which crops contribute most to covering fixed costs and generating profit. Among

other authors, the CM criterion (revenues – variable costs) was used by Taruvinga et al. (2020) when evaluating input efficiency in the form of various fertilizer levels in Chinese cabbage cultivation in South Africa. Similarly, Panta et al. (2022) assessed the efficiency of transitioning from conventional to organic farming in Nepal based on gross margin analysis for five selected crops and 250 producers. The estimated gross margins and cost-benefit analysis showed that organic products were as profitable as conventional ones for most crops.

Neumann and Morgenstern (1944) are considered the founders of modern game theory; they introduced it as a mathematical tool for examining economic and social behavior in situations characterized by interdependence among participants. A significant step in the development of game theory was the contribution of Nash (1951), who focused primarily on so-called non-cooperative games. He introduced the concept of Nash equilibrium—a stable state in which no participant can improve their outcome through a unilateral change. This concept has become one of the most important tools for analyzing strategic behavior. The concept of Nash equilibrium is frequently used to analyze situations where the outcome depends on the behavior of multiple participants. A typical example is a competitive market environment, where firms take the behavior of their competitors into account when determining prices or production quantities (Belleflamme et Peitz, 2021). Nash equilibrium possesses several important properties. One of these is that the players' strategies represent best responses to the decisions made by the other participants in the game. This means that if a player were to change their strategy while the others kept theirs unchanged, their outcome would worsen (Osborne and Rubinstein, 2020). Another important characteristic is that a Nash equilibrium is not necessarily the best collective solution for all players. In some instances, they could achieve a better outcome through cooperation; however, individual decision-making leads them to an equilibrium that is not optimal for everyone. This phenomenon can be observed, for example, in the well-known Prisoner's Dilemma, where rational individual decision-making results in a less favorable outcome for both players (Belleflamme et Peitz, 2021). Currently, the Nash equilibrium is also employed in conjunction with modern approaches such as experimental or behavioral economics. These approaches facilitate a better understanding of individual behavior in strategic situations and allow for the analysis of how equilibrium outcomes shift under varying economic conditions (Fudenberg et Tirole, 2016). A more comprehensive treatment of modern game theory is provided, for instance, by Myerson (1991), who focuses on analyzing conflict and cooperation among rational agents.

A specific part of game theory is represented by models in which the opponent is nature, with its states. The methodology of games against nature has also been developed in the field of agricultural decision-making. Rehman and Romero (2006) propose linking games against nature with goal programming, thereby creating a more realistic model of decision-maker behavior. This approach allows for the combination of various decision criteria—such as maximin or minimax regret—to better reflect decision-making under conditions of uncertainty. In the field of environmental conservation, Colyvan et al. (2011) demonstrate that many biodiversity conservation problems can be modeled as games, including games against nature. This approach enables the identification of optimal strategies amidst conflicting interests and supports adaptive ecosystem management. Ermon et al. (2012) to the allocation of renewable resources developed a model based on Markov decision processes that enables the identification of optimal resource management strategies with a guaranteed lower bound on utility. This approach is applied, for instance, to fisheries management in the North Pacific. In the context of the mining industry, Krzak (2013) applies games against nature to evaluate investments in the development of mineral deposits. The methodology enables sequential decision-making across project phases and the reduction of investment risk through improved assessment of uncertainties. In the field of transport engineering, Schmöcker et Fonzone (2015) apply the principles of games against nature to route choice decision-making. The model accounts for risk aversion and the uncertainties associated with traffic incidents. At the same time, the authors distinguish between games against nature and games against "demons," noting that, in practice, there is often partial information regarding risks. The methodology of games against nature is also employed in quantifying the security of a molecular program against malicious manipulations of its relative clock speed (Lutz et al., 2019). In this scenario, the molecular program's opponent perturbs clock speeds randomly according to the probabilities inherent in chemical kinetics. The robustness of a molecular program is quantified in terms of its ability to win in games against other molecular programs that manipulate its relative clock speeds. In the energy sector, for example, game theory has been applied to analyze the transition of the nuclear fuel cycle. Phathanapirom et al. (2020) model this process as a sequential game against nature, taking into account the interactions between a policymaker and an energy company. The results indicate that optimal strategies depend heavily on the probability distribution of technological and economic uncertainties. Hirschprung et Alkoby (2022) in the digital environment model information sharing as a game in which users weigh benefits against risks. They propose using artificial intelligence to support user decision-making, with results showing an increase in the overall utility of decisions. Vazirani (2023) to the field of investment presents an investment game

in which a single player allocates capital among various investment options to prepare for different future scenarios. This model extends the concept of the core from cooperative game theory to new types of decision-making problems. Freitas et al. (2024) model financial markets as a game. They generate predictions using Markov chain estimates. One player is a speculator whose strategies depend on their own risk and profit preferences, while the market represents the other player. Markov chains and their transition matrices are used to estimate mixed market probabilities, which are subsequently employed to identify the speculator's optimal strategy. Applying the game-theory model to real-time market data confirms the model's strong performance in terms of accuracy and profitability.

The topic of the research is based on the possibility of improving the economic results the economic performance of crop production by optimizing the allocation of land among individual crops. The aim of the paper is to identify an appropriate crop production structure for four production regions of Slovakia under conditions of uncertainty. In the field of agriculture, the most frequently used criteria for decision-making under conditions of uncertainty—specifically in "games against nature"—include the Wald criterion, the Savage criterion, and the Agrawal-Heady criterion. Each of these criteria is based on a different approach to risk and uncertainty and offers the decision-maker a distinct perspective on selecting the optimal alternative (Hillier et Lieberman, 2021).

2. RESEARCH METHODES

The stated objective of the study indicates that, under conditions of uncertainty, the decision-maker lacks information regarding the probabilities of specific states of nature. In such situations, it is necessary to employ specific decision criteria that allow for the selection of a suitable alternative even without knowledge of the probability distribution of future events. The article applies three types of game-theory models based on the Wald, Savage, and Agrawal-Heady criteria.

2.1. Wald's criterion

Wald's criterion is one of the fundamental methods for decision-making under conditions of uncertainty and is based on a pessimistic approach by the decision-maker. It assumes that the most unfavorable environmental state will occur, therefore, it seeks to select the alternative that ensures the best possible outcome even in the worst-case scenario. Solving game theory problems using mixed strategies is identified using a linear programming model.

$$\max v \tag{2.1}$$

$$\sum_{i=1}^{m} p_i a_{ij} \geq v \qquad (j = 1, 2, ..., n) \tag{2.2}$$

$$\sum_{i=1}^{m} p_i = 1 \qquad p_i \geq 0 \quad (i = 1, 2, ..., m) \tag{2.3}$$

where: v – expected gross profit per hectare

p_i – probability of decision alternative i

a_{ij} – gross profit of alternative i under given state of nature j

$i - 1,2,\dots,m$ individual decision alternatives

$j - 1,2,\dots,n$ possible states of nature

2.2. Savage's criterion

Savage's criterion, also known as the minimum loss criterion, is based on the concept of minimizing the loss resulting from an incorrect decision. Unlike Wald's criterion, this method does not operate directly with the original gross profit values but rather with the value of the so-called loss. Loss represents the difference between the best possible outcome for a given state of nature and the outcome the decision-maker would achieve by choosing a specific alternative. The decision-maker's goal is, therefore, to minimize the maximum possible loss.

This approach is particularly suitable for decision-makers seeking to minimize the potential negative consequences of an incorrect decision (Taha, 2017). The mathematical formulation of the model can be expressed as follows:

$$\min s \tag{2.4}$$

$$\sum_{i=1}^{m} p_i s_{ij} \leq s \qquad (j = 1, 2, ..., n) \tag{2.5}$$

$$\sum_{i=1}^{m} p_i = 1 \qquad p_i \geq 0 \quad (i = 1, 2, ..., m) \tag{2.6}$$

where: s – expected loss per hectare (loss relative to the best option for the given state of nature)

p_i – probability of decision alternative i

$s_{ij} = max_i(a_{ij}) - a_{ij}$ loss for alternative i under given state of nature j

2.3. Agrawal - Heady criterion

The Agrawal-Heady criterion is a relative profit criterion. Like Savage's criterion, it does not operate directly with the original gross profit values but rather with the value of so-called relative profit. Relative profit represents the difference between the outcome a decision-maker would achieve by choosing a specific alternative and the worst possible outcome for a given state of the environment. The objective is, therefore, to maximize the minimum relative profit. The model based on this criterion can be formulated as follows:

$$\max z \tag{2.7}$$

$$\sum_{i=1}^{m} p_i z_{ij} \geq z \qquad (j = 1, 2, ..., n) \tag{2.8}$$

$$\sum_{i=1}^{m} p_i = 1 \qquad p_i \geq 0 \quad (i = 1, 2, ..., m) \tag{2.9}$$

where: z – expected relative profit per hectare (profit compared to the worst-case scenario under the given state of nature)

p_i – probability of decision alternative i

$z_{ij} = a_{ij} - min_i(a_{ij})$ relative profit for alternative i under given state of nature j

In addition to the constraints inherent in the modeling methodology, the linear programming models incorporate conditions regarding the minimum share of specific crops within the crop rotation. Only about 15% of the land area is not subject to minimum crop rotation share constraints. Furthermore, the models include conditions limiting the maximum share of certain selected crops that would otherwise reach cultivation areas significantly exceeding current actual levels. Alternative solutions are generated not only by applying three model types but also by considering—or excluding—subsidies in the returns for individual commodities across Slovakia's various production zones: maize, sugar beet, potato, and mountainous regions. Beyond identifying the production structure and objective function values, the efficiency of individual crops can be assessed against the given criteria using both the slack variables from the primal solution (reflecting the extent to which minimum cultivation thresholds are exceeded) and dual prices. Input data were sourced from reports by the Ministry of Agriculture of the Slovak Republic covering the period from 2010 to 2024; however, data for 2016 and 2017 were excluded from the analysis due to poor data collection and the resulting lack of publication.

3. RESEARCH RESULTS AND DISCUSSION

To identify a suitable production structure for specific production areas, we base our analysis on data regarding the actual composition of arable land in the given area and the subsequent quantification of gross profit per hectare (revenue minus direct costs) over the periods under review. Based on these input data, we identify optimal production structures using model-based solutions derived from the methodological requirements associated with specific criteria.

3.1. Maize-growing region

The maize-growing region is located primarily in the warmest parts of Slovakia. This area is characterized by low elevations, warm climatic conditions, and fertile soils—specifically chernozems. It is one of Slovakia's most productive agricultural regions, accounting for approximately 30% to 35% of the country's agricultural land.

Results based on the Wald criterion

The model variables represent the percentage share in the crop rotation:

Wheat (x_1)	Edible peas (x_6)	Sunflower (x_{11})
Rye (x_2)	Other cereals (x_7)	Rapeseed (x_{12})
Barley (x_3)	Green maize (x_8)	Sugar beet (x_{13})
Oats (x_4)	Other annual forage crops (x_9)	
Grain maize (x_5)	Perennial forage crops (x_{10})	

Objective function: max v

(maximization of gross profit per hectare)

Constraints:

(expected gross profit in the respective state of nature ≥ v)

2010: $317{,}85x_1 + 146{,}86x_3 + 297{,}39x_4 + 599{,}82x_5 + 144{,}88x_6 + - 76{,}01x_8 + 47{,}25x_9 + 12{,}66x_{10} + 493{,}0x_{11} + 432{,}24x_{12} + 995{,}06x_{13} - v \geq 0$

(coefficients represent the gross profit per hectare of individual crops in a given year)

2011: $239{,}62x_1 + 190{,}36x_3 + 228{,}72x_4 + 749{,}75x_5 + 160{,}28x_6 - 104{,}75x_8 + 35{,}09x_9 + 18{,}39x_{10} + 548{,}19x_{11} + 332{,}44x_{12} + 1\ 133{,}62x_{13} - v \geq 0$

……

……

2023: $434{,}67x_1 - 541{,}91x_2 + 443{,}48x_3 - 9{,}39x_4 + 86{,}12x_5 + 277{,}37x_6 + 353{,}67x_7 + 788{,}4x_8 - 399{,}03x_9 + 118{,}87x_{10} + 469{,}12x_{11} + 839{,}95x_{12} + 646{,}8x_{13} - v \geq 0$

2024: $489{,}62x_1 + 245{,}92x_3 + 235{,}67x_4 + 623{,}38x_5 - 320{,}28x_6 + 67{,}08x_7 + 523{,}69x_8 + 116{,}26x_{11} + 829{,}37x_{12} +$

$1\ 294{,}73x_{13} - v \geq 0$

arable land: $x_1 + x_2 + x_3 + x_4 + x_5 + x_6 + x_7 + x_8 + x_9 + x_{10} + x_{11} + x_{12} + x_{13} = 1$

(the sum of the probabilities must equal 1)

The remaining conditions regarding the minimum or maximum representation of individual crops in the crop rotation, along with the solutions for the associated slack and dual variables, are presented in Table 1.

Under the specified conditions, a maximum gross profit of €310.32 per hectare can be achieved, a figure that already includes subsidies for individual crops. The optimal cropping pattern for the maize production zone is as follows: 26.90% wheat, 0.21% rye, 23.08% barley, 0.23% oats, 14.39% grain maize, 1.52% edible peas, 0.18% other cereals, 12.24% crops for animal fattening, 7.01% sunflowers, 9.57% rapeseed, and 4.65% sugar beet. The model solution indicates that most crops should be grown at the minimum required level; the exceptions are barley—whose share would exceed the minimum threshold by 12.77 percentage points—and sugar beet, whose

share would exceed the required value by 0.38 percentage points. Model sensitivity analysis shows that a 1% increase in arable land area would result in a profit increase of €4 per hectare. Since the shadow prices associated with the minimum crop representation requirements are negative—with the exception of barley and sugar beet—relaxing the constraint on the maximum share of cereals would likely lead to a further increase in the cultivation of these two commodities. Based on the model's input values, increasing the share of wheat by 1% would result in a decrease in total average profit of €0.78 per hectare. Crops such as rye, other cereals, green maize, and other annual forage crops exhibit the highest shadow prices; increasing their share by 1% would cause a reduction in average profit ranging from €0.36 to over €4.8 per hectare.

Table 1: Constraints for minimum or maximum crop representation and the corresponding slack and shadow prices in the solution based on Wald's criterion

Name	Relational operators	Constraint right hand side	Slack	Shadow price
Wheat	≥	0,2690	0	-78,12
Rye	≥	0,0021	0	-444,33
Barley	≥	0,1030	0,1278	0
Oats	≥	0,0023	0	-158,4
Grain maize	≥	0,1439	0	-213,7
Other cereals	≥	0,0018	0	-444,3
Edible peas	≥	0,0152	0	-254,78
Green maize	≥	0,0568	0	-479,84
Other annual forage crops	≥	0,0077	0	-478,03
Perennial forage crops	≥	0,0579	0	-310,55
Sunflower	≥	0,0701	0	-118,91
Rapeseed	≥	0,0957	0	-36,67
Sugar beet	≥	0,04264	0,0039	0
Cereals	≥	0,45	0,2	0
Perennial forage crops	≤	0,060	0,0021	0
Sugar beet	≤	0,060	0,0135	0
Cereals	≤	0,65	0	44,27
Arable land	=	1	0	400,06

Source: authors' calculations

If subsidies are excluded from consideration, the maximum gross profit drops to €99.12 per hectare. The elimination of subsidies would result in a profit decrease of €211.20 per hectare. The most significant changes occur with barley and grain maize; the share of barley falls from an initial 23.08% to 11.74%, whereas the share of grain maize rises sharply from 14.39% to 25.74%. In this instance, the shadow prices associated with minimum crop representation requirements are negative, once again confirming—based on Wald's criterion—the advisability of reducing the cultivation areas for these commodities (with the exception of grain maize).

Results based on the Savage criterion

In this case, the objective function is the minimization of loss per hectare—specifically, the loss relative to the best option for the given state of nature. The coefficients in the constraints represent the loss per hectare for individual crops in a given year—the loss relative to the best option for that year. The remaining constraints are identical to those in the previous model and are listed in Table 2, along with the slack and shadow variables.

Based on the primary solution, it is advantageous to cultivate crops with the following proportions: wheat 26.90%, rye 0.50%, barley 10.30%, oats 7.96%, grain maize 14.39%, edible peas 0.18%, green maize 5.67%, other annual forage crops 0.77%, perennial forage crops 5.79%, sunflowers 8.00%, rapeseed 12.00%, and sugar beet 6.00%.

Rapeseed, sunflowers, and sugar beet—along with oats and rye among the cereals—contributed positively to reducing the loss (Table 2). In the optimal solution, these crops have a higher share than the required minimum. Specifically, for sugar beet, a further 1% increase in the maximum share would reduce the loss by €16.4 per hectare. It is worth reducing the acreage of the other crops. For instance, a 1% increase in pea acreage would lead to a loss increase of €2.2 per hectare, while for wheat and grain maize, the increase would be €0.7 per hectare. In this scenario, a 1% increase in arable land area would worsen the value of the objective function.

Table 2: Slack and shadow prices in the solution based on Savage's criterion

Name	Relational operators	Constraint right hand side	Slack	Shadow price
Wheat	≥	0,2690	0	68,47
Rye	≥	0,0021	0,0028	0
Barley	≥	0,1030	0	104,36
Oats	≥	0,0023	0,0773	0
Grain maize	≥	0,1439	0	71,22
Other cereals	≥	0,0018	0	364,51
Edible peas	≥	0,0152	0	222,86
Green maize	≥	0,0568	0	479,98
Other annual forage crops	≥	0,0077	0	6,66
Perennial forage crops	≥	0,0579	0	289,17
Sunflower	≥	0,0701	0,0098	0
Rapeseed	≥	0,0957	0,0242	0
Sugar beet	≥	0,04264	0,0173	0
Cereals	≥	0,45	0,1524	0
Perennial forage crops	≤	0,060	0,0021	0
Sugar beet	≤	0,060	0	-1638,77
Cereals	≤	0,65	0,0476	0
Arable land	=	1	0	1638,77

Source: authors' calculations

In the no-subsidy variant the most significant change occurs with wheat, the share of which rises from 26.90% to 35.91%, representing an increase of 9 percentage points. Conversely, the share of rye falls to 0.21% and that of oats to 0.23%. Other crops remain at approximately the same levels as in the model with subsidies. Rapeseed and sugar beet once again contributed positively to reducing the loss.

Results based on the Agrawal-Heady criterion

The objective function is represented by the maximization of relative profit per hectare—defined as profit relative to the worst-performing option under the given state of nature. The coefficients in the constraints represent the relative profit per hectare for individual crops in a given year—profit relative to the worst-performing option in that year. The remaining constraints are identical to those in the previous model and are listed in Table 3, along with the slack and dual variables.

Under the given conditions, a maximum relative profit of €387.95 per hectare can be achieved with the following optimal cropping structure: 26.90% wheat, 0.21% rye, 19.81% barley, 0.23% oats, 14.39% grain maize, 1.52% peas, 0.18% other cereals, 5.67% green maize, 0.77% annual forage crops, 5.79% perennial forage crops, 7.02% sunflowers, 11.50% rapeseed, and approximately 6% sugar beet. Barley, rapeseed, and sugar beet contributed positively to the increase in relative profit; in the optimal solution, these crops are represented at levels exceeding their required minimums (Table 3). Increasing the acreage of other crops would be inefficient; for instance, a 1% increase in rye acreage would reduce relative profit by €4.20 per hectare, while a 1% increase for sunflowers would reduce it by €1.10 per hectare, and for wheat by €0.80 per hectare. Conversely, increasing the maximum share of sugar beet by 1% would raise relative profit by €0.30 per hectare. A 1% increase in arable land area would boost relative profit by €4.80 per hectare, whereas a 1% decrease would have the opposite effect.

Table 3: Slack and shadow prices in the solution based on Agrawal-Heady's criterion

Name	Relational operators	Constraint right hand side	Slack	Shadow price
Wheat	≥	0,2690	0	-79,02
Rye	≥	0,0021	0	-423,10
Barley	≥	0,1030	0,0950	0
Oats	≥	0,0023	0	-149,45
Grain maize	≥	0,1439	0	-105,77
Other cereals	≥	0,0018	0	-423,10

Edible peas	≥	0,0152	0	-256,68
Green maize	≥	0,0568	0	-442,48
Other annual forage crops	≥	0,0077	0	-439,27
Perennial forage crops	≥	0,0579	0	-352,37
Sunflower	≥	0,0701	0	-111,10
Rapeseed	≥	0,0957	0,1149	0
Sugar beet	≥	0,04264	0,0173	0
Cereals	≥	0,45	0,1654	0
Perennial forage crops	≤	0,060	0,0021	0
Sugar beet	≤	0,060	0	33,67
Cereals	≤	0,65	0,0345	0
Arable land	=	1	0	485,01

Source: authors' calculations

The optimal cropping structure remains largely similar when subsidies are excluded. The most significant changes occur with barley and rapeseed; the share of barley drops from an initial 19.81% to 10.30%, while the share of rapeseed rises sharply to approximately 21% of the arable land in the maize production zone. These changes indicate a shift in production toward crops with higher market efficiency in the absence of subsidy support. Rapeseed and sugar beet once again contributed positively to increasing relative profit. For other crops, it is advisable to reduce cultivation areas; the only exceptions are rapeseed and sugar beet. In the case of sugar beet, a further 1% increase in its maximum share would even lead to a rise in relative profit of €7.30 per hectare.

3.2. Sugar beet production area

The sugar beet production zone is located in the moderately warm regions of western and central Slovakia, primarily in hilly areas with fertile soils. This zone accounts for approximately 25–30% of Slovakia's agricultural land. Within this production zone, optimization based on the Wald criterion yielded a maximum average gross profit of €118 per hectare, achieved with an optimal cropping structure of 28.67% wheat, 0.31% rye, 15.80% barley, 1.19% oats, 8.30% grain maize, 7.50% edible peas, and 0.73% other cereals. Fodder crops should collectively constitute 18.2% of the total land area. Additionally, sunflowers should account for 1.87%, rapeseed for 13.06%, and sugar beet for 4.37%. Barley and edible peas had a positive impact on the objective function value; it would be advantageous to increase their shares above the minimum threshold by 5.56 and 6.6 percentage points, respectively. It would be appropriate to reduce the shares of other crops; for instance, a 1% reduction in the share of rye and oats would lead to an increase in total average profit of €3.4 per hectare, while a similar reduction for grain maize would result in an increase of €1.6 per hectare. A potential 1% increase in arable land area would not alter the objective function. In the scenario without subsidies, a higher proportion of rapeseed—replacing peas—had a positive effect on the objective function. A higher share of barley and sunflowers also had a positive impact.

Based on Savage's criterion, sugar beet and other cereals contributed positively to minimizing loss. In the optimal solution, these crops appear at a higher share than the required minimum: other cereals by 12.77 percentage points and sugar beet by 0.38 percentage points. Increasing the cultivation area for other crops would worsen the objective function; for instance, a 1% increase in the area of grain maize, wheat, oats, barley, or rye would lead to a rise in loss ranging from €15 to €25 per hectare, depending on the commodity. A 1% increase in arable land area would result in an increase in losses of €11.50 per hectare. In the scenario without subsidies, higher shares of other cereals and sugar beet would again positively influence the value of the objective function.

When applying the Agrawal-Heady criterion, the maximum relative profit reached approximately €340 per hectare. Barley contributed positively to increasing relative profit, as its share in the optimal solution was 12.7 percentage points higher than the required minimum level. Increasing the area of other crops would be inefficient—for example 1% increase in the area dedicated to rye and oats would result in a decrease in relative profit of €3.4 per hectare; for grain maize, the decrease would be €1.5 per hectare; for wheat, €0.8 per hectare; and so on. In this instance, the option of increasing the arable land area by 1% would lead to a positive outcome. In the scenario without subsidies, barley was again the primary contributor to the increase in relative profit, with rapeseed also playing a minor role. Here, a 1% increase in arable land area would result in a relative profit increase of €2.6 per hectare. Conversely, a reduction in the area would lead to a decrease in relative profit per hectare.

3.4. Potato production area

The potato-growing region is located primarily in the cooler areas of Central Slovakia. This region is characterized by higher altitudes, lower temperatures, and higher precipitation levels. It accounts for approximately 20–25% of Slovakia's agricultural land. Based on Wald's criterion, the optimization model achieved a maximum objective function value of €185.66 per hectare. Wheat holds the largest share of the cultivated area at 29.59%, followed by perennial forage crops (16.03%), rapeseed (16.00%), and green maize (14.24%). Barley accounts for 11.70% and grain maize for 8%, while other crops have only a marginal presence, with shares not exceeding 2.13%. Rapeseed, grain maize, and barley had a positive impact on increasing the average gross profit (exceeding the minimum threshold in the optimal solution by 2.8, 3.2, and 4 percentage points, respectively). Increasing the cultivation area for other crops would be inefficient in terms of shadow prices. If the arable land area were increased by 1%, the average profit would rise by €2.80. In the model scenario excluding crop subsidies, rapeseed and wheat are among the market crops that contribute to increasing the average gross profit per hectare (exceeding the minimum threshold in the optimal solution by 2.8 percentage points and 0.7 percentage points, respectively).

Based on Savage's criterion—with an objective function value of €710 per hectare—wheat and rapeseed contributed positively to reducing the loss. In the optimal solution, these crops have a higher representation than the required minimum: wheat by 7.3 percentage points and rapeseed by 2.8 percentage points. It would be advisable to reduce the acreage of other crops that have a positive dual value regarding the minimum crop rotation requirements; for instance, increasing the share of oats by 1% would result in a loss increase of €6.00 per hectare. Increasing the arable land area by 1% would lead to a loss increase of €7.80 per hectare, while a 1% decrease would have the opposite effect. In the scenario without subsidies, rapeseed would again contribute positively to loss reduction, but barley would take the place of wheat.

The maximum relative profit for the third criterion reached the value of €241 per hectare. Barley, grain maize and rapeseed had a positive effect (they exceed the minimum threshold in the optimal solution by 3.5 p.p., by 3.3 p.p., respectively by 2.8 p.p.). In the case of the possibility of increasing the share of oilseed rape by another 1%, the resulting criterion would improve by €4.70 per hectare. In the case of other crops, an increase of 1% leads to a deterioration of the result, for example in the case of rye by approximately €1.49 per hectare and in the case of oats by €1.24 per hectare. The possibility of increasing the area of arable land in the potato area by 1% would lead to an increase in the relative profit per hectare by 1.5 euros, and on the contrary, a decrease in the area by 1% would lead to a decrease in profit by this value. In the variant without subsidies, oats instead of barley had a positive effect on the criterion value, the other two market commodities with a positive effect are corn for grain and canola.

3.4. Mountain production area

The mountainous production area primarily encompasses the northern and northeastern parts of Slovakia, characterized by mountainous and sub-mountainous terrain. It accounts for approximately 15–20% of Slovakia's agricultural land. The optimal solution, based on the first criterion, yields a gross profit of €68.85 per hectare. The resulting crop structure is relatively balanced, with wheat holding the largest share at 22.56%. Perennial forage crops (27.96%) and green maize (14.01%) also represent significant shares. Rapeseed accounts for 6.00%, barley for 8.09%, and other cereals for 8.37%. Other annual forage crops make up 10.04%, oats 2.18%, and rye 0.81%. The primary solution indicates that the gross profit per hectare was positively influenced mainly by "other cereals"—which exceeded the minimum threshold in the optimal solution by 6.1 percentage points—and by rapeseed, which exceeded it by 2.8 percentage points. Sensitivity analysis shows that increasing the share of several crops leads to a poorer outcome: the impact is approximately €1.00 per hectare for each percentage point increase in wheat, €1.21 for rye, and €3.23 for oats. A 1% increase in arable land area would result in a gross profit increase of €2.26 per hectare. In the scenario without subsidies, the production structure and scale remain unchanged, but the gross profit per hectare is negative at -107.5 euros. Even in this scenario, rapeseed and other cereals had a positive impact on increasing gross profit. Reducing the cultivation area of other crops would help mitigate the loss per hectare.

Applying Savage's criterion resulted in an optimal value of €540 per hectare. Barley contributed most positively to loss reduction; it was the only crop in the optimal solution to exceed the required minimum share—specifically by 7.2 percentage points. Increasing the cultivation area for other crops would have worsened the objective function value. For instance, a 1% increase in the area allocated to rapeseed, rye, wheat, or oats would have led to a rise in loss ranging from €1.3 to €5.1 per hectare, depending on the commodity. A 1% increase in total arable

land area would not have altered the objective function value. In the scenario without subsidies, other cereals (with a 6-percentage-point increase) and rapeseed (with a 1-percentage-point increase) contributed positively to loss reduction, taking the place of barley in this regard.

The Agrawal–Heady criterion reached a value of €185 per hectare in the optimal solution. Only "other cereals" contributed positively to increasing the relative average profit, exceeding the minimum representation threshold by 7.2 percentage points. Shadow prices demonstrate the inadvisability of increasing the acreage of other commodities; for instance, increasing the share of rye or oats by 1% would result in a decrease in relative average profit of approximately €4.39 per hectare. Increasing the arable land area in the mountainous region by 1% would lead to a rise in relative profit per hectare of €4.50. A scenario without subsidies would result in a negative objective function value of -€153 per hectare. Wheat, rather than other cereals, would have a positive impact on this indicator.

4. CONCLUSION

The results of the model solutions demonstrated a significant dependence of the optimal production structure on the chosen decision-making criterion. The conservative Wald criterion favored crops with lower yield variability and more stable economic outcomes; it is preferred by highly risk-averse decision makers seeking to hedge against the worst-case scenario. The Savage criterion focused on minimizing potential losses resulting from an incorrect decision; it is typically used by decision makers wishing to avoid an extremely unfavorable outcome compared to the best possible option—essentially aiming to minimize decision errors. The Agrawal-Heady criterion represented a compromise approach, taking into account the relative performance of crops across various environmental conditions. It is employed by entities that consider relative gain—specifically, the advantage their chosen strategy offers over the worst-case alternative. Naturally, the choice of principle depends on the decision-maker's attitude. While a compromise solution incorporating multiple criteria via goal programming is possible, such an analysis lies beyond the scope of this paper.

For each criterion, optimal production structures and the corresponding objective-function values are identified both with and without subsidies. Crop efficiency also differs across production regions and decision criteria. For each production region and each criterion, the analysis identifies market crops that are economically worthwhile to cultivate beyond their required minimum area and crops for which cultivation above this threshold is not economically advantageous. These effects are quantified by determining the extent to which it is worthwhile to exceed the prescribed minimum area and by measuring the change in the value of the relevant criterion resulting from a 1% change in the area allocated to a given crop. The effects of a potential 1% increase or decrease in the total area of arable land are also quantified.

The applied models proved to be effective tools for supporting decision-making under uncertainty in any production area, as they allow for the systematic evaluation of alternatives without requiring knowledge of the probabilities of future states. Their practical application can contribute to a more efficient production structure, optimized economic results, and improved risk management within agricultural enterprises.

REFERENCES

BELLEFLAMME, P., PEITZ, M. (2021): Industrial Organization: Markets and Strategies. 2nd ed. Cambridge: Cambridge University Press.

COLYVAN, M., JUSTUS, J., REGAN, H. M. (2011): The conservation game. Biological Conservation, 144(4), 1246–1253. https://doi.org/10.1016/j.biocon.2010.10.028

ERMON, S.; CONRAD, J., GOMES, C. P., SELMAN, B. (2012): Playing games against nature: optimal policies for renewable resource allocation. CoRR. https://doi.org/10.48550/arxiv.1203.3478

FREITAS, J. C. Y., PINTO, F., FELGUEIRAS, O. (2024): Game Theory for Predicting Stocks' Closing Prices. Mathematics, 12(17), 2676. https://doi.org/10.3390/math12172676

FUDENBERG, D., TIROLE, J. (2016): Game Theory. Cambridge: MIT Press.

HILLIER, F. S., LIEBERMAN, G. J. (2021): Introduction to Operations Research. 11th ed. New York: McGraw-Hill Education.

HIRSCHPRUNG, R., ALKOBY, S. (2022): A Game Theory Approach for Assisting Humans in Online Information-Sharing. Information, Vol. 13, Issue 4, p183, DOI: 10.3390/info13040183

KNIGHT, F. H. (1921). Risk, Uncertainty and Profit. Boston: Houghton Mifflin.

KRZAK, M. (2013): The evaluation of an ore deposit development prospect through application of the games against nature approach. Asia-Pacific Journal of Operational Research, Singapore, Vol. 30, Issue 6, DOI: 10.1142/S0217595913500292

LUTZ, J. H., LUTZ, N., LUTZ, R., RILEY, R. (2019): Robustness and Games Against Nature in Molecular Programming. ICSE-NIER. https://doi.org/10.1109/icse-nier.2019.00025

MYERSON, R. B. (1991): Game Theory: Analysis of Conflict. Cambridge, MA: Harvard University Press.

NASH, J. F. (1951): Non-Cooperative Games. Econometrica, 19(3), 286–295. https://doi.org/10.2307/1907266

NEUMANN, J., MORGENSTERN, O. (1944): Theory of Games and Economic Behavior. Princeton, NJ: Princeton University Press.

OSBORNE, M. J., RUBINSTEIN, A. (2020): A Course in Game Theory. Cambridge: MIT Press.

PANTA, H., REGMI, P., BAHADUR, G., GAUCHAN, D., BHANDRI, H. (2022): Economics of Cereal and Vegetable Crops under Organic and Conventional Production Systems in Nepal. Online. Agricultural Extension Journal [online]. Vol. 6, no. 3.

PHATHANAPIROM, U. B., HAAS, D. A., LEIBOWICZ, B. D. (2020): A game-theoretic approach to nuclear fuel cycle transition analysis under uncertainty. Annals of Nuclear Energy, 137. https://doi.org/10.1016/j.anucene.2019.107112

REHMAN, T., ROMERO, C. (2006): Formulating generalized 'goal games' against nature. Applied Mathematics and Computation, 175, 486–496. https://doi.org/10.1016/j.amc.2005.08.024

SCHMÖCKER, J.-D., FONZONE, A. (2015): Decision Principles for Routing Strategies: Games against Nature and Demons. Asian Transport Studies, 3(4), 362–377. https://doi.org/10.11175/eastsats.3.362

TARUVINGA, B., NDOU, P., RAMUSANDIWA, T. D., SEETSENG, K. a DU PLOOY, C. P. (2020): A stepwise analysis of production returns and cost distribution for Chinese cabbage produced under irrigation in South Africa. Journal of Agricultural Science. Vol. 13, no. 1, p. 88.

VAZIRANI, V. V. (2023): The Investment Management Game: Extending the Scope of the Notion of Core. arXiv. https://doi.org/10.48550/arXiv.2302.00608

The Template Effect: How Model Legislation Manufactured a National Camping-Ban Wave After Grants Pass v. Johnson

Manan Dua[1]

[1] FCHome Initiative, Cupertino, California, United States, manandua319@gmail.com, ORCID: 0009-0001-9149-0791

Abstract: The Supreme Court in City of Grants Pass v. Johnson (2024) ruled that the Constitution does not prohibit punishing public camping, lifting the Eighth Amendment cloud that Martin v. City of Boise (2019) had cast over enforcement in the western United States. In less than two years, over 350 municipalities and 14 states had passed laws to limit public camping and sleeping. This paper asks how a body of law that is normally local could spread this fast, and whether the spread tracked local housing conditions. The paper synthesizes ordinance trackers, published model-legislation texts, federal point-in-time data, and federal executive and litigation records. First, the adoptions fall into three distinct textual families tied to named drafting organizations rather than to independent local drafting; one such family, based on a single Illinois Municipal League template, reproduces across a cluster of otherwise dissimilar municipalities. Second, the state-level templates and the municipal one differ mainly in enforcement compulsion, while penalty severity varies comparatively little between them: funding conditions and private rights of action strip local governments of the discretion to leave an enacted ban unenforced. Third, the wave continued through a period in which the national point-in-time count fell 3.3 percent; two states supplied 92 percent of that decline. The paper concludes that the model-ordinance pipeline is the appropriate unit of analysis for this wave, and it specifies the jurisdiction-level coding design that would test the propositions advanced here.

Keywords: policy diffusion, homelessness criminalization, model legislation, policy transfer, Grants Pass v. Johnson

1. INTRODUCTION

Municipal law in the United States is usually local in nature. A city attorney drafts an ordinance, a council debates and adopts it at the speed local politics dictates, and the resulting text offers insight into conditions within the jurisdiction that adopted it. Such prohibitions on sleeping and camping in public places had been in effect for decades in a patchwork pattern, with thousands of individual municipalities holding their own policies, until a single Supreme Court ruling disrupted that pattern within the span of two years.

In City of Grants Pass v. Johnson, the Court ruled on June 28, 2024, that an ordinance against public camping, alone, does not constitute a violation of the Eighth Amendment's ban on cruel and unusual punishment. In so ruling, the Court reversed the Ninth Circuit and abrogated its reasoning in Martin v. City of Boise (2019), which had treated the unavailability of shelter as a practical bar to enforcement across nine western states. By the end of 24 months, over 350 cities and 14 states had implemented measures addressing street homelessness, according to tracking by the National Homelessness Law Center and national reporting by Stateline (Sequeira, 2026).

This paper does not ask only whether such a wave occurred, but also how fast it moved. In the first year alone, there were some 260 municipal measures, or approximately five per week, sustained across the full year. That rate reached small municipalities in Illinois, several state legislatures in the South, and the federal executive branch in Washington within roughly the same time frame, and it produced ordinances that read almost identically across jurisdictions sharing neither a housing market nor a legal tradition. The speed and the similarity of the texts also point to a mechanism operating beyond any given city hall.

There have been two approaches to this scholarship since the ruling, neither of which treats the drafting and circulation of model text as the object of study. The majority's discussion of status and conduct, and its connection to Robinson v. California (1962), has been the subject of constitutional and doctrinal commentary. There is a newer empirical literature that questions whether criminalization ordinances are effective in reducing homelessness, most directly Lebovits and Sullivan (2025). In both lines of inquiry, the question is what the ordinance does, constitutionally or empirically. Neither line of inquiry asks about the origin of that language. If, as the evidence below indicates, a significant portion of the post-2024 wave arrived already drafted, then what each city itself drafted is not the variable worth explaining; rather, it is which template reached that city and what it contained.

This paper poses two questions. How did a single constitutional ruling turn into a two-year, multi-state wave of legislation? And what does the documented content of the templates that carried that wave tell us about how criminalization spread in relation to local housing conditions? The analysis is a desk synthesis, not a causal test:

it structures the public record around a known diffusion framework, identifies which specific provisions diffused from one jurisdiction to another, and sets out the research design that would be necessary to test the resulting propositions with original data.

2. LEGAL BACKGROUND

The ordinances at issue in Grants Pass were unremarkable as drafting goes. Grants Pass, Oregon, a city of approximately 38,000 people, has an estimated 600 people experiencing homelessness on a given night. It had a municipal code in place that banned people from sleeping on the sidewalks, streets, and alleys, and from camping on public property, including in city parks, under sections 5.61.030 and 6.46.090, with penalties increasing from civil fines to park-exclusion orders to criminal trespassing charges for repeat offenders.

The plaintiffs' claim was based on two precedents. In Robinson v. California (1962), the Supreme Court ruled that a state law criminalizing a status (narcotics addiction) is unconstitutional under the Eighth Amendment. Martin v. City of Boise (2019) then expanded that rationale to people sleeping outdoors, reasoning that a person could not be criminally punished for sleeping in public if they had no access to shelter. Because Martin bound the Ninth Circuit, shelter availability served as a prerequisite to enforcement in Alaska, Arizona, California, Hawaii, Idaho, Montana, Nevada, Oregon, and Washington (Note 1).

That extension was rejected by a six-to-three majority. Justice Gorsuch, writing for the Court, interpreted the Cruel and Unusual Punishments Clause as a restriction on the manner and severity of punishment a government uses, rather than as a restriction on the conduct a government is able to forbid. Justice Sotomayor dissented, joined by Justices Kagan and Jackson. Because Martin was a court of appeals decision rather than a U.S. Supreme Court precedent, Grants Pass technically abrogated it rather than overruled it, but the practical effect was the same: jurisdictions inside the Ninth Circuit regained enforcement powers they had lost since 2018, while jurisdictions elsewhere received a clear signal that this kind of ordinance would survive Supreme Court review.

The focus in what follows will be on two points of change. First, the ruling removed a legal constraint without providing any drafting template of its own, so every jurisdiction that wished to act after June 2024 confronted the same legal and drafting challenge at the same moment. Second, the ruling did not arrive in a vacuum. As of 2021, 48 states already had at least one law restricting conduct associated with homelessness, and 15 states already banned camping in certain public areas (National Homelessness Law Center, 2021). The post-2024 wave thus started from an already existing base of legislation and organizational structure, which directly affects the diffusion mechanisms discussed in Section 3.

3. LITERATURE AND ANALYTICAL FRAMEWORK

3.1. Policy Diffusion

The study of policy diffusion has its point of departure in Walker's (1969) observation that the pattern of innovation among American states more closely tracks communication among officials than independent problem-solving occurring within any one state. Event history analysis, the field's most widely used empirical approach, was developed by Berry and Berry (1990), which separates internal factors that influence adoption, such as a state's fiscal capacity, from external factors, such as adoption by neighboring states.

The taxonomy used in this paper for the post-Grants Pass record is provided by Shipan and Volden (2008). They distinguish four mechanisms. Learning is manifest when a jurisdiction updates its stance based on empirical evidence about an earlier adopter's outcomes. Competition occurs when jurisdictions that share a border, or have a mobile population, alter policy to avoid taking on costs that a neighbor has pushed away, often resulting in geographic concentrations. Imitation occurs when a jurisdiction copies a larger or more visible peer regardless of that peer's results, an effect Shipan and Volden find to be comparatively short-lived. Coercion occurs when a higher level of government imposes a mandate or fiscal condition on another level of government (Note 2).

These four mechanisms are not only conceptually distinct; they also leave different, easily observed signatures in a documentary record, which is what makes them tractable for a desk synthesis rather than a statistical model. Learning implies a correlation between adoption timing and the publication of evidence about outcomes. Competition implies clustering among geographic or economic neighbors. Imitation implies textual similarity that cannot be explained by shared local conditions. Coercion suggests that some kind of linkage occurs between the boundaries of adoption and those of a higher authority's jurisdiction or funding.

3.2. Policy Transfer and Organized Drafting

A second literature, linked to Dolowitz and Marsh (2000), moves away from the adopting jurisdiction toward the agents that transport policy content across jurisdictions. Karch (2007) demonstrated that national advocacy and professional organizations shape which policy options reach a state's legislative agenda, long before any question of adoption arises. Hertel-Fernandez (2019) described in detail the manner in which a handful of well-resourced drafting organizations can secure nearly identical statutory text in dozens of state legislatures via coordinated model-bill campaigns, transforming what appears to be a decentralized state innovation process into a centrally supplied product.

That literature suggests a refinement to the Shipan and Volden scheme as applied to a wave like this one. What is now at stake is not simply one official's attention being drawn to a visible peer, but the possibility that a template, once it circulates through an organized intermediary, shapes imitation directly. The content is chosen in advance by an organization, the timing of its release is determined by that organization, and the marginal drafting cost of adoption is almost zero for any jurisdiction. It may instead appear that hundreds of distinct governments are imitating each other when, in fact, it is a single supply channel.

3.3. Propositions

Together, the two literatures yield three propositions that the available public record can address descriptively, though jurisdiction-level data beyond what is currently available would be needed for a full causal test.

P1. Post-Grants Pass measures cluster into identifiable textual families that are clearly linked to specific drafting organizations, rather than constituting a diffuse population of independently drafted local responses.

P2. These templates are distinct from a typical local camping ban in that they include various enforcement-compulsion mechanisms that constrain a local government's discretion over whether to enforce a law once it is passed. The differences in penalty severity across the three families identified below are quite small; the differences in enforcement are where the meaningful variation lies.

P3. The pace of adoption is only weakly linked to contemporaneous change in measured local homelessness, consistent with imitation and organized transfer rather than learning from outcomes.

4. MATERIALS AND METHOD

This is a structured desk synthesis of publicly available secondary sources. Since no original data were collected, no jurisdictions were contacted, and no human subjects were involved in the study, there was no need for ethical approval.

Four types of material were collated. The first category is primary legal text, specifically the Grants Pass opinion itself, the abrogated Martin decision, Robinson, and the state statutes and municipal ordinances discussed in Section 5. The second category is published model-legislation text together with the drafting organizations' own descriptions of it, specifically the Cicero Institute's Reducing Street Homelessness Act, the Goldwater Institute's Safe Neighborhoods Act, and the Illinois Municipal League's model public camping ordinance dated July 16, 2024. The third category is adoption tracking compiled by advocacy organizations, principally the American Civil Liberties Union's post-Grants Pass tracker and the National Homelessness Law Center's Housing Not Handcuffs project, supplemented by contemporaneous reporting from Stateline, National Public Radio, and WUNC. The fourth category is federal measurement and federal action, namely the 2025 Annual Homelessness Assessment Report, Executive Order 14321 of July 24, 2025, and the Continuum of Care funding notices issued and litigated during the 2025-2026 grant cycle.

The coding of these materials took place in three stages. First, documented cases of template-based adoption were identified from the tracker and the journalistic record and classified according to the organization that created the template. Second, the provisions attributed to each template were compared across the resulting families and coded by function (penalty provisions versus provisions that limit local enforcement discretion or redirect funding); each provision was coded as specified in the model text, not specified in the model text, or not documented in the material available, resulting in the matrix reported in Table 2. Third, the two-year time frame for adoption was compared to the national point-in-time series for the same period.

Two features of the underlying evidence base should be noted before the results are read. Advocacy trackers apply their own inclusion criteria, group ordinances, resolutions, and enforcement measures under a single label,

and do not cover small jurisdictions evenly; the numbers reported here should be read as pattern and order of magnitude, not as a census, and none of the claims in this paper depend on their exact precision. The point-in-time count carries its own limitation: it captures a narrow view of homelessness on a single night in January and is known to undercount rural, tribal, and youth populations, which limits the conclusions that can be drawn from any comparison against it. Section 7 returns to these limitations as well.

5. RESULTS

5.1. The Scale and Pace of Adoption

Table 1 and Figure 1 summarize the two years of adoption after the ruling. In the first year, some 260 municipal measures were adopted in total, an average of nearly five per week, a figure considerably higher than what independent drafting at several hundred separate municipal legal departments could reasonably be expected to produce on a stand-alone basis. A further 90 municipalities, or approximately 1.7 per week, were added in the second year. The wave decelerated in the second year, but continued well past the point at which the novelty of the ruling itself could explain new enactments.

The activity profile was quite different at the state level. During the first year, 57 bills were introduced across 17 states, 8 of which became law, 4 were pending, and 45 (79 percent) were defeated. That failure rate reflects a legislative process more cumbersome than a municipal council vote, and it also supplies the population of non-adoption cases that any future statistical test of this wave would require as a comparison group.

Table 1

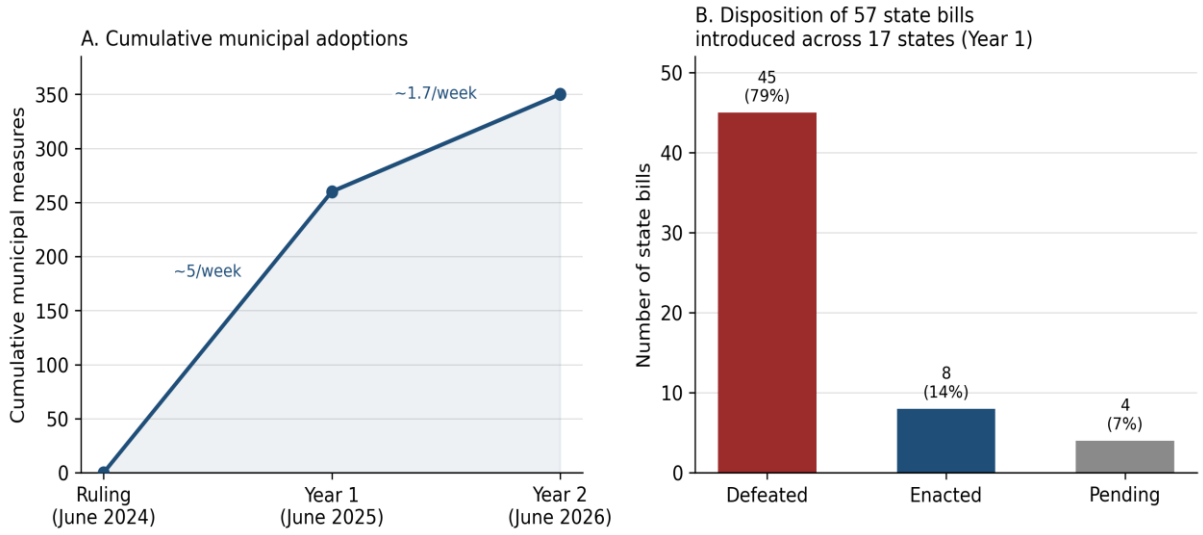
Homelessness criminalization measures enacted after City of Grants Pass v. Johnson, June 2024 through June 2026

Level of government	First year (to June 2025)	Cumulative (to June 2026)
Municipal measures enacted	Approximately 260 laws	More than 350 cities
State bills introduced	57 bills across 17 states	Not separately reported
State bills enacted	8 (4 pending, 45 defeated)	14 states with laws or measures in force

Note. Counts are collected by the National Homelessness Law Center and are published in its one-year tracker (2025), in Shelterforce (2025), and in Sequeira (2026). Because the tracker aggregates ordinances, resolutions, and enforcement measures under a single label and uses its own rules for inclusion, the figures are intended to show order of magnitude, but are not meant to be a census.

Figure 1

Pace of Municipal Adoption and Disposition of State Bills



Note. Panel A displays cumulative municipal measures at the ruling, one year after, and two years after, with the implied weekly rate for each interval. The results of the 57 state bills introduced across 17 states in the first year appear in Panel B. Adoption numbers are based on advocacy trackers and represent order of magnitude, not a census.

5.2. Textual Families

The record suggests that at least three different template families exist, each associated with a named drafting organization.

On July 16, 2024, the Illinois Municipal League released a model public camping ordinance. It has a penalty system that starts with $75 for a first violation and goes up to $750 under section 1-2-9 of the Illinois Municipal Code, with a jail option on a sixth or later violation within a rolling 24-month period, and a community-service alternative. That same structure is reflected in tracker entries and local reporting from a set of Illinois municipalities, such as Mundelein, Pekin, and Morton, with a 2024 review identifying thirteen Illinois ordinances carrying the league's language (American Civil Liberties Union, 2026; Illinois Municipal League, 2024; The Appeal, 2024). The cluster is lopsided, and that is instructive: Springfield tabled its proposed ordinance in September 2024 after facing public opposition, and a comparable ordinance in Champaign was rejected in 2025. Template availability appears to have increased the likelihood of adoption without determining it in every case.

The Cicero Institute's (2024) Reducing Street Homelessness Act is a state-level, not a local, measure that integrates three elements. It creates a statewide camping ban and introduces a Class C misdemeanor offense with fines up to $5,000 and approximately 30 days in jail. It denies state funds to municipalities and nonprofit service providers that do not enforce. And it channels homelessness dollars from permanent housing toward state-approved encampments, which allow people to stay there for only six months. Reporting that quotes the institute's own staff has found bills with such provisions in Florida, Georgia, Kentucky, Oklahoma, Utah, Idaho, Mississippi, Tennessee, and Texas, as well as another bill in North Carolina (HB 781). HB 1925, approved by the Texas Legislature in June 2021 and effective that September, also made public camping a Class C misdemeanor and introduced liability threats for non-enforcing localities, including litigation and the forfeiture of state grants. It is that enforcement-compulsion logic that later state templates would go on to generalize.

The third family concerns civil liability rather than criminal penalty, and originates with the Goldwater Institute (2024). The Safe Neighborhoods Act is based on Proposition 312, passed by Arizona voters in 2024. Property owners can seek damages from local governments over unenforced laws concerning camping, panhandling, loitering, public intoxication, and drug activity. Georgia passed a version in 2026 (HB 295), and Oklahoma passed the Oklahoma Safe Neighborhoods Act of 2026 (HB 3985), which only applies to cities with over 130,000 people. A companion Florida bill, HB 1365 of 2024, permits residents, business owners, and the state attorney general to bring civil actions against municipalities for non-enforcement, with recovery of costs and attorney fees. This law was signed on March 20, 2024, went into effect on October 1, 2024, and saw its private right of action take effect on January 1, 2025; it is codified at sections 125.0231 and 166.0485 of the Florida Statutes.

Table 2 shows the signature provisions of the three families. This repeats the pattern of P1: a small number of stable textual families attributable to named organizations, rather than a population of locally developed ordinances that merely resemble one another.

Table 2
Signature Provisions of Three Documented Template Families

Template and source	Level	Penalty provisions	Enforcement compulsion	Fiscal redirection
Model public camping ordinance (Illinois Municipal League, 2024)	Municipal	$75 first violation rising to $750; jail available on sixth violation in 24 months	None identified	None identified
Reducing Street Homelessness Act (Cicero Institute)	State	Class C misdemeanor, up to $5,000 and about 30 days	State funds withheld from non-enforcing municipalities and providers	Redirects funding from permanent housing to sanctioned encampments

Template and source	Level	Penalty provisions	Enforcement compulsion	Fiscal redirection
Safe Neighborhoods Act (Goldwater Institute); cf. Florida HB 1365	State	Relies on the underlying ban	Property-owner compensation claims; in Florida, civil action by residents, businesses, and the attorney general	None identified

Note. Florida HB 1365 is grouped with the Goldwater family because it relies on the same private-enforcement reasoning, though it is a state enactment rather than an instance of that model.

5.3. The Function of the Traveling Provisions

Coding the three families by function, rather than by severity, produces the paper's second finding. The Illinois municipal template has the lowest penalties of the three, but the two state-level templates carry a class of device that the municipal template lacks entirely. These mechanisms are not dependent on the penalty imposed on the violator, but rather on the discretion of the local government itself. The Cicero model withholds state funds from jurisdictions that do not enforce; the Goldwater model and Florida's HB 1365 allow private parties (or the state attorney general) to sue or seek compensation from a local government for failing to enforce. Both devices eliminate a practice that has always been a source of tension in this part of municipal law: cities retaining a ban on camping in their code while enforcing it inconsistently or not at all.

That distinction is not without substance, since selective enforcement has been used as a safety valve in American municipal law for decades. A template that provides only a ban leaves local enforcement discretion intact, regardless of the ban's text. A template that combines a ban with a funding penalty or a private right of action turns what was a permissive local authority into an obligation owed to parties outside city government. That obligation is a claim on local enforcement decisions, one that state constitutional law and home-rule doctrine, not federal criminal procedure, are able to address. It is also the provision class the doctrinal literature has had the least occasion to examine, as it has understandably focused on the constitutionality of penalties and not on the compulsion devices layered around them, which is the empirical basis for P2.

5.4. The Federal Layer

The enforcement-compulsion mechanism also gained a vertical, federal dimension in the second year of the wave. On July 24, 2025, Executive Order 14321, "Ending Crime and Disorder on America's Streets," was signed. It ordered the Department of Justice to seek the rescission of consent decrees and judicial orders restricting civil commitment; it ordered federal agencies to focus discretionary grants on jurisdictions that enforce camping and loitering restrictions and clear encampments; and it ordered housing and health agencies to stop funding Housing First programming, which it said had failed to resolve what it called the root causes of street homelessness.

The funding instrument meant to implement that directive was much more controversial than the order itself. On November 13, 2025, the Department of Housing and Urban Development (HUD) released a notice of funding opportunity worth about $3.9 billion that lowered the priority of Housing First programs and favored enforcement-aligned jurisdictions in scoring. The notice was withdrawn and revised in December 2025. On December 23, 2025, the United States District Court for the District of Rhode Island imposed a substantial injunction on the revised notice, and a notice restoring the prior scoring criteria was reopened in January 2026. These developments are not final and are subject to appeal, and therefore are reported here as a contested funding process rather than as settled federal policy. Within the parameters defined in Section 3, this federal activity is coercion in the Shipan and Volden sense, flowing downward from the federal government to the states and municipalities, and it is the same mechanism that the state-level templates had already been developing vertically between states and municipalities.

5.5. Adoption Against Measured Need

The federal point-in-time series offers a partial test of P3. HUD's 2025 Annual Homelessness Assessment Report, released May 29, 2026, recorded 745,652 people experiencing homelessness on a single night in January 2025, including 266,320 in unsheltered locations. The total represented a decrease of 25,828 people, or 3.3 percent,

from the 771,480 counted in January 2024, the first year-over-year national decrease in nearly a decade. Figure 2 decomposes that decrease: New York accounted for 12,459 of it and Illinois for 11,256, so those two states together supplied 23,715 of the national total of 25,828, or about 92 percent, while homelessness rose in 28 states over the same period. Table 3 sets out these indicators together.

Table 3

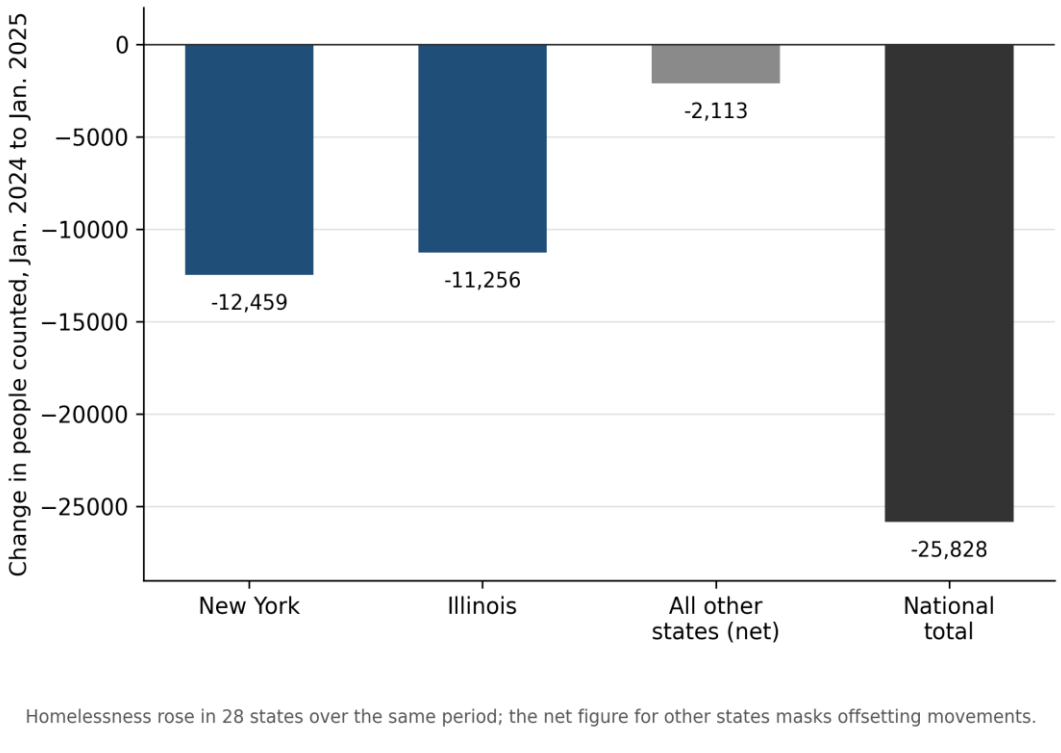
National Point-in-Time Indicators, January 2024 and January 2025

Indicator	January 2024	January 2025	Change
Total counted	771,480	745,652	Decrease of 25,828 (3.3%)
Chronically homeless individuals	152,585	155,750	Increase of 3,165; highest recorded
Unsheltered	Not reported here	266,320	Not reported here
Veterans	Not reported here	32,495	Lowest recorded
People in families	Not reported here	Not reported here	Decrease of about 11%
States recording an increase	Not applicable	28	Not applicable
Share of national decrease from New York and Illinois	Not applicable	23,715 of 25,828	About 92%

Note. Figures are from the 2025 Annual Homelessness Assessment Report (U.S. Department of Housing and Urban Development, 2026) and the summaries in National Alliance to End Homelessness (2026), and National Low Income Housing Coalition (2026). Cells marked as not reported here fall outside the comparison this paper draws and were not separately verified against the underlying data tables.

Figure 2

Composition of the National Point-in-Time Decrease, January 2024 to January 2025



Note. The first two bars show the contributions of New York and Illinois to the national decrease; the third shows the net contribution of all remaining states combined, which masks the fact that homelessness rose in 28 states over the same period.

The comparison supports P3, though only in a qualified way. Two caveats matter. A national aggregate cannot show whether any individual adopting jurisdiction faced rising or falling local homelessness, and the alignment between a June-to-June adoption window and a single January count is imperfect at best. What the comparison can establish is narrower but still informative: the wave was not a national response to worsening measured

conditions, because the national trend moved in the opposite direction across the same period, and the improvement that did occur was too geographically concentrated in two states to describe conditions in the several hundred other jurisdictions that adopted new restrictions.

The effects literature points the same direction. Lebovits and Sullivan (2025) apply a difference-in-differences design to criminalization ordinances enacted between 2000 and 2021 across the hundred most populous American cities and report a 2.2 percent increase in unsheltered homelessness among adopting cities relative to non-adopting cities, an effect the authors describe as statistically insignificant. Their treatment variable covers criminalization ordinances broadly, including public-intoxication and public-urination provisions, so the estimate should not be read as specific to camping bans alone. Read with that caveat, the finding indicates that jurisdictions adopting after 2024 were not doing so in response to any demonstrated reduction in homelessness attributable to earlier criminalization measures. Table 4 summarizes how each of the four diffusion mechanisms from Section 3 fits the record assembled here.

Table 4

Diffusion Mechanisms and Their Fit with the Observed Record

Mechanism	Observable implication	Evidence in the record	Assessment
Learning	Adoption follows evidence of effectiveness	Available evaluation finds no reduction in unsheltered homelessness	Weakly supported
Competition	Geographic clustering and sensitivity to neighbors	Illinois cluster is consistent, but not distinguishable from shared template access	Indeterminate
Imitation	Textual similarity without relation to local conditions	An identical penalty schedule recurs across dissimilar municipalities	Supported
Coercion	Adoption follows lines of higher-level authority and funding	State funding penalties, private rights of action, and from 2025 federal executive action and contested grant criteria	Supported

Note. Mechanisms follow the taxonomy in Shipan and Volden (2008). Assessments are descriptive judgments based on the secondary record and are not statistical tests.

6. DISCUSSION

Read together, the findings suggest that the post-Grants Pass wave moved through an already-established distribution system, rather than through hundreds of independent local policy decisions. The ruling did not create the templates that carried it. The Cicero model had circulated since Texas enacted its statewide ban in 2021, the Goldwater compensation model traced back to a 2024 ballot measure in Arizona, and state-level restrictions on camping had already been in place across most of the country before the 2024 ruling. The ruling eliminated the particular legal risk that had rendered these templates unappealing for adoption within the Ninth Circuit and legally uncertain in other circuits. Once that risk was removed, adoption proceeded as quickly as the existing distribution system allowed, considerably faster than independent municipal drafting would have permitted.

That reading is relevant to the applicability of the Shipan and Volden framework below the state level, where it was not originally developed. Their taxonomy is based on the premise that governments possess independent drafting capacity, which is fairly the case for state legislatures, but not so much for a city government of twenty thousand residents. There are high fixed costs to drafting and developing a defensible ordinance from scratch for a small city, but low fixed costs when ordinance language already drafted and vetted elsewhere is adopted instead. In such cases, the provision of ready-made text is no longer a passive backdrop to the act of adopting, but an active factor in adoption, and what seems like imitation is more aptly understood as a by-product of supply than as evidence of local officials' desire to mimic one another. The evidence from Illinois illustrates this in two ways: on the one hand, the presence of the league template led to a cluster of Illinois adoptions; on the other, two cities in the same state considered the same template and both rejected it, which suggests that while supply is a factor in adoption, it does not guarantee it.

The enforcement-compulsion finding has the more obvious implication for governance. Constitutional litigation after Grants Pass will continue to center on penalties, because penalties are what the Eighth Amendment reaches; funding conditions, private rights of action, and compensation claims fall outside that category entirely and instead raise questions of state constitutional law and home-rule doctrine. A local government that judges

enforcement counterproductive on the ground, or that simply lacks the shelter capacity to which displaced people could be directed, now risks fiscal loss or civil liability for acting on that judgment. Whatever conclusion one reaches about the wisdom of camping bans themselves, removing that particular decision from the level of government closest to local conditions is a distinct institutional development that merits attention on its own terms.

Litigation since the ruling supplies a partial check on this process, notably through a different constitutional door than the Eighth Amendment. Missouri's HB 1606 of 2022, an early instance of the Cicero model, was struck down in its entirety by the Missouri Supreme Court in December 2023 on single-subject grounds (Byrd v. State of Missouri, 2023), before Grants Pass was even decided. In May 2026, a Jefferson County, Kentucky, district judge held the unlawful-camping provision of the state's Safer Kentucky Act unconstitutional under both the state and federal constitutions and dismissed the underlying citation with prejudice; local reporting (Louisville Public Media, 2026) and the Kentucky ACLU described it as the first such ruling in the state, though a different Jefferson County judge had upheld the same provision months earlier, and the ruling remains subject to appeal. Both cases point toward state constitutional structure, rather than federal Eighth Amendment doctrine, as the area of law in which these templates are currently most exposed to legal challenge.

Two further points follow from the record. First, the circulation of model text is not confined to one side of this debate. The National Homelessness Law Center has produced its own model bill, the Gloria Johnson Act, named for the lead respondent in Grants Pass; the bill had been introduced in eleven states and passed in none of them by the two-year mark, while a federal Housing Not Handcuffs Act, introduced by Representatives Pramila Jayapal and Maxwell Frost on June 26, 2025, the first anniversary of the ruling, had yet to see a hearing by its second anniversary. The availability of a template does not seem to be the only determinant of diffusion, as this asymmetry reveals that the resources behind a template also play a role. Second, it is hard to evaluate these ordinances in isolation, due to the measurement environment. Point-in-time counting captures a narrow definition of homelessness and is not designed to detect displacement into motels, vehicles, or doubled-up living arrangements.

7. LIMITATIONS

Four limitations bound the claims advanced in this paper.

First, the adoption counts rely on advocacy trackers that apply their own inclusion criteria, group several distinct kinds of instrument (ordinances, resolutions, enforcement directives) under a single label, and cover small jurisdictions unevenly. They may overstate the wave by counting amendments to pre-existing ordinances as new enactments, or understate it by missing jurisdictions that publish no readily accessible code. The counts used here should be read as establishing pattern and order of magnitude; no claim in this paper depends on their precise accuracy.

Second, the link this paper draws between model texts and specific adoptions rests on documented matches reported by third parties and on the model texts themselves, not on a systematic line-by-line comparison of enacted ordinance language against the source templates. That evidence is sufficient to establish that template-based adoption occurred and to characterize what the identified templates contain; it is not sufficient to establish what share of the roughly 350 adopting cities relied on a template rather than drafting independently, and this paper makes no such quantitative claim. The Illinois municipalities named in Section 5.2 are limited to those for which adoption of the league's specific language could be corroborated in the available record; a complete accounting would require reading each municipality's own council record.

Third, the comparison drawn in Section 5.5 between adoption and measured need operates entirely at the national level, which cannot resolve whether any individual adopting jurisdiction was itself experiencing rising local homelessness at the time it acted. The appropriate test for that question is a jurisdiction-level one, pairing each adoption date against Continuum of Care point-in-time data and shelter-inventory figures for the corresponding geography.

Fourth, several elements of the federal layer described in Section 5.4 and the litigation described in Section 6 remain unresolved as of this writing. The Continuum of Care funding criteria remain subject to an injunction that could be modified or reversed on appeal, and the Kentucky ruling described in Section 6 may itself be appealed. Either development would change the weight the coercion mechanism should be assigned in any updated version of this analysis.

Addressing these limitations in full requires an original data-collection effort beyond the scope of a desk synthesis. The design implied by the analysis here would code the complete text of ordinances adopted between June 2024 and June 2026 across a defined sample of jurisdictions, recording penalty structure, exemption language, notice requirements, and the presence or absence of any enforcement-compulsion provision. Coded texts would then be compared against the published model-legislation texts identified in Section 5.2 to produce a quantitative textual-similarity measure for each ordinance. The 45 state bills that were defeated in the first year, together with the Illinois municipalities that considered and declined the league template, would supply the population of non-adoption cases that such a design requires as a comparison group.

8. CONCLUSION

Two years after City of Grants Pass v. Johnson, more than 350 municipalities and 14 states had adopted measures restricting public camping. First, those adoptions cluster into template families attributable to three named drafting organizations, with an identical penalty schedule recurring, without significant variation, across a set of Illinois municipalities that otherwise share little in common. Second, the state-level templates and the municipal one differ mainly in enforcement compulsion: devices that constrain local discretion over whether to enforce an enacted ban, while penalty severity varies comparatively little across the three families. Since 2025, that same form of pressure has begun operating vertically as well, through federal executive action and a contested federal funding process. Third, the wave continued through a period in which the national point-in-time count fell 3.3 percent, with roughly 92 percent of that decline concentrated in two states, and through the publication of evidence that criminalization ordinances of this kind produce no measurable reduction in unsheltered homelessness.

The analysis offered here is descriptive, and its conclusions are accordingly provisional. What it does establish is that the model-ordinance pipeline is a subject the existing doctrinal and effects literatures have had no occasion to examine directly, and it specifies the jurisdiction-level coding and event-history design that would be needed to test the three propositions advanced in Section 3.3 against original data. Whether template availability predicts adoption once local housing conditions, shelter capacity, and political composition are properly controlled remains, on the present record, an open empirical question. It is a question the data set described in Section 7 would be positioned to answer.

AUTHOR CONTRIBUTIONS

The author conceived the study, assembled and coded the secondary-source record, conducted the analysis, and drafted and revised the manuscript.

DATA AVAILABILITY STATEMENT

This is a desk synthesis based on publicly available secondary sources. No new data were generated, and no original data were collected. All sources used are publicly available and cited in the References.

AUTHOR NOTE

This work received no external funding and was not undertaken as part of a funded research project; the author acknowledges no funded research assistance beyond the publicly available sources cited throughout. This manuscript has not been presented at a conference or other venue. The author declares no conflicts of interest.

NOTES

Note 1. The Ninth Circuit has jurisdiction over Alaska, Arizona, California, Hawaii, Idaho, Montana, Nevada, Oregon, and Washington, as well as Guam and the Northern Mariana Islands. Although Martin was never binding outside the circuit, numerous jurisdictions did consider it persuasive authority in assessing litigation risk prior to 2024.

Note 2. There is some variation in terms used in the diffusion literature. What Shipan and Volden label as imitation is termed by some authors as "emulation," and some do not view coercion as horizontal diffusion at all, since it is hierarchical rather than a peer relation. This paper retains the Shipan and Volden labels throughout for consistency.

REFERENCES

American Civil Liberties Union. (2026). Two years since Grants Pass: Tracking the criminalization of homelessness. https://www.aclu.org/two-years-since-grants-pass-tracking-the-criminalization-of-homelessness

Berry, F. S., & Berry, W. D. (1990). State lottery adoptions as policy innovations: An event history analysis. American Political Science Review, 84(2), 395-415. https://doi.org/10.2307/1963526

Byrd v. State of Missouri, (Mo. banc Dec. 19, 2023).

Cicero Institute. (2024). Confronting homelessness. https://ciceroinstitute.org/news-media/confronting-homelessness/

City of Grants Pass v. Johnson, 603 U.S. 520 (2024).

Dolowitz, D. P., & Marsh, D. (2000). Learning from abroad: The role of policy transfer in contemporary policymaking. Governance, 13(1), 5-23. https://doi.org/10.1111/0952-1895.00121

Executive Order 14321. (2025, July 24). Ending crime and disorder on America's streets. The White House. https://www.whitehouse.gov/presidential-actions/2025/07/ending-crime-and-disorder-on-americas-streets/

Goldwater Institute. (2024). Safe Neighborhoods Act [Model legislation]. https://www.goldwaterinstitute.org/wp-content/uploads/2025/09/SFA-One-Pager-and-Language.pdf

Hertel-Fernandez, A. (2019). State capture: How conservative activists, big businesses, and wealthy donors reshaped the American states—and the nation. Oxford University Press.

Illinois Municipal League. (2024, July 16). Model ordinance: Public camping. https://www.iml.org/file.cfm?key=27910

Karch, A. (2007). Democratic laboratories: Policy diffusion among the American states. University of Michigan Press.

Lebovits, H., & Sullivan, A. (2025). Do criminalization policies impact local homelessness? Policy Studies Journal. Advance online publication. https://doi.org/10.1111/psj.70056

Louisville Public Media. (2026, May 4). Jefferson County judge's ruling challenges constitutionality of unlawful camping ban. https://www.lpm.org/news/2026-05-05/jefferson-county-judge-challenges-constitutionality-of-unlawful-camping-ban

Martin v. City of Boise, 902 F.3d 1031 (9th Cir. 2018), amended and superseded on denial of reh'g en banc, 920 F.3d 584 (9th Cir. 2019).

National Alliance to End Homelessness. (2026, May 29). Long-awaited federal data shows the first overall reduction in homelessness since 2016. https://endhomelessness.org/media/news-releases/long-awaited-federal-data-shows-the-first-overall-reduction-in-homelessness-since-2016/

National Homelessness Law Center. (2021). Housing not handcuffs 2021: State law supplement. https://homelesslaw.org/wp-content/uploads/2021/11/2021-HNH-State-Crim-Supplement.pdf

National Homelessness Law Center. (2025, May). One year since Grants Pass [Housing Not Handcuffs tracker]. https://housingnothandcuffs.org/emergent-threats-homelessness-criminalization/

National Low Income Housing Coalition. (2026). HUD 2025 Annual Homelessness Assessment Report finds first reduction in overall homelessness in nearly a decade. https://nlihc.org/resource/hud-2025-annual-homelessness-assessment-report-finds-first-reduction-overall-homelessness

National Public Radio. (2024, May 20). Amid record homelessness, a Texas think tank tries to upend how states tackle it. https://www.npr.org/2024/05/20/1251405278/homeless-camping-ban-texas-cicero-states

Robinson v. California, 370 U.S. 660 (1962).

Sequeira, R. (2026, June 25). 2 years after Grants Pass, 14 states, 350 cities have tougher laws on street homelessness. Stateline. https://stateline.org/2026/06/25/2-years-after-grants-pass-14-states-350-cities-have-tougher-laws-on-street-homelessness/

Shelterforce. (2025, July 3). Criminalizing homelessness doesn't work, study finds. https://shelterforce.org/2025/07/03/criminalizing-homelessness-doesnt-work-study-finds/

Shipan, C. R., & Volden, C. (2008). The mechanisms of policy diffusion. American Journal of Political Science, 52(4), 840-857. https://doi.org/10.1111/j.1540-5907.2008.00346.x

The Appeal. (2024, November 1). Grants Pass ruling triggers new wave of measures criminalizing homelessness. https://theappeal.org/supreme-court-homelessness-grants-pass-ruling-camping-bans/

U.S. Department of Housing and Urban Development. (2026). 2025 Annual Homelessness Assessment Report to Congress, Part 1: Point-in-time estimates. https://www.hud.gov/news/hud-no-26-037

Walker, J. L. (1969). The diffusion of innovations among the American states. American Political Science Review, 63(3), 880-899. https://doi.org/10.2307/1954434

WUNC. (2025, May 6). A conservative Texas think tank is inserting itself in NC's homeless policy. Why? https://www.wunc.org/politics/2025-05-06/conservative-texas-thinktank-north-carolina-homeless-policy

Administrative Innovation: The Role of Digital Transformation in Public Sector

Maria Amorina Stoian[1] **Maria Cristina Achim[2]**

[1] National University of Political Studies and Public Adminsitration(Romania), negru.amorina@yahoo.ro

[2] National University of Political Studies and Public Adminsitration(Romania), maria.achim98@yahoo.com

Abstract: Digital transformation has become an important dimension of public sector reform, influencing how public organizations structure their activities, manage information, make decisions, and deliver services. At the same time, the introduction of digital technologies does not automatically lead to administrative innovation. The outcomes of digital transformation depend to a considerable extent on the institutional and organizational capacity of public sector organizations to integrate new technologies into existing administrative processes and practices.

In this article I want to present the relationship between digital transformation and administrative innovation in the public sector, with particular focus on the organizational and institutional factors that influence the adoption and effective use of digital technologies.

The research follows a qualitative comparative approach, combining a review of the relevant academic literature with an analysis of selected digital government initiatives and administrative reforms in OECD countries. For the comparative analysis I identify common patterns and differences in the way digital transformation has been incorporated into public administration, as well as the conditions that have supported or constrained administrative innovation.

The article present that digital transformation should be considered as part of a broader process of administrative change rather than as a purely technological intervention. Institutional capacity, leadership, organizational culture, employee competencies, and regulatory frameworks are important factors in determining whether technological investments result in meaningful changes in administrative practices. By examining these relationships, the study contributes to the literature on administrative innovation and digital government and provides a basis for understanding how digital transformation can support longer-term public sector reform.

Keywords: administrative innovation; digital transformation; public sector; digital government; artificial intelligence;

1. INTRODUCTION

Digital transformation has moved from the periphery of administrative reform to its center. Public organizations increasingly use shared data infrastructures, digital identity, cloud services, automated decision support, interoperable registers, and online service platforms. These technologies alter not only the channel through which a service is delivered but also the allocation of tasks, the use of information, the relationship between agencies, and the interaction between public institutions and citizens. Yet a digital interface can coexist with unchanged routines, fragmented responsibilities, and paper-based back offices. The analytical problem is therefore not whether governments adopt technology, but when technology produces administrative innovation: a substantive change in organizational processes, governance arrangements, capabilities, or public services that creates public value.

This distinction matters because digitization, digitalization, and digital transformation describe different degrees of change. Digitization converts analogue information into digital form. Digitalization uses digital tools to improve an existing activity. Digital transformation denotes wider organizational and institutional change generated through combinations of digital technologies (Mergel et al., 2019; Vial, 2019). The three processes may overlap, but only the latter necessarily raises questions about structures, authority, professional roles, and institutional rules. Treating every technology project as transformation obscures cases in which administrations merely reproduce existing bureaucracy in electronic form.

Research on public sector innovation reaches a similar conclusion from a different starting point. Innovation is not synonymous with novelty or procurement. It involves the adoption and implementation of an idea that is new to the organization and changes how public value is created (de Vries et al., 2016; Hartley, 2005). Public organizations face distinctive conditions: multiple and sometimes conflicting goals, legal constraints, political accountability, limited tolerance for failure, and the need to protect equality, due process, and privacy. Accordingly, practices that appear efficient from a technical perspective may be unacceptable if they reduce transparency, exclude vulnerable users, or weaken avenues for review.

This paper asks: under what organizational and institutional conditions does digital transformation generate administrative innovation in the public sector? It develops a framework from academic literature and applies it

comparatively to three prominent OECD experiences: the United Kingdom's digital-era reforms and Government Digital Service model, Denmark's highly institutionalized digital public administration, and Estonia's interoperable digital state. The cases are not presented as a performance ranking. They are used as theoretically informative configurations that reveal different routes through which technology, capacity, and institutions interact.

The argument is that digital transformation produces durable administrative innovation when five conditions are aligned: strategic and political leadership; cross-organizational coordination and institutional capacity; a culture that supports learning and controlled experimentation; digital and managerial competencies; and an enabling regulatory framework that also protects public values. Technology is an important resource, but it does not substitute for these conditions. The comparative analysis also shows that digital success can create new forms of dependence, centralization, exclusion, and opacity. Administrative innovation must therefore be judged not only by efficiency and uptake but by adaptability, accountability, inclusion, and the capacity to sustain change over time.

2. CONCEPTUAL AND THEORETICAL FRAMEWORK

2.1. Administrative Innovation in the Public Sector

Administrative innovation encompasses the introduction of new organizational structures, managerial practices, procedures, governance arrangements, and approaches to service delivery within public administration. Hartley (2005) identifies innovation across services, processes, strategies, governance, and rhetoric, demonstrating that innovation in the public sector is not confined to the development of new products. Similarly, the systematic review conducted by de Vries et al. (2016) distinguishes between process, product or service, governance, and conceptual innovation. For the purposes of this paper, administrative innovation covers changes in internal workflows, organizational boundaries, decision-making routines, coordination mechanisms, and interactions between public administrations and service users.

The public-sector setting influences both the factors driving innovation and the criteria used to assess its results. Compared with private firms, public organizations generally face less competitive pressure but are more strongly influenced by political, regulatory, and professional expectations. Innovation may originate from political leaders, middle managers, frontline professionals, or partnerships involving citizens and external organizations. Its outcomes span several dimensions, including efficiency, service quality, public trust, transparency, equity, responsiveness, and democratic participation. Sørensen and Torfing (2011) suggest that collaboration can strengthen the development, selection, and implementation of public innovations by bringing together knowledge and resources across institutional boundaries. Nevertheless, effective collaboration depends on adequate coordination capacity and clearly defined responsibilities.

Institutional theory offers an explanation for why comparable technologies can produce different administrative results. Formal regulations, professional norms, and shared assumptions influence which innovations are regarded as legitimate and how they are put into practice. In response to coercive, mimetic, or normative pressures, organizations may introduce highly visible digital solutions while leaving their underlying practices largely unchanged. Such adoption reflects patterns associated with institutional isomorphism.

(DiMaggio & Powell, 1983). This creates the possibility of ceremonial digitalization: the appearance of modernization without a corresponding transformation of authority, routines, or capabilities.

2.2. From E Government to Digital Transformation

Early studies of e-government largely examined the transfer of information and administrative transactions to online platforms. Later research broadened this focus to include integration, citizen participation, data sharing, and organizational change. Janowski (2015) presents the evolution of digital government as a progression from digitization to transformation and engagement, ultimately leading to policy shaped by its specific context. Dunleavy et al. (2006) characterize digital-era governance through reintegration, needs-based holism, and digitization, suggesting that information technologies can help address some of the fragmentation arising from New Public Management. From these perspectives, technology forms part of a broader restructuring of the state, extending beyond a change in service-delivery channels.

Based on expert interviews, Mergel et al. (2019) understand public-sector digital transformation as a comprehensive effort to reshape core processes and services, rather than merely convert existing activities into digital formats. Gong et al. (2020) similarly highlight the interaction between technological, organizational, and environmental factors in shaping transformation. In their systematic review, Haug et al. (2024) show that digitally driven change can range from gradual adjustments to substantial transformation, with results influenced by leadership, employee skills, organizational structures, and culture. Collectively, these studies challenge technological determinism by showing that a system's technical capabilities alone cannot explain how it is incorporated into administrative practice.

Bureaucracy, in this context, should not be viewed solely as a barrier to change. Formal rules, documented records, consistent procedures, and decisions open to review help uphold legality and equal treatment. Cordella and Tempini (2015) demonstrate that information technology can reinforce bureaucratic arrangements by improving coordination and supporting the consistent application of public rules. The central issue is therefore to determine which bureaucratic characteristics require redesign, which remain essential, and how digital systems can improve responsiveness while maintaining accountability.

2.3. Public Value and the Risks of Digital Change

A public-value perspective broadens assessment beyond cost reduction. Bannister and Connolly (2014) argue that information and communication technology can affect duty-oriented, service-oriented, and socially oriented public values. Twizeyimana and Andersson (2019) identify improved public services, administrative efficiency, open government, ethical behavior, trust, and social value as central dimensions of public value creation through digital government. This implies that a technically successful project may still fail administratively if it worsens accessibility, concentrates discretion in opaque systems, or weakens procedural safeguards.

Artificial intelligence makes these tensions more visible. AI can support classification, forecasting, fraud detection, document processing, and individualized services. At the same time, it can reproduce bias, make reasoning difficult to explain, and blur responsibility between public officials and vendors. Wirtz et al. (2019) identify legal, ethical, social, and implementation challenges alongside potential productivity benefits. Sun and Medaglia (2019) show that public-sector AI adoption is constrained by data quality, organizational capability, legitimacy, and stakeholder conflict. Zuiderwijk et al. (2021) therefore argue that AI governance must address transparency, accountability, participation, and institutional capacity. AI should be treated as a demanding case of administrative innovation, not merely as a more advanced technology.

3. RESEARCH DESIGN AND METHOD

The study uses a qualitative comparative design combining a focused review of academic literature with structured analysis of three national digital-government experiences. The review is integrative rather than a statistical meta-analysis. It draws on peer-reviewed research in public administration, government information systems, organization studies, and innovation studies. Sources were selected for their direct relevance to four analytical areas: definitions of public-sector innovation; conceptualizations of digital transformation; organizational and institutional determinants; and documented national or organizational cases. Foundational studies were combined with recent systematic reviews to connect established theory with current evidence.

The cases—the United Kingdom, Denmark, and Estonia—were selected through purposive, theory-oriented sampling. All are OECD members with mature digital-government arrangements, but they represent different administrative configurations. The United Kingdom illustrates a centrally sponsored digital-service unit seeking to diffuse agile, user-centered practices across a large departmental state. Denmark illustrates long-term institutionalization of digital public administration across a coordinated welfare state and the normalization of mandatory digital interaction. Estonia illustrates an architecture-led model built around interoperable registers, digital identity, and distributed data exchange. Variation across these configurations helps identify common conditions while avoiding the assumption that one institutional model is universally transferable.

A common analytical protocol was applied to each case. The comparison considers: (1) the administrative innovation introduced; (2) the role of leadership and central coordination; (3) organizational culture and learning; (4) competencies and professional roles; (5) legal and institutional arrangements; and (6) public-value tensions. Evidence is interpreted through pattern matching: observations in the case literature are compared with the conditions derived from the conceptual framework. The analysis does not claim causal identification or measure

national performance. Its purpose is analytical generalization—refining an explanation of how digital transformation becomes embedded as administrative innovation.

The design has limitations. Published case literature tends to focus on prominent initiatives and may underrepresent failed or routine projects. National labels can also conceal substantial variation among ministries, municipalities, and policy sectors. Moreover, digital systems develop rapidly, whereas academic publication occurs with delay. These constraints are addressed by limiting claims to mechanisms documented in academic research and by treating each case as a configuration rather than a uniform national reality.

4. ORGANIZATIONAL AND INSTITUTIONAL CONDITIONS

4.1. Leadership and Strategic Direction

Leadership aligns technological opportunities with administrative objectives. Political backing can provide the authority needed to introduce standards across departments, support reform teams, and settle disputes over resources or institutional responsibilities. Administrative leaders translate this support into operational priorities, governance structures, and everyday practices. Because digital transformation frequently disrupts established authority over budgets, data, procurement, and service design, senior-level commitment is essential. In its absence, local incentives tend to encourage separate initiatives and modest improvements.

Effective leadership does not necessarily require centralized implementation. A strong central authority can define shared standards and common components while individual agencies retain responsibility for delivery. What matters is the ability to provide clear direction while enabling learning and adaptation. Mergel (2016) explains that agile innovation in government depends on iterative development, multidisciplinary collaboration, and ongoing feedback, rather than detailed specifications established entirely in advance. Leaders must therefore provide an authorized space for experimentation while ensuring accountability for public expenditure and compliance with legal duties. Maintaining this balance is difficult, as unsuccessful public initiatives can attract political scrutiny even when experimentation is essential to organizational learning.

4.2. Organizational Culture and Learning

Public-sector digital transformation combines exploration and exploitation. Administrations must test new practices while continuing to deliver essential services. A culture oriented exclusively toward error avoidance may encourage large, rigid projects that conceal uncertainty until late stages. Conversely, unconstrained experimentation can create inconsistency and expose citizens to untested decisions. Product-based and agile approaches manage uncertainty through smaller releases, user research, measurable feedback, and continuous improvement.

Culture is embedded in incentives and structures. Employees need permission to question inherited procedures; managers need procurement and budgeting arrangements that support iteration; and organizations need mechanisms for sharing learning across projects. Plesner et al. (2018) demonstrate that digitalization transforms public work by changing visibility, coordination, professional roles, and expectations. Resistance may thus reflect legitimate concerns about autonomy, workload, or service quality rather than simple unwillingness to change. Participation in design and implementation can turn local knowledge into a reform resource.

4.3. Competencies and Professional Roles

Digital capability is organizational, not merely individual. It includes technical expertise, data literacy, service design, product management, legal knowledge, procurement competence, cybersecurity, and the capacity to translate between professions. Multidisciplinary teams are important because public services combine policy rules, operational practice, technology, and citizen experience. Reliance on external vendors can provide scarce skills but may also weaken the state's ability to specify needs, evaluate trade-offs, and adapt systems.

Transformation also changes the competencies required of generalist managers and frontline staff. Managers need sufficient digital understanding to govern portfolios and risks. Frontline workers need to interpret system outputs, identify errors, and explain decisions. When automation is introduced without these complementary capabilities, organizations may become dependent on systems they cannot effectively challenge. Human oversight is meaningful only when officials possess authority, time, and expertise to use it.

4.4. Regulatory Frameworks and Public Value Safeguards

Law can enable transformation by recognizing digital identity, electronic signatures, data exchange, and once-only data collection. It can also establish privacy, security, accessibility, transparency, and review obligations. These safeguards should not be treated as external constraints added after design. They define the legitimate administrative space within which innovation occurs. Embedding legal and ethical expertise in multidisciplinary teams helps translate public values into system requirements.

Regulatory adaptation must also address responsibility. Data-driven and automated systems involve policy owners, data controllers, technical teams, vendors, and frontline users. If responsibility is dispersed, affected citizens may struggle to obtain explanations or corrections. Governance therefore requires audit trails, documented decision rules, contestability, and clear escalation routes. The objective is not to eliminate discretion but to ensure that digitally mediated discretion remains visible and reviewable.

5. COMPARATIVE ANALYSIS OF OECD EXPERIENCES

5.1. United Kingdom Digital Service Reform

The United Kingdom provides an influential example of transformation through a strong central digital unit. Digital-era governance had already emerged as an alternative to fragmented New Public Management, emphasizing reintegration, holistic services, and digital processes (Dunleavy et al., 2006; Margetts & Dunleavy, 2013). The Government Digital Service model gave organizational form to these ideas through common standards, a unified web presence, multidisciplinary teams, user-centered design, and greater internal capability. The relevant administrative innovation was not simply a website. It was a new way of designing, assuring, and continuously improving public services.

This model shows how central leadership can change administrative routines. Cross-government standards and spending controls created leverage over departmental projects, while demonstrator services helped establish the legitimacy of new methods. Agile and product-oriented work challenged conventional sequences in which policy was defined separately from implementation and technology was outsourced after detailed specification. Digital specialists, designers, and product managers gained a stronger role alongside policy and operational professions.

The same experience reveals limits. A central unit's authority must coexist with departmental accountability, legacy systems, and sector-specific expertise. Standards may spread more readily than deeper changes to data, funding, and operating models. Mergel et al. (2019) emphasize that digital transformation requires changes to processes and culture, not only visible service interfaces. The United Kingdom case therefore illustrates both the catalytic value of a protected reform center and the difficulty of institutionalizing its methods across a heterogeneous state.

5.2. Denmark Coordinated and Institutionalized Digital Administration

Denmark represents a more cumulative and institutionalized pathway. Digital public administration developed through sustained coordination among levels of government, common infrastructures, and broad normalization of digital interaction. The administrative innovation lies in embedding digital channels and data use into routine welfare-state administration rather than isolating them in temporary technology programs. Over time, digitalization became part of how organizations define legitimate and efficient administration.

Studies of Danish public organizations show, however, that this process transforms work rather than simply removing it. Plesner et al. (2018) find that digital technologies redistribute tasks, increase the visibility of activities, and reshape coordination and professional identities. Employees must reconcile standardized systems with complex cases and citizen needs. Plesner and Justesen (2022) further show that making legislation digital-ready affects the relationship between legal drafting and administrative implementation: rules must be formulated in ways that can be operationalized digitally, bringing technical and administrative considerations earlier into the policy process.

Denmark also makes inclusion especially important. When digital interaction becomes the default or mandatory channel, efficiency gains for the majority can create barriers for citizens with limited skills, disabilities, language difficulties, or complex circumstances. The case demonstrates that mature transformation requires assisted-

digital arrangements, exceptions, accessible design, and institutional responsibility for users who do not fit standardized pathways. High adoption does not eliminate the need for human support; it changes where support is required.

5.3. Estonia Architecture Led Digital State

Estonia illustrates transformation organized around a coherent institutional and technical architecture. Digital identity, distributed registers, and secure data exchange permit agencies to reuse verified information while retaining responsibility for their own data. The model supports end-to-end digital transactions and reduces the need for citizens to mediate between administrative units. Its administrative innovation is infrastructural: interoperability becomes a durable capability on which multiple services and later innovations can be built.

Kattel and Mergel (2019) explain Estonia's digital transformation through the interaction of political commitment, public-sector capability, institutional experimentation, and a compelling reform narrative. The case cautions against explaining outcomes through technology alone. Architecture mattered because legal recognition, organizational responsibility, and trust arrangements developed with it. The distributed design also combined common rules with agency-level ownership, showing that interoperability does not require a single centralized database.

The Estonian experience nevertheless depends on path-specific conditions, including state-building after independence, administrative scale, and early strategic choices. Direct transplantation to larger or more fragmented states may fail if institutional relationships and data governance are not comparable. The transferable lesson is therefore not a particular platform but the value of stable architectural principles, clear responsibility for authoritative data, and long-term investment in institutional trust and security.

Table 1: Comparative Patterns in Digital Transformation and Administrative Innovation

Dimension	United Kingdom	Denmark	Estonia
Primary pathway	Central digital-service reform and diffusion of user-centered, agile methods	Long-term coordination and normalization of digital administration	Interoperable infrastructure, digital identity, and distributed registers
Main administrative innovation	New service-design, assurance, and product-management routines	Digital integration of routine administration and policy implementation	Reusable state architecture enabling cross-agency services
Key enabling condition	Political sponsorship and a capable reform center	Institutional continuity and cross-government coordination	Coherent architecture linked to law, responsibility, and trust
Persistent tension	Central standards versus departmental autonomy and legacy systems	Efficiency and mandatory digital channels versus inclusion	Transferability, cybersecurity, and dependence on path-specific institutions
General lesson	Reform units can catalyze change but must embed capability beyond the center	Mature digitalization reshapes work and requires support for non-standard users	Infrastructure creates options when governance and accountability develop with it

Source: Authors' synthesis based on Dunleavy et al. (2006), Kattel and Mergel (2019), Margetts and Dunleavy (2013), Mergel et al. (2019), Plesner et al. (2018), and Plesner and Justesen (2022).

5.4. Cross Case Findings

The three cases differ in scale, administrative tradition, and reform pathway, yet they share several mechanisms. First, each links visible services to less visible institutional changes. The United Kingdom connected user-facing reform to service standards and new professional roles; Denmark connected digital channels to coordinated administration and policy design; Estonia connected transactions to identity, registries, and data-exchange rules. Front-end improvement was most consequential when back-office processes and responsibilities were redesigned.

Second, central capacity played a role in every case, but its form varied. In the United Kingdom it appeared as a reform unit with standards and assurance powers. In Denmark it was expressed through sustained coordination

and shared strategic direction. In Estonia it was embodied in architectural rules and common infrastructure. This suggests that the relevant variable is not centralization as such but the state's ability to create and govern common assets while preserving necessary domain expertise.

Third, digital transformation changed work and professional boundaries. New specialists entered administrative processes, data became a cross-organizational resource, and policy choices were increasingly expressed in system rules. These shifts can improve consistency and learning, but they can also conceal discretion inside technical artefacts. Multidisciplinary governance and meaningful avenues for challenge are therefore part of transformation, not secondary controls.

Finally, success generates its own risks. Widely used infrastructures can become difficult to modify; mandatory channels can exclude; central standards can suppress local adaptation; and extensive data exchange can magnify cybersecurity and privacy consequences. Administrative innovation should thus include capacity for revision. A digital system is not institutionally mature because it is stable, but because it can be adapted transparently when law, evidence, technology, or citizen needs change.

6. DISCUSSION

6.1. When Digital Transformation Becomes Administrative Innovation

The analysis suggests that administrative innovation depends on a combination of mutually reinforcing conditions, none of which is sufficient on its own. Leadership unsupported by organizational capability can generate ambitious commitments and reliance on external suppliers. Expertise without institutional authority may remain concentrated in isolated teams. Interoperability without clear legal provisions can lead to disputes over data sharing, while regulation unsupported by design capacity risks embedding outdated procedures. An experimental culture that lacks accountability may encourage initiatives that are difficult to justify to citizens. Lasting administrative innovation therefore requires these elements to work together.

This interpretation sharpens the distinction between incremental and transformative change. Incremental digitalization can deliver meaningful benefits, as online forms and automated workflows may save time and reduce errors. Change becomes transformative when it reshapes interdependent routines, responsibilities, information flows, or governance arrangements across a broader system. The distinction rests on organizational and institutional effects rather than technological novelty. Artificial intelligence, for example, may deliver relatively limited automation, whereas a simple shared data standard can support substantial administrative restructuring.

The cases further indicate that transformation entails both dismantling established institutional practices and embedding new ones. Existing approaches may need to be challenged, but their replacement requires new standards, responsibilities, and safeguards to become part of everyday operations. Temporary innovation laboratories and projects can support exploration, yet sustained public value depends on continued maintenance, wider implementation, and accountability. Institutionalization therefore enables useful innovations to become reliable features of public administration.

6.2. Implications for Public Managers

Public managers should begin with an administrative problem and a public-value objective, not a preferred technology. A service should be mapped across its full journey, including legal rules, data sources, back-office work, exceptions, and redress. This reveals whether the intervention merely adds a digital channel or addresses the causes of fragmentation and delay. Benefits should be specified across efficiency, quality, accessibility, transparency, and fairness, with explicit recognition of trade-offs.

Governance should be organized around products and capabilities rather than one-time implementations. Multidisciplinary teams need continuing responsibility for service performance, security, accessibility, and adaptation. Common components should be governed as public infrastructure with clear ownership, funding, and standards. Procurement should preserve the administration's ability to understand and modify critical systems, including access to data, documentation, and transferable knowledge.

Capability development should extend beyond specialist teams. Senior leaders need digital and data literacy; policy professionals need to understand how rules become code and workflows; operational staff need channels

for reporting system failures and edge cases. Training is necessary but insufficient if job structures, pay, career paths, or decision rights prevent skilled people from influencing outcomes. Institutions must make digital competence consequential.

Evaluation should combine adoption and efficiency metrics with public-value indicators. Useful measures include completion rates, processing time, error and appeal rates, accessibility, differential outcomes among groups, user effort, staff workload, and the speed with which a service can respond to policy change. For automated decisions, evaluation should also examine data quality, explanation, human review, and the distribution of errors. These measures turn safeguards into operational responsibilities rather than abstract principles.

6.3. A Framework for Responsible Administrative Transformation

The findings can be summarized as a five-part framework. First, strategic leadership defines the public problem and authorizes cross-boundary change. Second, institutional capacity supplies coordination, architecture, procurement intelligence, and continuity. Third, organizational learning enables iterative development while preserving accountability. Fourth, competencies connect technical, policy, legal, and operational knowledge. Fifth, regulation and public-value safeguards establish legitimate use, inclusion, transparency, and redress. Feedback among all five is essential because implementation exposes issues that strategy and regulation must address.

The framework also identifies a practical sequence. Administrations should diagnose the service system and its institutional constraints; define public-value outcomes; design governance and capability arrangements; develop and test changes with users and staff; evaluate distributional as well as aggregate effects; and institutionalize mechanisms for maintenance and revision. This sequence is iterative rather than linear. Its purpose is to keep technological development connected to administrative responsibility throughout the life of the service.

7. CONCLUSION

Digital transformation can contribute to substantial public-sector reform, yet the adoption of technology does not, by itself, amount to administrative innovation. Comparative evidence from the United Kingdom, Denmark, and Estonia indicates that meaningful reform occurs when digital systems are integrated with redesigned processes, shared infrastructure, evolving professional practices, and legitimate institutional rules. Different administrative traditions can achieve such change through distinct arrangements, including centrally directed reform, sustained coordination across levels of government, or state building guided by digital architecture. These experiences offer no universal model for replication.

Five conditions consistently emerge across the cases: leadership, institutional and coordination capacity, a culture that encourages learning, multidisciplinary expertise, and regulatory frameworks that support digital activity while safeguarding public values. These conditions reinforce one another. Where they are missing, technically effective projects may remain marginal, perpetuate fragmentation, or introduce additional risks. When these conditions align, digital initiatives can produce lasting changes in administrative practice.

The study contributes to existing scholarship by bringing together research on public-sector innovation and digital transformation, while positioning public values as integral to transformation itself. Although efficiency and ease of use remain significant, administrative innovation must also uphold legality, inclusion, transparency, security, and opportunities to challenge decisions. These considerations become particularly relevant as artificial intelligence assumes a greater role in processes involving administrative judgment.

Future research should assess the framework through longitudinal and sector-specific studies. Further comparative analysis is needed to understand how digital reforms develop beyond their initial political backing, how organizations sustain their capabilities, how frontline discretion evolves, and how benefits and burdens are distributed across citizens. Greater attention should also be given to unsuccessful initiatives, which receive less coverage in the literature but may reveal institutional constraints more clearly. The principal policy implication is that investment in digital technology must be accompanied by investment in the administrative capacity required to govern its use, adapt it to changing needs, and justify it to the public.

REFERENCES

Bannister, F., & Connolly, R. (2014). ICT, public values and transformative government: A framework and programme for research. Government Information Quarterly, 31(1), 119–128. https://doi.org/10.1016/j.giq.2013.06.002

Cordella, A., & Tempini, N. (2015). E-government and organizational change: Reappraising the role of ICT and bureaucracy in public service delivery. Government Information Quarterly, 32(3), 279–286. https://doi.org/10.1016/j.giq.2015.03.005

de Vries, H., Bekkers, V., & Tummers, L. (2016). Innovation in the public sector: A systematic review and future research agenda. Public Administration, 94(1), 146–166. https://doi.org/10.1111/padm.12209

DiMaggio, P. J., & Powell, W. W. (1983). The iron cage revisited: Institutional isomorphism and collective rationality in organizational fields. American Sociological Review, 48(2), 147–160. https://doi.org/10.2307/2095101

Dunleavy, P., Margetts, H., Bastow, S., & Tinkler, J. (2006). New Public Management is dead—Long live digital-era governance. Journal of Public Administration Research and Theory, 16(3), 467–494. https://doi.org/10.1093/jopart/mui057

Fountain, J. E. (2001). Building the virtual state: Information technology and institutional change. Brookings Institution Press.

Gil-Garcia, J. R., Dawes, S. S., & Pardo, T. A. (2018). Digital government and public management research: Finding the crossroads. Government Information Quarterly, 35(4), 633–646. https://doi.org/10.1016/j.giq.2018.11.002

Gong, Y., Yang, J., & Shi, X. (2020). Towards a comprehensive understanding of digital transformation in government: Analysis of flexibility and enterprise architecture. Government Information Quarterly, 37(3), 101487. https://doi.org/10.1016/j.giq.2020.101487

Hartley, J. (2005). Innovation in governance and public services: Past and present. Public Money & Management, 25(1), 27–34. https://doi.org/10.1111/j.1467-9302.2005.00447.x

Haug, N., Dan, S., & Mergel, I. (2024). Digitally-induced change in the public sector: A systematic review and research agenda. Public Management Review, 26(7), 1963–1987. https://doi.org/10.1080/14719037.2023.2234917

Janowski, T. (2015). Digital government evolution: From transformation to contextualization. Government Information Quarterly, 32(3), 221–236. https://doi.org/10.1016/j.giq.2015.07.001

Kattel, R., & Mergel, I. (2019). Estonia's digital transformation: Mission mystique and the hiding hand. In P. 't Hart & M. Compton (Eds.), Great policy successes (pp. 143–160). Oxford University Press. https://doi.org/10.1093/oso/9780198843719.003.0008

Margetts, H., & Dunleavy, P. (2013). The second wave of digital-era governance: A quasi-paradigm for government on the Web. Philosophical Transactions of the Royal Society A: Mathematical, Physical and Engineering Sciences, 371(1987), 20120382. https://doi.org/10.1098/rsta.2012.0382

Mergel, I. (2016). Agile innovation management in government: A research agenda. Government Information Quarterly, 33(3), 516–523. https://doi.org/10.1016/j.giq.2016.07.004

Mergel, I., Edelmann, N., & Haug, N. (2019). Defining digital transformation: Results from expert interviews. Government Information Quarterly, 36(4), 101385. https://doi.org/10.1016/j.giq.2019.06.002

Plesner, U., & Justesen, L. (2022). The double darkness of digitalization: Shaping digital-ready legislation to reshape the conditions for public-sector digitalization. Administration & Society, 54(4), 685–710. https://doi.org/10.1177/00953997211037556

Plesner, U., Justesen, L., & Glerup, C. (2018). The transformation of work in digitized public sector organizations. Journal of Organizational Change Management, 31(5), 1176–1190. https://doi.org/10.1108/JOCM-06-2017-0257

Scholta, H., Mertens, W., Kowalkiewicz, M., & Becker, J. (2019). From one-stop shop to no-stop shop: An e-government stage model. Government Information Quarterly, 36(1), 11–26. https://doi.org/10.1016/j.giq.2018.11.010

Sørensen, E., & Torfing, J. (2011). Enhancing collaborative innovation in the public sector. Administration & Society, 43(8), 842–868. https://doi.org/10.1177/0095399711418768

Sun, T. Q., & Medaglia, R. (2019). Mapping the challenges of artificial intelligence in the public sector: Evidence from public healthcare. Government Information Quarterly, 36(2), 368–383. https://doi.org/10.1016/j.giq.2018.09.008

Tangi, L., Janssen, M., Benedetti, M., & Noci, G. (2021). Digital government transformation: A structural equation modelling analysis of driving and impeding factors. International Journal of Information Management, 60, 102356. https://doi.org/10.1016/j.ijinfomgt.2021.102356

Twizeyimana, J. D., & Andersson, A. (2019). The public value of e-government: A literature review. Government Information Quarterly, 36(2), 167–178. https://doi.org/10.1016/j.giq.2019.01.001

Vial, G. (2019). Understanding digital transformation: A review and a research agenda. The Journal of Strategic Information Systems, 28(2), 118–144. https://doi.org/10.1016/j.jsis.2019.01.003

Wirtz, B. W., Weyerer, J. C., & Geyer, C. (2019). Artificial intelligence and the public sector—Applications and challenges. International Journal of Public Administration, 42(7), 596–615. https://doi.org/10.1080/01900692.2018.1498103

Zuiderwijk, A., Chen, Y.-C., & Salem, F. (2021). Implications of the use of artificial intelligence in public governance: A systematic literature review and a research agenda. Government Information Quarterly, 38(3), 101577. https://doi.org/10.1016/j.giq.2021.101577

Fiscalisation as a Control Boundary: Internal Control in Digitally Transforming SMEs

PhD (c) Zamira Yildirim **Prof. Dr. Suzana Guxholli**

Universiteti Barleti, Albania, zamiragerra@umb.edu.al, ORCID ID: 0009-0001-3572-8953

Abstract: Digitalisation is changing how small and medium-sized enterprises (SMEs) generate, process and report transaction information. This is particularly relevant in the Western Balkans, where electronic invoicing has become widespread while deeper digital integration remains limited. The OECD (2026) reports that e-invoicing is used by 58% of surveyed SMEs in the region, reaching 77% in Albania, whereas ERP and cloud technologies remain far less adopted. Recent research has examined related aspects of this transformation. Broccardo et al. (2023) show that digitalisation contributes to more mature management control systems in Italian SMEs, while Roffia and Dabić (2024) highlight the role of management control and integrated information systems in SME resilience. Judijanto et al. (2025) link e-invoice automation and internal control to reductions in tax adjustments, though their focus remains on regulatory outcomes rather than the internal mechanisms producing them. The literature on Continuous Transaction Controls (CTC) further distinguishes pre-clearance from post-clearance validation regimes. These streams offer limited insight into how SMEs organise internal preventive controls around the point at which a transaction enters a digitally enforced fiscal system. This paper presents work in progress conceptualising fiscalisation as a potential *control boundary* within SMEs: a point where information-processing demands shift as transactions move from internal handling to formal fiscal recording. Drawing on Organizational Information Processing Theory (OIPT), it develops a framework distinguishing preventive controls from corrective controls, derives four theoretical propositions, and proposes an exploratory qualitative design combining a focused literature review with semi-structured interviews with accounting and finance professionals in Albanian SMEs, to be implemented in a subsequent empirical phase. The study contributes to the literature on digitalisation, management control and e-invoicing by shifting focus from technology adoption and tax compliance towards the organisational timing of internal control at the boundary between internal transaction processing and formal fiscal recording.

Keywords: fiscalisation, internal control, digitalisation, SMEs, Organizational Information Processing Theory

JEL Classification: M42, M41, L86, O33

1. INTRODUCTION

Digitalisation is reshaping the way small and medium-sized enterprises (SMEs) generate, process and report transaction information. For many SMEs the first and most visible form of digitalisation is not a strategic investment in enterprise systems but a regulatory one: the obligation to issue invoices electronically and to submit them to, or have them validated by, the tax authority. In the Western Balkans this pattern is pronounced. According to the OECD (2026), e-invoicing is used by 58% of surveyed SMEs in the region and by 77% in Albania, whereas enterprise resource planning (ERP) and cloud technologies are used far less. Electronic invoicing has therefore become widespread faster than the deeper information-system integration that would normally support it.

This asymmetry raises an organisational question that has received little attention. When a transaction must pass through a digitally enforced fiscal system, the moment at which it becomes a formal, externally visible record moves from the period-end close to the moment of issuance. An error that was previously corrected quietly during monthly reconciliation may now already be visible to the tax authority, may already have reached the customer, and may require a formal correcting document rather than an internal adjustment. The timing of internal control relative to the fiscalisation point can therefore matter for the cost of errors, for the burden placed on accounting staff, and for the reliability and usefulness of the information that management eventually receives.

Existing research explains how digitalisation affects management control, how e-invoicing supports assurance, and how CTC regimes change tax reporting. Studies show that digitalisation can strengthen management control systems in SMEs (Broccardo et al., 2023; Roffia & Dabić, 2024), that low-complexity ERP systems may support continuous auditing (Gonçalves & Imoniana, 2023), and that e-invoice automation combined with internal control is associated with fewer tax adjustments (Judijanto et al., 2025). The policy literature on Continuous Transaction Controls (CTC) distinguishes regimes in which the tax authority validates invoices before or shortly after transmission (OECD, 2024). What remains underexplored is how SMEs organise their own preventive and corrective controls around the fiscalisation point, and particularly how preventive controls before submission interact with corrective controls after submission.

This paper addresses that gap by proposing to treat fiscalisation as a *control boundary*: the point at which a transaction leaves internal processing and enters formal fiscal recording. The paper is guided by two research questions that also frame a wider doctoral project on fiscalisation and SME control in Albania:

- RQ1: How do SMEs adapt internal control mechanisms to identify, correct and monitor transaction anomalies in a digitally fiscalised environment?
- RQ2: How do accounting and finance professionals perceive the effects of these control mechanisms on the reliability and timeliness of information used for managerial monitoring and decision-making?

The present paper is work in progress. It develops the conceptual framework, derives theoretical propositions grounded in Organizational Information Processing Theory (OIPT) and specifies an exploratory qualitative research design; the empirical phase, based on semi-structured interviews with accounting and finance professionals in Albanian SMEs, is planned as the next stage. The paper contributes by shifting attention from technology adoption and tax compliance towards the organisational timing of internal control at the boundary between internal transaction processing and formal fiscal recording. The remainder of the paper reviews the literature (Section 2), sets out the theoretical framework (Section 3), describes the context (Section 4), presents the conceptual framework and propositions (Section 5), specifies the research design (Section 6), discusses expected contributions and implications (Section 7) and closes with limitations, next steps and conclusions (Sections 8 and 9).

2. LITERATURE REVIEW

2.1 Digitalisation and management control in SMEs

Research on management control in small firms has long emphasised that control is exercised through a package of mechanisms rather than a single system (Malmi & Brown, 2008), and that diagnostic controls and interactive controls play different roles in monitoring and learning (Simons, 1995). Recent work links this view to digital transformation. Broccardo et al. (2023) find that digitalisation can contribute to more mature management control systems in Italian SMEs, while Roffia and Dabić (2024) highlight the relevance of management control and integrated information systems for SME resilience. Common to these studies is the finding that digital technologies matter for control when they are integrated into how information is produced and used, not merely when they are adopted. This is important for the Western Balkans, where adoption of e-invoicing is high but integrated systems are less common (OECD, 2026).

2.2 E-invoicing, continuous auditing and internal control

A second stream examines whether digital transaction data can support more continuous forms of assurance and control. Gonçalves and Imoniana (2022) assess the readiness of low-complexity ERP systems to support continuous auditing in SMEs, pointing to the conditions under which even simple systems can generate data suitable for continuous monitoring. Judijanto et al. (2025) connect e-invoice automation and internal control with reductions in tax adjustments, suggesting that automation and control jointly improve the quality of tax-relevant information. These contributions focus mainly on outcomes, such as fewer adjustments or greater audit readiness. They say less about the internal organisational mechanisms through which firms detect and correct anomalies, and about when in the transaction cycle those mechanisms operate. Internal control frameworks such as COSO (2013) describe preventive and detective control activities in general terms but were not designed to address the specific situation in which an external authority participates in the validation of each transaction.

2.3 Continuous Transaction Controls and the fiscal boundary

The tax-policy literature describes Continuous Transaction Controls (CTC) as a family of regimes in which tax authorities obtain, and in some designs approve, transaction data at or near the time of the transaction. A central distinction is between pre-clearance models, in which the authority validates an invoice before it is transmitted to the buyer, and post-clearance or reporting models, in which invoices are transmitted and reported shortly afterwards (OECD, 2024). From the perspective of the taxpayer, these designs place the point of formal recording at different moments and impose different consequences for errors. The CTC literature, however, is written mainly from the viewpoint of tax administration: it analyses design, compliance and revenue effects, and does not describe how the regulated firm reorganises its internal controls in response.

2.4 Research gap

Taken together, these streams establish that digitalisation can strengthen control, that digital transaction data can support continuous assurance, and that fiscal systems increasingly validate transactions in near real time. They do not explain how SMEs organise preventive controls around the point at which a transaction enters a digitally enforced fiscal system, nor whether the timing of control, before or after fiscalisation, affects the reliability and usefulness of the resulting information. This paper positions itself in that gap.

3. THEORETICAL FRAMEWORK: ORGANIZATIONAL INFORMATION PROCESSING THEORY

Organizational Information Processing Theory (OIPT) views organisations as systems that must process information to reduce uncertainty and coordinate activities (Galbraith, 1973). Its central proposition is one of fit: performance is higher when an organisation's information processing capacity matches the information processing requirements it faces (Tushman & Nadler, 1978). Requirements increase with task uncertainty, interdependence between units and environmental demands. Capacity can be increased through investment in information systems, vertical information flows, lateral relations and additional processing resources, or requirements can be reduced through slack resources, standardisation and self-contained tasks.

OIPT is used not simply because fiscalisation is digital, but because the central phenomenon concerns a change in information-processing requirements and the organisational capacity required to respond to them.

OIPT is well suited to the fiscalisation setting for three reasons. First, fiscalisation is an externally imposed change in the information environment: it adds a formal validation step, strict data formats, time constraints and external visibility to each transaction. Second, it is a discontinuity rather than a gradual change, because before submission a transaction is an internal matter and after submission it is a formal record. Third, SMEs typically operate with limited and heterogeneous processing capacity, so the fit between requirements and capacity is an open empirical question rather than a given.

We therefore conceptualise the *fiscalisation point* as the moment at which a transaction is submitted to, or validated by, the fiscal system. Information processing requirements rise around this point in at least four respects: formal validity (mandatory data elements and formats), timing (issuance and submission in near real time), external visibility (the authority can observe the record) and correction cost (errors after submission require formal documents such as cancellations or credit notes rather than internal adjustment). SMEs can respond by relocating validation upstream, that is, by reducing the need for correction through better checks before submission, or by building capacity downstream through reconciliation and correction routines. The choice between these responses, and the capacity that supports it, is what this paper terms the organisation of control around the control boundary.

Four constructs are used throughout. *Preventive controls* are activities that validate transaction data and detect anomalies before fiscal submission. *Corrective controls* are activities that identify and correct anomalies after submission, including reconciliation and formal correcting documents. *Monitoring and reconciliation* refers to systematic comparison of fiscal records with internal accounting and management records. *Information reliability and timeliness* refers to the extent to which management information is accurate, consistent with fiscal records and available when decisions are made.

4. CONTEXT: FISCALISATION AND SME DIGITALISATION IN ALBANIA AND THE WESTERN BALKANS

The Western Balkans represent a particularly informative research context, as the region's SMEs display a pronounced asymmetry in the pace and depth of digital adoption The OECD (2026) reports high use of e-invoicing (58% of surveyed SMEs across the region and 77% in Albania) alongside substantially lower use of ERP and cloud technologies. In other words, many SMEs have been brought into a digitally enforced fiscal environment without necessarily having the integrated internal systems that would support upstream validation. This combination is the very condition under which the location of internal control relative to the fiscalisation point becomes consequential.

Albania has introduced a mandatory fiscalisation regime under which invoices are issued and reported through a central electronic platform. Under **Law No. 87/2019** ("On the invoice and the turnover monitoring system") and its subsequent amendment **Law No. 108/2020**, **September 1, 2021** marked the final phase of Albania's "Fiscalization" (*Fiskalizimi*) rollout, making real-time electronic invoicing and e-reporting mandatory across all categories of taxpayers.. Two features of this regime are relevant here. First, the regime places a formal,

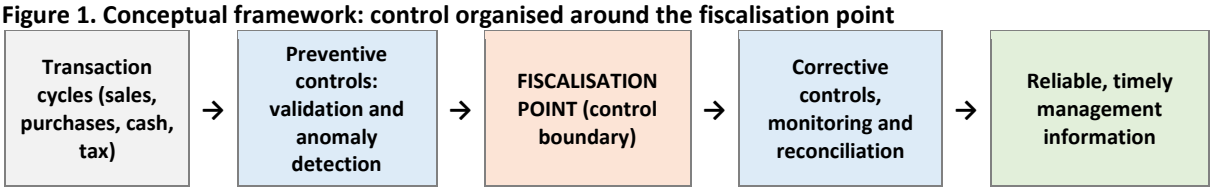
externally visible record at the point of issuance, so that corrections after fiscalisation leave a trace. Second, the regime coexists with a business population in which 99.9% of active enterprises in the economy are small and medium enterprises (INSTAT 2024) and in which accounting is frequently performed by a small in-house team or by external accountants. These characteristics make Albania an informative exploratory context for examining how internal control is organised around the fiscalisation point, while the findings should be read as context-specific rather than general.

5. CONCEPTUAL FRAMEWORK AND PROPOSITIONS

5.1 Framework

Figure 1 summarises the framework. Transactions originate in the sales, purchase, cash and tax cycles of the SME. Before the fiscalisation point, preventive controls validate transaction data and detect anomalies. At the fiscalisation point, the transaction enters the fiscal system. After it, corrective controls and systematic monitoring and reconciliation compare fiscal and internal records and correct differences. The quality of these mechanisms shapes the reliability and timeliness of the information that reaches management. The framework corresponds to the process-based model on which the wider doctoral project is built (Digital Fiscalisation Environment, Sales Control, Purchase Control, Cash Control, Tax Control, Monitoring and Reconciliation, High-quality Management Reporting) and isolates the element that this paper concentrates on: the timing of control relative to the fiscalisation point.

Figure 1. Conceptual framework: control organised around the fiscalisation point



Source: author's own conceptualisation. Information processing capacity (integration of accounting information systems, staff competence, procedures) is expected to condition the strength of both control layers.

5.2 Control activities before and after fiscalisation

Table 1 illustrates how the preventive and corrective layers may appear in the four transaction cycles. The examples are indicative and will be refined and tested in the empirical phase.

Table 1. Indicative preventive and corrective control activities by cycle

Cycle	Before fiscalisation (preventive)	After fiscalisation (corrective and monitoring)
Sales	Validation of customer identification, item, price and tax rate before issuance; authorisation of exceptions; completeness check of mandatory fields	Reconciliation of fiscalised invoices with the sales ledger; issue of cancellations or credit notes; review of rejected or unmatched documents
Purchases	Matching of supplier documents with orders and receipts before recording; checks on supplier data and tax treatment	Reconciliation of received e-invoices with the fiscal platform and the purchase ledger; follow-up of missing or disputed documents
Cash	Matching of payment method and till or POS data to the invoice before submission; cash-handling limits	Reconciliation of fiscalised sales with bank and cash records; investigation of differences
Tax	Pre-submission checks of tax classification and rates	Reconciliation of tax returns with fiscal records; review of adjustments
Monitoring	Exception reports and rules embedded in the system; defined responsibilities	Periodic analysis of corrections, delays between transaction and fiscal recording, and differences between fiscal and management records

Source: author's own conceptualisation.

5.3 Control configurations

Because firms may weight the two layers differently, the framework distinguishes three ideal-typical configurations (Table 2). These are analytical devices for guiding data collection and comparison, not findings.

Table 2. Ideal-typical control configurations around the fiscalisation point

Configuration	Characteristics	Expected implications
Preventive-dominant	Most validation and anomaly detection occurs before submission; few post-submission corrections	Higher upfront effort and capacity requirements; lower correction cost and closer alignment between fiscal and management records
Corrective-dominant	Fiscalisation is treated as the checkpoint; anomalies are mainly found and corrected afterwards	Lower upfront effort but more formal corrections, higher reconciliation burden and greater exposure of errors to the authority
Hybrid	Selective pre-submission checks for high-risk transactions combined with systematic post-submission reconciliation	Balance between effort and correction cost; dependence on clear risk criteria and monitoring routines

Source: author's own conceptualisation.

5.4 Propositions

Drawing on OIPT and the framework above, four propositions are advanced. They are intended to guide the empirical phase and to be revised in light of the data.

P1. As fiscalisation raises information processing requirements around the point of submission, SMEs will relocate part of their transaction validation and anomaly detection to the stage before submission.

P2. The extent of upstream (preventive) control depends on internal information processing capacity, in particular the integration of accounting information systems and the competence of accounting staff; SMEs with lower integration will rely more on manual pre-checks or on post-submission correction.

P3. Corrections after fiscalisation are costlier than corrections before it because they create formal, externally visible records; SMEs that treat fiscalisation as a corrective checkpoint will therefore report a heavier reconciliation and correction burden.

P4. Systematic post-fiscalisation monitoring and reconciliation improves the reliability and timeliness of management information, whereas ad hoc reconciliation is associated with divergence between fiscal records and management records.

6. PROPOSED RESEARCH DESIGN

This section specifies the design that will be implemented in the empirical phase. No primary data have yet been collected.

6.1 Approach and rationale

An exploratory qualitative design is appropriate because the phenomenon, the organisation of control around the fiscalisation point, is poorly documented, the constructs are still being refined and the aim is to understand practices and their rationale rather than to estimate effects. The design combines a focused literature analysis, used to refine the framework and interview guide, with semi-structured interviews, which allow comparable coverage of the core themes while leaving room for firm-specific detail. A comparative logic across firms is used to identify recurring configurations (Eisenhardt, 1989).

6.2 Sampling

Purposive sampling will be used to recruit accounting and finance professionals in Albanian SMEs operating under mandatory fiscalisation. The target is approximately 12 to 15 interviews, to be adjusted according to

thematic saturation. Participants will be selected to vary in three dimensions: sector (for example retail, services, wholesale and production), size (micro, small and medium) and degree of digital integration (e-invoicing only versus ERP-supported accounting). Both in-house finance staff and external accountants serving SME clients will be included, given that accounting responsibilities in SMEs are often split between the two.

6.3 Data collection

Interviews will follow a semi-structured guide organised around the framework: (i) the firm and its systems; (ii) the flow of transactions to fiscalisation; (iii) validation and anomaly detection before submission; (iv) reconciliation and correction after submission; (v) monitoring and management reporting; and (vi) constraints, resources and perceived changes since fiscalisation. An indicative guide is provided in Appendix A. Interviews are expected to last 40 to 60 minutes, will be conducted in Albanian, audio-recorded with consent and transcribed. Where participants agree, non-sensitive supporting documents, such as a description of internal procedures or an anonymised example of an exception or correction log, will be collected to triangulate accounts.

6.4 Analysis

Transcripts will be analysed thematically (Braun & Clarke, 2006), combining deductive codes derived from the framework (preventive controls, corrective controls, monitoring and reconciliation, capacity, information reliability and timeliness) with inductive codes that emerge from the data. Following the logic of structured qualitative analysis (Gioia et al., 2013), first-order participant terms will be grouped into second-order themes and aggregate dimensions. Cross-case comparison will then be used to classify firms into control configurations and to examine whether the patterns are consistent with propositions P1 to P4. Quotations used in reporting will be translated into English by the author and checked by a second bilingual reader.

6.5 Quality and ethics

Trustworthiness will be supported by a clear audit trail of coding decisions, triangulation with documents where available, reflexive notes and, where feasible, sharing of a short summary with participants for comment. Participation will be voluntary and based on informed consent; firms and individuals will be anonymised, and data will be stored securely and used only for research purposes

7. EXPECTED CONTRIBUTIONS AND IMPLICATIONS

Theoretical contribution. The paper extends the application of OIPT to a setting in which an external regulator introduces a discontinuity into the information environment of small firms. It offers the concept of the control boundary and a set of propositions on how firms locate control relative to that boundary, thereby complementing research that has focused on technology adoption or on compliance outcomes (Broccardo et al., 2023; Judijanto et al., 2025).

Contribution to management control research. By focusing on timing, the paper adds a temporal dimension to the study of control packages in SMEs (Malmi & Brown, 2008) and links internal control practice to the quality of information available for managerial monitoring and decision-making, which is the concern of RQ2.

Practical implications. For SME owners and accountants, the framework may help to identify where anomalies are best caught and how to allocate limited processing capacity between prevention and correction. For professional bodies and software providers, it points to the design of validation routines and exception reports that operate before submission. For tax authorities and policymakers, it suggests that the design of clearance and reporting requirements interacts with SME capacity, so that support measures may need to address internal control capability as well as technology access.

8. LIMITATIONS AND NEXT STEPS

The paper is conceptual and its propositions have not been tested; the framework and typology may change once data are collected. The proposed sample is small and drawn from one country, so the findings will be analytically rather than statistically generalisable, and reliance on interviews means that practices will be reported from the perspective of participants. The framework also treats the fiscalisation point as a single

boundary, whereas actual regimes may include several stages, such as rejection and re-submission, that could be examined in later work.

The next steps are to finalise the interview guide, obtain any required institutional approval, recruit participants and conduct the interviews, and to integrate the resulting evidence into the doctoral project, where the control boundary perspective will inform the analysis of the sales, purchase, cash and tax control cycles and of monitoring and reconciliation. The propositions may subsequently be examined with larger samples using survey methods.

9. CONCLUSION

Fiscalisation moves the moment at which a transaction becomes a formal record, and thereby changes what it means for an SME to control its transactions. This paper has proposed to treat that moment as a control boundary, has used OIPT to explain why SMEs may locate validation, anomaly detection, reconciliation and correction differently before and after it, and has set out propositions and a research design for examining this in Albanian SMEs. If supported, the perspective would offer researchers a more precise way to study digitalisation and internal control in small firms, and would offer practitioners and policymakers a clearer view of how digitally enforced fiscal requirements interact with the organisation of control.

REFERENCES

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology, 3*(2), 77–101.

Broccardo, L., Truant, E., & Dana, L. P. (2023). The interlink between digitalization, sustainability, and performance: An Italian context. Journal of Business Research, 158, 113621.

COSO (Committee of Sponsoring Organizations of the Treadway Commission). (2013). *Internal Control – Integrated Framework*. COSO.

Eisenhardt, K. M. (1989). Building theories from case study research. *Academy of Management Review, 14*(4), 532–550.

Galbraith, J. R. (1973). *Designing complex organizations*. Addison-Wesley.

Gioia, D. A., Corley, K. G., & Hamilton, A. L. (2013). Seeking qualitative rigor in inductive research: Notes on the Gioia methodology. *Organizational Research Methods, 16*(1), 15–31.

Goncalves, R. C. M. G., & Imoniana, J. O. (2022). Readiness of low complexity ERP for continuous auditing in SMEs: The Brazilian case study. Control and Cybernetics, 51(3), 389-420.

Judijanto, L., Hardiansyah, A., & Arifudin, O. (2025). Ethics and security in artificial intelligence and machine learning: Current perspectives in computing. *International Journal of Society Reviews (INJOSER)*, *3*(2), 374-380.

Malmi, T., & Brown, D. A. (2008). Management control systems as a package: Opportunities, challenges and research directions. *Management Accounting Research, 19*(4), 287–300.

OECD. (2024). *Consumption Tax Trends 2024*. OECD Publishing. https://www.oecd.org/en/publications/2024/11/consumption-tax-trends-2024_57c7322a.html

OECD. (2026). *Western Balkans Enterprise Survey*. OECD Publishing. https://www.oecd.org/en/publications/western-balkans-enterprise-survey_a1b14188-en.html

Roffia, P., & Dabić, M. (2024). The role of management control and integrated information systems for the resilience of SMEs. *Review of Managerial Science*, *18*(5), 1353-1375.

Simons, R. (1995). *Levers of control: How managers use innovative control systems to drive strategic renewal*. Harvard Business School Press.

Tushman, M. L., & Nadler, D. A. (1978). Information processing as an integrating concept in organizational design. *Academy of Management Review, 3*(3), 613–624.

INSTAT (2024) Statistics on small and medium enterprises. INSTAT Publishing. https://www.instat.gov.al/en/themes/industry-trade-and-services/structural-business-statistics/publication/2026/statistics-on-small-and-medium-enterprises-2024/

Appendix A. Indicative interview guide

Theme	Indicative questions
1. Firm and systems	What systems do you use for invoicing, accounting and reporting? Who is responsible for recording and checking transactions?
2. Path to fiscalisation	Describe how a sale (and a purchase) moves from the moment it occurs to its fiscal recording. Which steps are manual and which automated?

Theme	Indicative questions
3. Before submission	What checks are made before an invoice is submitted? How are errors or unusual transactions identified? Who authorises exceptions?
4. After submission	What happens when an error is found after submission? How often does this occur and what does correction involve? How are fiscal records reconciled with accounting records?
5. Monitoring and reporting	How do you monitor differences, delays and corrections? How reliable and timely is the information that reaches management, and how is it used?
6. Capacity and change	What resources, skills and tools support these controls? What has changed in your control practices since fiscalisation, and why?

Risks to the Development of External Demand for a Small Open Economy

Eleonóra Matoušková

Bratislava University of Economics and Business, eleonora.matouskova@euba.sk, ORCID: https://orcid.org/0000-0001-7286-1414

Abstract: The Slovak Republic, as a small country, i.e. also a small economy, is dependent on the export of its products. Slovakia's exports account for approximately 85% of GDP, imports account for approximately 82% of GDP. Therefore, this economy is very sensitive to changes in foreign demand and to fluctuations in the business cycle in general. The level of openness of the Slovak economy has long reached around 170% of GDP and is one of the most open economies within the EU and OECD countries. Like Slovakia, two other countries within the V-4 are in a similar situation, namely Hungary and the Czech Republic, which are also smaller countries. The aim of the article is to identify changes in foreign demand over the past twenty years and their impact on individual economies. A significant decline in foreign demand occurred in Slovakia during the years of the global financial crisis (-16.4% exports and -18.9% imports) and the economic crisis caused by the coronavirus pandemic (-16.7% exports in 2020). Even today, there is considerable uncertainty on foreign markets. In particular, it concerns the question of the development of the German economy, the possible introduction of new or an increase in existing tariffs, the rise in energy prices, and geopolitical tensions. This increases concerns about the growth of the Slovak economy, which is already below 1% of GDP in 2026 and the development may deteriorate even more.

Keywords: openness of the economy, foreign demand, economic performance.

1. INTRODUCTION

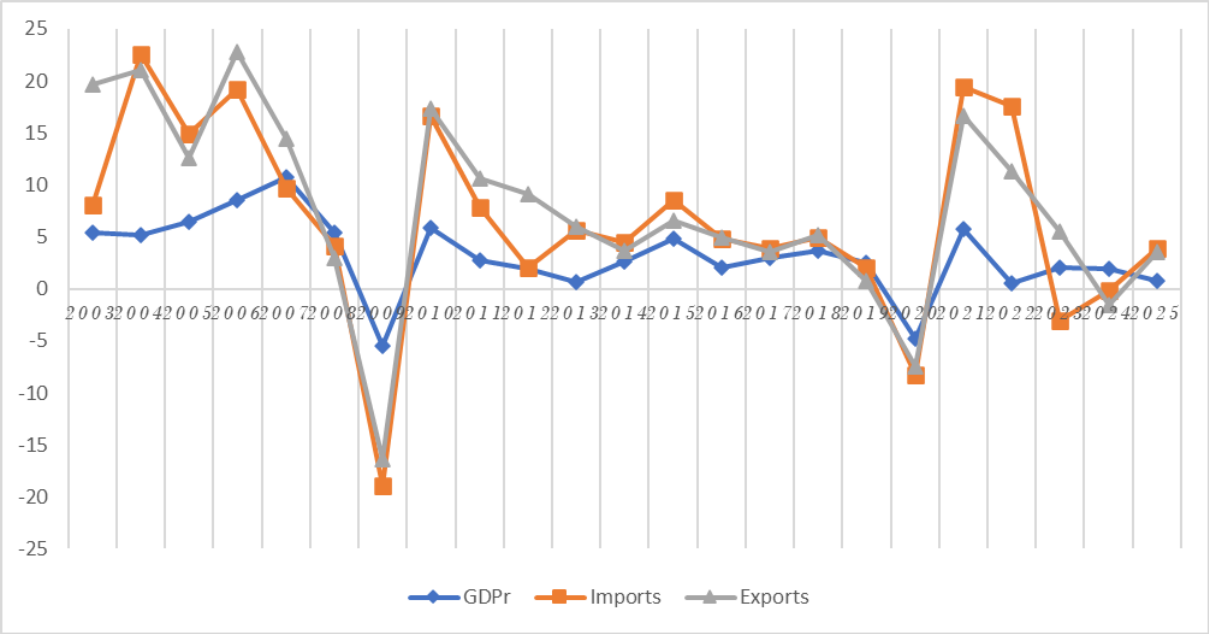
Slovakia is a small, open and export-oriented economy. The high openness of the economy and the dependence on the export of manufactured goods can be a risk for the country. In 2019, the openness of the Slovak economy reached 185% of GDP. The value of goods and services exported from Slovakia represented 93% of GDP. The share of imports was 92% of GDP. It was the fourth most open economy in the European Union. Only three countries have a higher level of openness, namely Luxembourg, Malta and Ireland. Within the V4 countries (the Slovak Republic, the Czech Republic, Hungary and Poland), Hungary is approaching the openness of the Slovak economy with a share of exports and imports of goods and services in GDP at the level of 163%. The Czech economy has achieved an openness of 145% of GDP. Among the V4 countries, Poland has the lowest openness, which, as a large economy, achieves an openness level of 106% of GDP. Lower openness can be an advantage in certain circumstances, as it means less sensitivity to changes in the external environment.

2. CYCLICAL DEVELOPMENT OF EXPORTS AND IMPORTS IN THE PERIOD 2003 – 2020

During the monitored period, which for us is the period 2003 – 2025, Slovakia's GDP was subject to cyclical fluctuations. The situation was the same for other economies whose development we follow in our article. Economies have gone through two phases of economic recession. The first recession was caused by the global financial crisis in 2008/2009 and was reflected in a decline in GDP in all monitored countries. The second recession was triggered by the spread of the coronavirus pandemic. GDP contracted again in 2020. However, the decline in the economy was lower than in 2009.

The cyclical development of the economy was accompanied by the cyclical development of exports and imports. In the case of the Slovak economy, which, as a small economy, is dependent on exports, the decline in foreign demand was the main, or rather one of the most serious triggers of the economic recession.

Graph 1: Cyclical development of real GDP, imports and exports in the Slovak Republic
(year-on-year change in %)

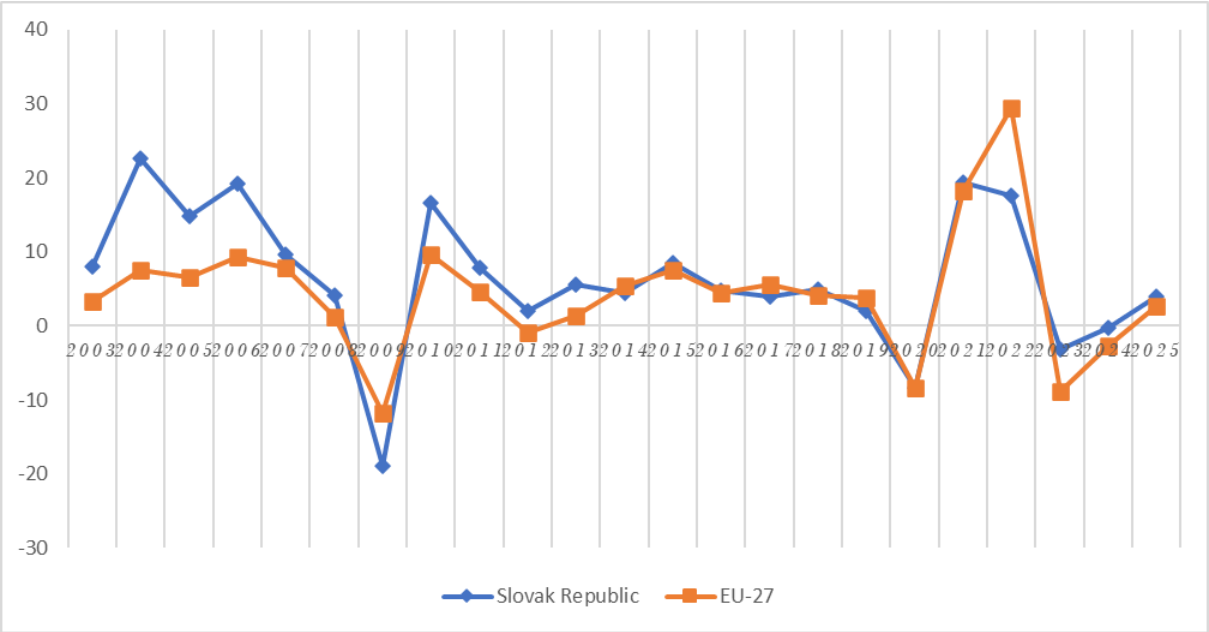


Source: own processing based on OECD data.

At the beginning of our reporting period, during the growth phase of the Slovak gross domestic product, i.e. in the years 2003 – 2008, high increases in exports were recorded, which amounted to an average of 15.6% per year. It was a positive manifestation of Slovakia's accession to the European Union, the opening of markets for Slovak companies and the high growth rate of real GDP. During the second phase of economic growth in 2010-2019, the average year-on-year increases in exports were already lower (6.8%).

With the decline in real GDP (-5.5%) in 2009 during the global financial crisis, Slovakia's exports and imports decreased. The year-on-year decline in exports compared to 2008 was -16.4% and imports -18.9%. The recovery in economic growth in the following year was accompanied by an increase in exports and imports (17.3% and 16.6%, respectively). The subsequent slowdown in real GDP growth in the following years was also caused by a decline in both export and import growth. Nevertheless, in this period, it was net exports that contributed positively to the year-on-year GDP growth in Slovakia. The decrease in imports was caused by lower demand for goods and semi-finished products from abroad.

Graph 2 Development of imports in the Slovak Republic and the EU-27
(year-on-year change in %)



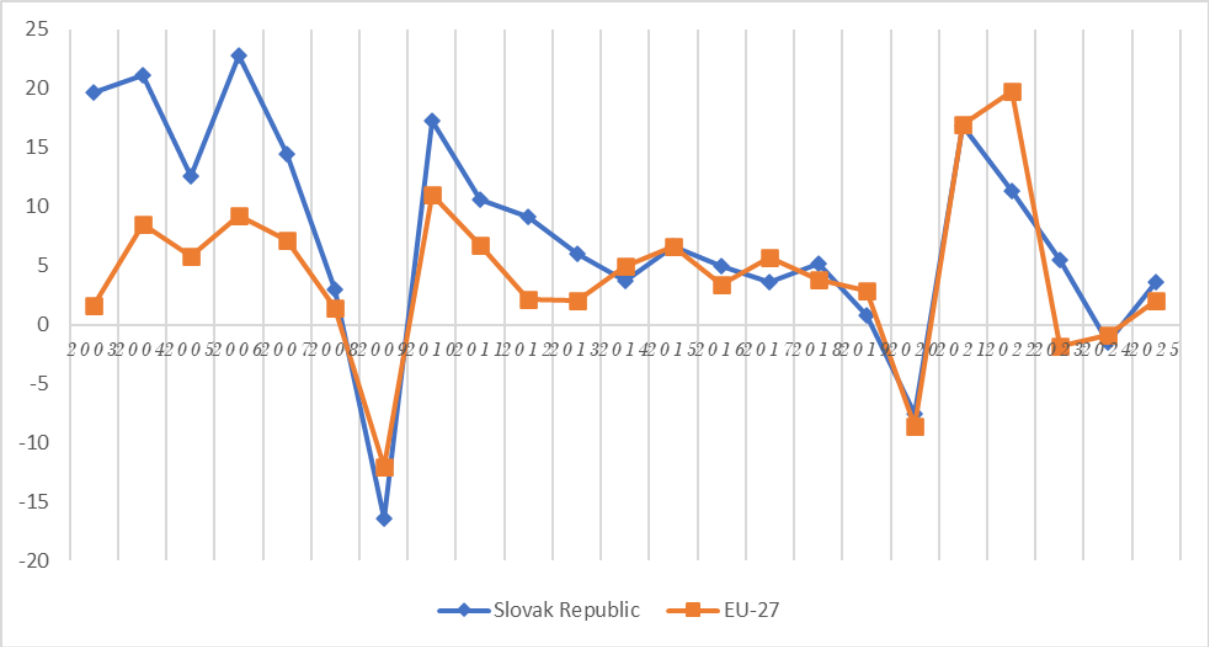
Source: own processing based on OECD data

In the case of the second recession in 2020 caused by the coronavirus pandemic, the decline in real GDP in Slovakia by -4.8% was accompanied by a decrease in exports by -7.5% and imports by -8.3%. Both economic crises during the projection period, during which real GDP contracted (in 2009 and 2020), were associated with a decline in exports and imports.

Slovakia's trade balance ended in 2019 with a deficit and a deficit was also reached in the current account of the balance of payments. In relation to GDP, the current account deficit was -2.9%. The trade deficit in 2019 was reflected in an increase in its ratio to GDP, which reached -0.8%.

The development of imports was very similar throughout the reporting period in the Slovak Republic and in the EU-27. After a period of high growth (2003-2007), it slowed down significantly in 2008 (4.1% in Slovakia and 1.2% in the EU-27). In 2009, at the time of the biggest economic recession in Europe, imports in Slovakia fell by -18.9% and in the EU-27 by -11.8%. In the following year, imports increased again in both Slovakia and the EU-27, but imports stagnated in 2012 and 2013. In the year of the outbreak of the pandemic (2020), imports in both economies fell by -8.3%.

Graph 3 Development of exports in the Slovak Republic and in the EU-27
(year-on-year change in %)

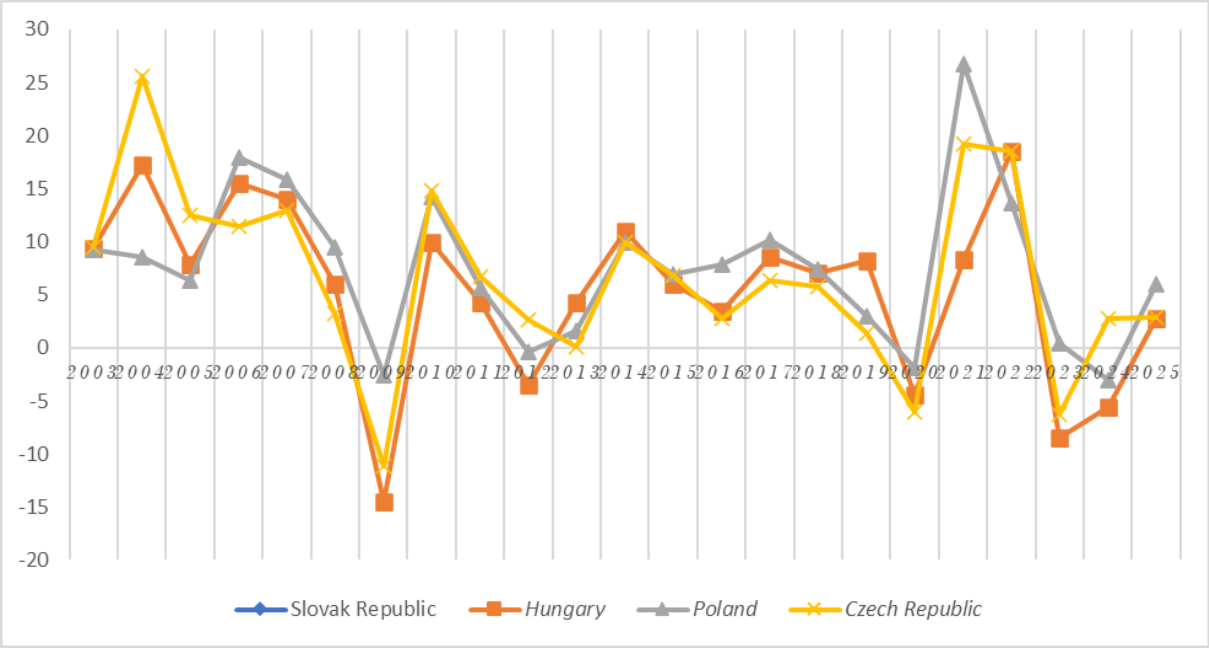


Source: own processing based on OECD data

The development of imports was very similar throughout the reporting period in the Slovak Republic and in the EU-27. After a period of high growth (2003-2007), it slowed down significantly in 2008 (4.1% in Slovakia; 1.2% in the EU-27). In 2009, at the time of the biggest economic recession in Europe, imports in Slovakia fell by -18.9% and in the EU-27 by -11.8%. In the following year, imports increased again in both Slovakia and the EU-27, but imports stagnated in 2012 and 2013. In the year of the outbreak of the pandemic (2020), imports in both economies fell by -8.3%.

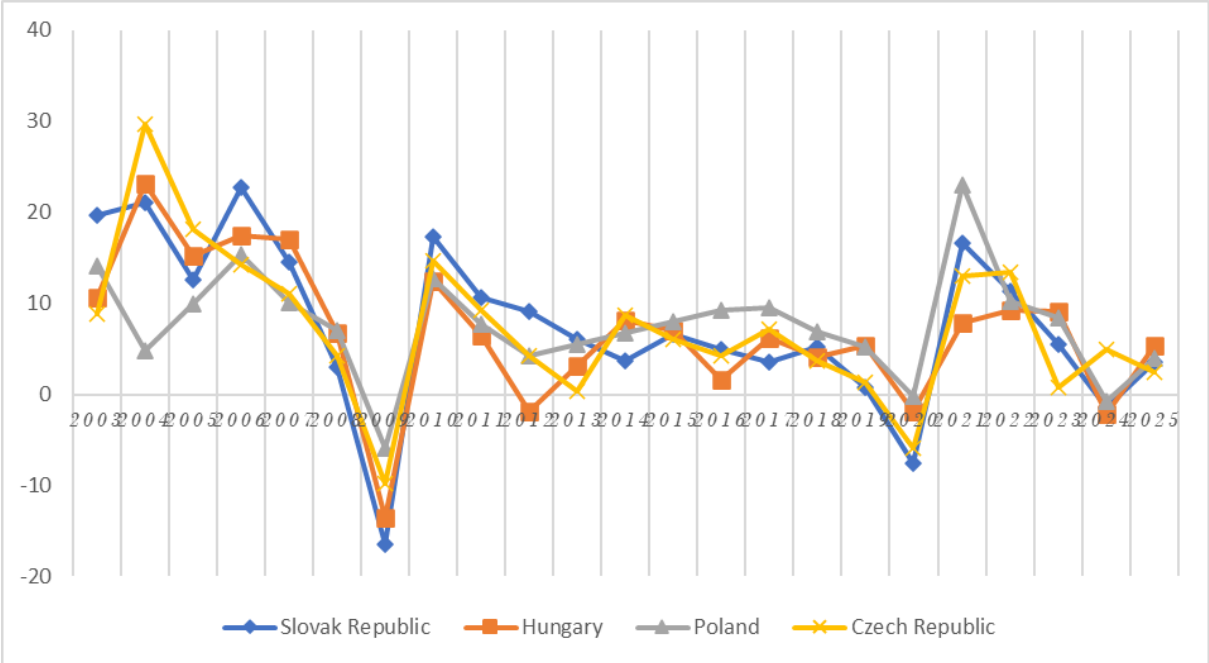
The curve of cyclical fluctuations in imports during the entire period under review had an almost identical shape and course in all V4 countries. The high drop in imports in 2009 was replaced by a recovery in the following year and stagnation in 2012-2013. The coronavirus pandemic in 2020 caused a drop in imports in all four V4 countries, which was the largest in Slovakia (-8.3%) and the lowest in Poland (-1.9%).

Graph 4 Development of imports in the V4 countries
(year-on-year change in %)



Source: own processing based on OECD data.

Chart 5 Development of exports in the V4 countries
(year-on-year change in %)



Source: own processing based on OECD data

The export performance of the Slovak economy as well as the economy of the European Union was subject to cyclical fluctuations in the period under review. Exports in 2009 fell year-on-year in both economies (in Slovakia by -16.4%; in the EU by -12%). As in the case of imports, in 2010 there was a rapid but short recovery in both imports and exports (17.3% in Slovakia, 11% in the EU). Export growth slowed down the following year, as did in 2012, in both economies. The slowdown in exports was caused by relatively low domestic demand in Germany, but also in other countries. The disproportionate indebtedness of several euro area countries, uncertainty and concerns about further economic and political developments were also reflected in this area. In 2014 – 2019, the growth rate of exports in Slovakia no longer reached the high values from the pre-crisis period. The development in this area was very similar in the European Union and Slovakia after 2014, including a cyclical decline in exports in 2020 as a result of reduced demand abroad due to the measures taken against the spread of COVID-19 (-7.5% of Slovakia; -8.6% of the EU).

3.CYCLICAL DEVELOPMENT OF EXPORTS AND IMPORTS IN THE PERIOD 2021 – 2025

After the initial shock from the anti-pandemic measures subsided, exports grew again in all monitored economies in 2021. The highest export growth was achieved by Poland (23%) and Slovakia and the EU-27 (17%). In this regard, the need to meet the deferred consumer demand of the population during the pandemic and the resumption of supplies of components and raw materials from abroad had a positive effect.

The year 2022 was specific, in which both exports and imports continued to grow in all monitored countries. It was not because the economy was growing so significantly. This seemingly positive development was mainly due to the energy crisis and the rise in energy commodity prices (gas, oil) due to the outbreak of the military conflict in Ukraine. It was therefore an inflationary increase in the prices of both imported and exported products. The prices of imported raw materials from outside the EU rose sharply, and the value of exported goods also grew, as rising production costs were reflected in the prices of manufactured goods. Imports increased the most in the EU-27 (up by 29.5%) and exports (19.8%).

In the following year, 2023, the situation on the energy market stabilized, the prices of energy commodities fell, which was reflected in a decline in the value of imports in all monitored countries. Imports fell the most in the EU-27 (-8.8%) and Hungary (-8.5%). In the EU-27, exports also declined (-1.8%) due to a decline in the purchasing power of the population, a slowdown in global demand and a dampening of inflation.

In 2024, both exports and imports declined in all monitored countries except the Czech Republic. In the Czech Republic, exports increased (5%) based on the success in exporting high-tech products and cars to the European market. The reason for the decline in exports in other countries was the decline in European demand, the stagnation of the German economy, and the slowdown in the development of the main trading partners in Western Europe. In 2025, both exports and imports grew in all monitored economies. There has been a slight recovery in demand in the European Union. Hungary's exports increased the most (5.4%) as a result of investments in the production of electric batteries and in the automotive industry. Slovak exports increased (3.6%), driven mainly by exports of cars, electrical machinery and military exports. Exports to the countries of our traditional trading partners – Germany, the Czech Republic, Austria and Poland – grew the fastest. Exports to China decreased significantly year-on-year, falling by as much as -27.6%. The cause of this dramatic decline in exports is a significant decrease in demand from Chinese consumers for more expensive European cars with internal combustion engines, a slowdown in domestic demand in China and the imposition of tariffs between the European Union and China.

4. CONCLUSION

Slovakia's foreign trade balance has not deteriorated much in recent years, mainly due to the redirection of part of exports from markets outside the European Union (China, USA) to EU countries and also due to the lower value of energy commodity imports as a result of more favorable price developments. In 2025, 4.6% more goods were exported to the EU than in 2024. A year-on-year decline was recorded in the case of exports to the USA (about 20%) and China (almost 30%). The significant decrease in exports to the US was caused by the tightening of trade policy by the US, namely the increase in tariffs (by 25%) on cars. Slovakia was the most affected EU country in this regard. In August 2025, the tariff was reduced to 15% for EU countries, but this only mitigated the negative impact on the Slovak economy. The European Union's Automotive Plan aims to support the transition of the entire automotive industry to sustainable mobility, while ensuring its international competitiveness. [2] The intention is to maintain a strong European production base.

Although the Slovak economy recorded a trade surplus of approximately EUR 3 billion in 2025, risks to the further development of foreign demand for Slovak production remain. [5] Export performance at constant prices has been relatively stable in recent years and has increased slightly in 2025, but the growth rate is only modest. The risk is posed by austerity measures aimed at optimizing production capacities in car manufacturers operating in Slovakia. The fact that Slovakia still remains dependent on the development of one sector – the automotive industry – is also a threat. Geopolitical tensions in the world are also a risk to foreign trade. The good news is the expected stronger recovery in external demand due to Germany's expansionary fiscal policy. [3] This could also increase demand in the automotive industry. The start of the new Volvo car plant will have a positive impact on the growth of the economy and exports in Slovakia.

ACKNOWLEDGEMENTS

This article was written with the support of the VEGA research project 1/0545/23 “Improving the functioning of economic processes using the knowledge of behavioral economics. Theoretical and empirical approach”.

REFERENCES

(1) Eurostat (2026). Eurostat regional yearbook. Luxembourg, Publication Office of the EU.

(2) Eurostat (2026). Sustainable development in the European Union. Monitoring report on progress towards the SDGs. Luxembourg, Publication Office of the EU.

(3) Kľúčik, M. – Miklošovič, T. (2026). Makroekonomická prognóza vývoja ekonomiky Slovenska. Bratislava, EÚ SAV.

(4) Matoušková, E. a kol. (2021). Hospodársky cyklus: ekonomické, sociologické a behaviorálne aspekty. Brno, Tribun EU.

(5) Morvay, K. a kol. (2026). Hospodársky vývoj Slovenska v roku 2025. Bratislava, EÚ SAV.

(6) OECD (2026). OECD Economic Outlook, Interim Report September 2026: Weathering Successive Shocks, OECD Publishing, Paris, https://doi.org/10.1787/f751d02b-en.

Modeling Sustainable Product Development in Zoos: Integrating Service-Dominant Logic and Customer Journey Mapping

Endre Akos Papp[1] **Anna Dunay**[2]

[1] John von Neumann University, Doctoral School of Management and Business Administration, Budapest, Hungary, pappendre2@gmail.com, ORCID: https://orcid.org/0009-0003-3784-7862

[2] John von Neumann University, Doctoral School of Management and Business Administration, Budapest, Hungary, dunay.anna@nje.hu, ORCID: https://orcid.org/0000-0003-0254-9243

Abstract: The study examines how zoo product offerings can be interpreted and developed through the integrated application of Service-Dominant Logic (SDL) and Customer Journey Mapping (CJM). It explores how visitor needs and development opportunities identified through CJM can be complemented by the SDL perspective on value co-creation, supporting sustainable service-based product development aligned with zoos' educational, conservation, and social missions. The study applies qualitative conceptual modeling rather than empirical visitor data collection. A hypothetical visitor persona—a mother with two approximately ten-year-old children seeking an active and varied outdoor weekend program—was used to model the complete customer journey from need recognition and information search through choice, ordering, purchase, consumption, active collaboration, and recommendation. For each phase, CJM was used to identify touchpoints, visitor goals, emotions, difficulties, and development opportunities. Selected SDL principles were then translated into analytical questions concerning value propositions, operant resources and resource integration, visitor participation and co-creation, and value emerging in use and context. The two perspectives were subsequently interpreted together to identify service-based product-development opportunities. The conceptual model indicates that CJM and SDL provide complementary perspectives: CJM identifies where and in relation to which visitor needs or difficulties development opportunities arise, while SDL explains how value can emerge through interaction, participation, and resource integration. The zoo product can therefore be understood not as a fixed output delivered to visitors, but as a service-based value offering shaped through interactions between the zoo and its visitors before, during, and after the visit. The integrated approach may support sustainable product development by linking visitor experience more closely to educational, conservation, and social value creation. As the model is conceptual and based on a single hypothetical persona, future research should apply the framework to multiple visitor groups and empirical visitor data.

Keywords: sustainability; zoo; Service-Dominant Logic; Customer Journey Mapping; conservation

1. INTRODUCTION

1.1. The "What, How, and for Whom" Question in the Development of Zoos

Zoo product and service offerings have continuously evolved over the centuries, reflecting broader social, cultural, and scientific trends. In ancient Egyptian, Chinese, and Mesopotamian menageries, collections of exotic animals symbolized power, wealth, and prestige. These collections were accessible exclusively to royal families and elites, and removing wild animals from their original habitats and controlling them within enclosed spaces served more as a display of human control over nature than as institutions for shaping public attitudes or conserving species (Kisling, 2022).

Public accessibility as a fundamental concept in the development of European zoos emerged in the eighteenth and nineteenth centuries with the establishment of Tiergarten Schönbrunn in Vienna (1752) and London Zoo (1828). During this period, the development of zoological institutions was driven by growing interest in the natural sciences, particularly species classification, catalyzed by the Enlightenment and the novelty of a world expanded through exploration. Despite their scientific aspirations, these early zoos retained a strong entertainment focus: exotic species were displayed in enclosures that prioritized architectural style, human-centered functionality, and visibility over animal welfare (Hancocks, 2001).

During the twentieth century, the environmental movement and growing awareness of biodiversity loss encouraged zoos to emphasize their roles as centers of education and conservation, and they gradually became hubs for research, breeding programs, and public information. The introduction of more naturalistic enclosures, such as Carl Hagenbeck's open-moat designs in the early 1900s, reflected the increasing importance of animal welfare and visitor attitude formation (Rothfels, 2002). By the turn of the twenty-first century, ethical questions surrounding zoo operations, the direct and indirect relationship between keeping animals in captivity and human

impacts driving the critical decline of wild populations, and the need to balance population-level and individual animal welfare had become major drivers of further development (Conway, 2003).

Social and economic processes generated by the rapid changes in the planet's climate and ecosystems are also pushing zoo operating structures toward sustainability and integrated, value-creating service development. Modern zoos now operate as multifunctional institutions, combining species conservation, education, research, and recreation with efforts to promote animal welfare and serve target audiences (Greenwell et al., 2023). They emphasize entertaining yet informative experiences, using interactive exhibits, immersive representations of natural biotopes, and advanced technologies to engage diverse audience groups. Behind-the-scenes tours, wildlife-conservation campaigns, and digital learning platforms exemplify this integration. When examining the outputs of modern zoos, however, the importance of data and other intellectual products supplied to scientific, administrative, and legislative partners should not be overlooked (*EAZA Advocacy*, n.d.). Zoos increasingly position themselves as important actors in global conservation efforts, bridging the gap between human society and the natural world.

1.2. Sustainability

1.2.1. Definition of Sustainability

Sustainability, rooted in intergenerational equity, is the ability to meet present needs without compromising the ability of future generations to meet their own needs. This framework emphasizes the integration of environmental, social, and economic considerations to support the long-term well-being of both people and the planet (Brundtland, 1987).

A complex understanding of the modern sustainability challenge has become one of the most important guiding principles in zoo development in the twentieth and twenty-first centuries.

1.2.2. Main Dimensions of Sustainability

Sustainability is commonly interpreted according to the Triple Bottom Line (TBL), which comprises environmental, social, and economic dimensions:

- Environmental sustainability focuses on conserving and responsibly managing natural resources and ecosystems, including pollution reduction, energy and resource efficiency, and biodiversity protection (Lee et al., 2023).
- Social sustainability promotes equal opportunities and respect for human rights and supports social well-being through access to education and other social services, social cohesion, and fair labor practices (Mika, 2017).
- Economic sustainability supports long-term value creation while minimizing negative impacts. Its main considerations include encouraging innovation and sustainable business practices for resilient economies, creating fairer income distribution and reducing inequalities, and promoting inclusive growth (World Bank (Washington, District of Columbia), 2019).

1.2.3. Principles of Sustainability

Sustainable decisions are based on principles such as:

- intergenerational equity, ensuring that resource use does not endanger future generations;
- the precautionary principle, encouraging proactive action under uncertainty to prevent irreversible damage;
- integration, supporting a balance among environmental, social, and economic objectives in policy programs and their practical implementation;
- circularity, promoting material reuse through closed-loop systems and thereby reducing waste (MacArthur, 2013).

1.2.4. Applications of Sustainability

Sustainability can be applied to almost every area and sector of society and the economy. Sustainability efforts across sectors are coordinated through global goals and frameworks, including the United Nations Sustainable Development Goals (SDGs)—17 goals addressing poverty, inequality, and environmental challenges (Rosa, 2017)—and the environmental, social, and governance (ESG) framework, a corporate assessment tool for evaluating sustainability performance and impact.

Sustainability is a dynamic, integrative approach that harmonizes environmental, social, and economic objectives and can be realized only through consensual action processes built around shared values.

1.2.5. Contribution of Zoos to Sustainability Goals

Zoos can contribute substantially to achieving the United Nations Sustainable Development Goals through conservation, education, research, and social engagement (World Association of Zoos and Aquariums (WAZA), 2020). Their core activities align closely with SDG 15 (Life on Land) through biodiversity conservation, ex situ breeding programs for endangered species, and in situ contributions that support habitat restoration [1]. As important actors and venues for environmental education, they support SDG 4 (Quality Education) through educational programs that promote environmental awareness and encourage responsible visitor behavior [2]. They contribute to SDG 13 (Climate Action) by raising public awareness of the impacts of climate change on biodiversity and by pursuing sustainable operational practices [3]. Zoos may also contribute to SDG 10 (Reduced Inequalities) by providing inclusive access to facilities and programs and educational opportunities for disadvantaged communities [4]. Through job creation and tourism, zoos can foster local economic development, contributing to SDG 8 (Decent Work and Economic Growth) [5]. These multiple contributions position zoos as important partners in addressing global sustainability challenges.

1.3. Introduction to the Service-Dominant Logic Framework

The Service-Dominant Logic (SDL) framework introduced by Vargo and Lusch (Vargo & Lusch, 2008) represents a paradigm shift in how products and value are conceptualized in marketing and management. In contrast to traditional goods-dominant logic (GDL), which considers tangible goods as the primary units of exchange, SDL emphasizes service as the fundamental basis of economic activity, defining service as the application of competences for the benefit of another actor. SDL views value as emerging through interactions between service providers and consumers rather than as something embedded in goods and delivered unilaterally.

The framework is supported by ten foundational premises:

- Service is the fundamental basis of exchange. All economic activity is rooted in service provision rather than in the production of goods.
- Indirect exchange masks the service nature of exchange. The added value of dynamic services is combined with the static offering value of goods.
- Goods are distribution mechanisms for service provision. The tangible aspects of goods facilitate the delivery of service.
- Operant resources are the fundamental source of competitive advantage. Skills and knowledge create value rather than static operand resources.
- All economies are service economies. Service underlies every economic system, including those traditionally described as goods-based.
- The customer is always a co-creator of value. Value emerges through interactions between providers and customers.
- The enterprise cannot deliver value; it can only offer value propositions. Providers propose value, while customers determine actual value-in-use.
- A service-centered view is inherently customer-oriented and relational. Relationships and understanding customer needs are central to service provision.

- All social and economic actors are resource integrators. Value creation involves multiple actors integrating different resources.
- Value is always uniquely and phenomenologically determined by the beneficiary. Each customer subjectively determines value based on experience.

1.3.1. Potential Application of the SDL Framework in Zoos

The framework can be applied broadly across tourism sectors (Blazquez-Resino et al., 2015), including zoos, to redefine the concept of the "product". When SDL is adapted to zoos, emphasis shifts from animals and exhibits as dominant marketing elements toward value-creating collaboration, the lasting effects of experiences, and contributions to social well-being. In this context, the "product" is not the animal itself or the system of zoo exhibits, but the value arising from educational programs, conservation efforts, and visitor engagement. This perspective aligns with modern social and sustainability expectations, emphasizing collaboration and value co-creation through immersive, interactive experiences.

SDL may help zoos better understand and respond to the needs of different stakeholders, ranging from visitors seeking educational and recreational experiences to civil-society organizations advocating animal welfare and global conservation networks working to protect biodiversity. This service-oriented approach highlights the potential of zoos as platforms for attitude formation and for promoting ecological and social sustainability.

1.3.2. Limitations of the SDL Framework

Although SDL is widely recognized for advancing a service-centered perspective, it has also been criticized for both its theoretical and practical application (Zsigmond, 2019). Some critics argue that SDL is overly abstract and does not provide sufficiently concrete practical guidance for individual industries. Its proposition that service underlies all economic exchange may also be less straightforward in resource-intensive sectors or in sectors where consumers are difficult to involve in interactive processes. Because firms mainly offer value propositions in SDL, value remains subjective and can be difficult to measure when the framework is used alone. SDL also provides limited detailed operational tools for implementing value co-creation processes, which can be challenging for organizations that depend on explicit guidance. One way to address these limitations is to combine SDL with other models according to the specific needs of the field of application (Kankaanpää, 2024).

1.4. Introduction to Customer Journey Mapping

Customer Journey Mapping (CJM) is a strategic tool that visually represents a customer's experiences and interactions with a service or organization. It serves as a blueprint for understanding and enhancing customer engagement by highlighting touchpoints as well as positive and negative emotions and outcomes throughout the journey. By identifying pain points and opportunities for improvement, organizations can optimize the overall customer experience and support satisfaction and loyalty. CJM is essentially an empathy-driven approach that places the customer perspective at the forefront of service design. It captures the full spectrum of customer interactions, from initial awareness to post-engagement experiences, and provides insight into how services can be tailored to meet needs effectively (Lemon & Verhoef, 2016).

1.4.1. Main Components of a Comprehensive CJM

- Personas: representations of typical customer groups based on emotional states, goals, and difficulties. Zoo examples include families with children seeking nature-based entertainment; school groups seeking curriculum-aligned activities; and conservation enthusiasts interested in behind-the-scenes tours.
- Touchpoints: specific moments of interaction between the customer and the zoo. Touchpoints may be brand-owned, partner-owned, customer-owned, or social/external/independent. External factors can include other customers, peers, independent information sources, the environment, and weather. Zoo examples include social-media posts featuring animals or events and advertisements.
- Customer goals: objectives customers seek to achieve at each stage, such as learning about wildlife, having a once-in-a-lifetime experience at an unusual location, or supporting conservation.

- Emotional states and emotional peaks: feelings experienced at different stages, for example, excitement during planning or joy when seeing animals.
- Pain points and difficulties: areas where customer expectations are not met, such as long entry queues or crowded, hard-to-view exhibits.
- Opportunities: actions that reduce frustration and support long-term relationships, loyalty, value co-creation, brand building, and repeat visits, such as fast-track entry lanes or loyalty rewards.
- Backstage processes: internal activities and systems that support the customer experience but may not be visible to customers.

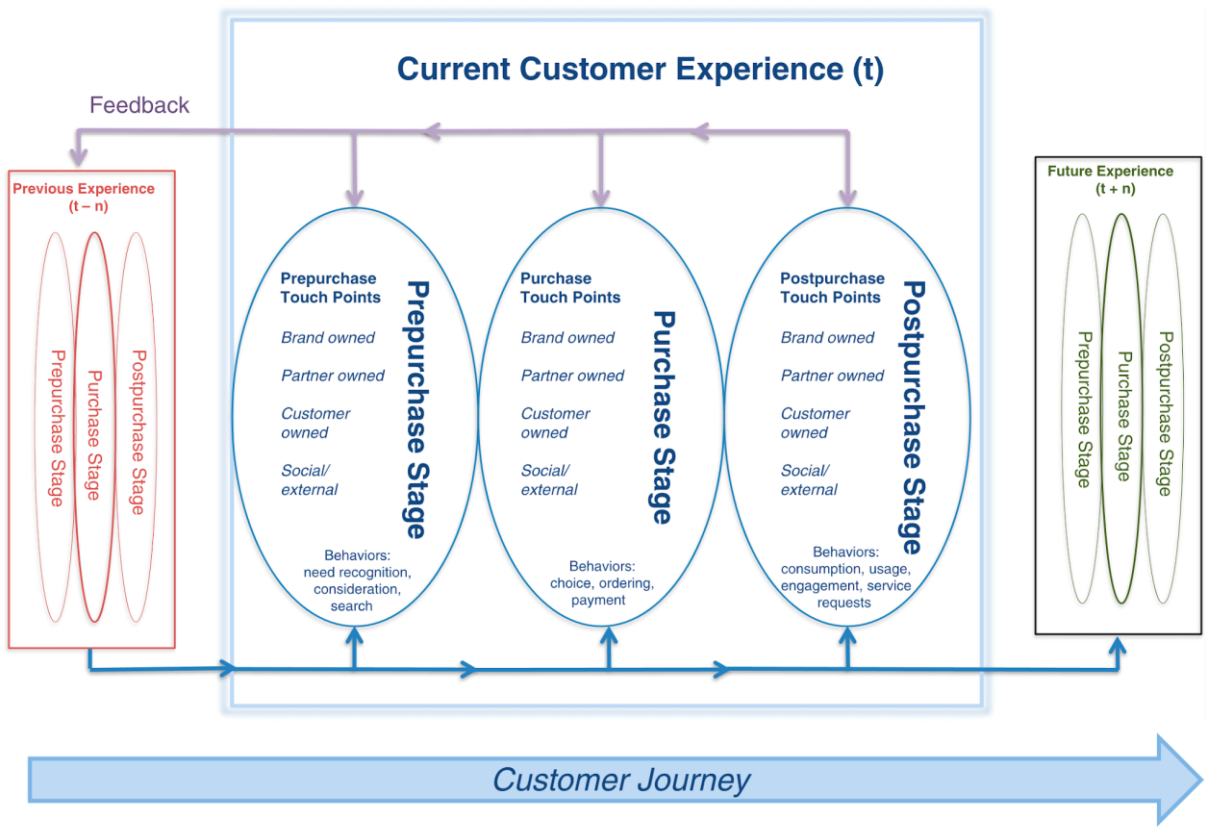
1.4.2. Stages of the Customer Journey

Pre-purchase: interaction with the brand, category, and environment before the purchase transaction. The stages include (1) need recognition, influenced by external and internal triggers and previous brand experiences; (2) search, involving information channels selected according to individual preferences; and (3) consideration, involving decision-making such as pricing and special programs.

Purchase: the purchase of tangible products or experience programs. The stages include (1) choice, influenced by the purchasing environment such as on-site or online channels; (2) ordering, which should support customer confidence; and (3) payment, where the payment experience can reinforce a sense of satisfaction.

Post-purchase: (1) consumption, a critical stage in which value recognition and relationships are strengthened through value-in-use; and (2) active collaboration and recommendation, where accumulated positive experiences can generate loyalty, advocacy, and repeat business, while negative interactions may undermine trust, loyalty, and brand reputation. Effective management of this phase requires attention to customer service, satisfaction, and continued engagement (Figure 1).

Figure 1: Structure of a Customer Journey Map (based on Lemon and Verhoef, 2016).



1.4.3. The Customer Journey Mapping Process

The practical application of CJM is a collaborative, iterative process that systematically explores the customer experience, identifies experiences at individual touchpoints, and determines development opportunities that can be derived from them. The process can vary according to its purpose and context, but its main steps can be summarized as follows:

Research and data collection. Collect qualitative and quantitative information on customer behavior, goals, preferences, experiences, and difficulties through interviews, observations, surveys, visitor feedback, or data from digital platforms.

Definition of customer personas. Based on the information collected, define personas that represent key target-audience segments, including relevant demographics, goals, motivations, challenges, and behavioral patterns.

Definition of customer-journey stages. Divide the customer process into consecutive stages ranging from need recognition and information search through purchase and consumption to post-purchase experiences. These stages establish the structural framework of the CJM.

Mapping touchpoints and interactions. Identify direct and indirect interactions between the customer and the service provider at each stage, including online and offline channels and interactions controlled or influenced by the provider, partners, customers, and external actors.

Analysis of customer goals, emotions, and difficulties. Assign customer goals and positive or negative emotional states to each stage and touchpoint and identify pain points and barriers that make goals more difficult to achieve or negatively affect the experience.

Identification of development opportunities. Use the identified goals, experiences, and difficulties to determine intervention points to improve the customer experience, for example by redesigning touchpoints, improving communication, simplifying processes, or creating new service elements.

Iteration and testing. CJM is not static. It can be reviewed and modified regularly based on new customer information, feedback, and experiences. Practical testing of identified development opportunities and feedback on the results support continuous improvement of the service process and customer experience.

2. METHOD

2.1. Methodological Approach

The research uses qualitative conceptual modeling to examine the integrated applicability of CJM and SDL in service-based product development in zoos. The study does not rely on empirical visitor data; instead, it examines the link between the two approaches by modeling a hypothetical visitor persona and the associated customer journey.

The methodological approach assumes that CJM and SDL interpret the relationship between service provider and consumer from different but complementary perspectives. CJM provides a structured map of the visitor journey, enabling identification of touchpoints, visitor goals, emotional states, difficulties, and development opportunities at each stage. SDL, in contrast, focuses on the value that emerges through interactions, resource integration, and value co-creation between the service provider and the consumer.

The integration is based on the assumption that CJM can identify points along the visitor journey where service development is possible, while SDL can interpret these development points from a value co-creation perspective. The integrated analysis explores how development opportunities identified at individual stages of the visitor journey can be transformed into service-based product-development opportunities that support not only the visitor experience but also the zoo's educational, conservation, and social value creation.

2.2. CJM-Based Modeling

The first step of the modeling was to define a hypothetical zoo visitor persona. The persona used in the model is a mother with two approximately ten-year-old children who is looking for a varied outdoor weekend program lasting several hours and involving physical activity. The persona was not derived from empirical visitor data but serves as the subject of a model illustrating the integrated application of CJM and SDL.

The customer journey associated with the persona follows the CJM structure presented above. The analysis covers pre-purchase, purchase, and post-purchase experiences and divides the journey into recognition, search, consideration, choice, ordering, purchase, consumption, active collaboration, and recommendation.

For each stage, the analysis identified touchpoints and their control, visitor goals, assumed emotional states, possible difficulties, and associated development opportunities. According to touchpoint control, the analysis distinguished interactions controlled or influenced by the brand, customer, partner, and external factors. The analysis produced a CJM-based development opportunity for each stage that either supports the visitor's goal or reduces the identified difficulty.

2.3. Integrating the SDL Perspective into the CJM Model

To integrate the SDL perspective into the CJM model, we selected those SDL principles that can be directly interpreted in relation to interactions and value-creation processes at individual stages of the visitor journey. The purpose was not to examine every SDL principle independently, but to develop an analytical framework that could be connected to the visitor-centered structure of CJM.

Accordingly, the analysis focused on five SDL principles: the role of operant resources, the consumer as an active co-creator of value, the value proposition, resource integration, and the beneficiary- and context-determined nature of value. These principles provided the theoretical framework through which we interpreted each CJM stage from an SDL perspective.

Analytical questions were then assigned to the selected SDL principles. At each CJM stage, we asked: (1) what knowledge, competence, or other operant resource the zoo can mobilize; (2) how the visitor can become an active participant in value creation; (3) what value proposition appears at the stage; (4) which zoo, visitor, partner, or external resources can be integrated; and (5) what value may emerge in the visitor's own context and through use of the service.

Table 1: Analytical questions assigned to the SDL principles in focus.

SDL-based analytical dimension	Analytical question applied to CJM stages
Value proposition	What value proposition can be linked to the visitor goal, difficulty, or development opportunity appearing at the given stage?
Resources and resource integration	Which zoo, visitor, partner, or external resources are integrated in the creation of value?
Visitor participation and co-creation	What role does, or could, the visitor play in the interaction and in value creation?
Context and value-in-use	What value may emerge for the visitor through the interaction and use of the service?

The analytical questions in Table 1 were applied to all stages of the visitor journey examined. The stage-specific interpretations generated by these questions jointly constitute the SDL perspective of the respective stage. Thus, the SDL perspective is not an additional analytical layer independent of CJM; rather, it is a value-creation interpretation produced by applying selected SDL principles to concrete situations along the visitor journey.

2.4. Integrated Analysis and Identification of Product-Development Opportunities

In the third modeling step, we connected findings from the CJM and SDL perspectives in a unified analytical process. At each visitor-journey stage, we started with the development opportunities identified through the CJM and interpreted them alongside the SDL perspective developed as described above.

We summarized the SDL perspective of each stage with a label expressing the dominant value-creation mechanism at that point, making the logical chain of value creation along the visitor journey easier to follow. The CJM development opportunity and its associated SDL perspective were then interpreted jointly, and service-based product-development opportunities grounded in value co-creation were derived from their combination.

The integrated analytical sequence can therefore be described as follows: CJM stage → visitor goal, difficulty, and development opportunity → application of SDL-based questions → stage-specific SDL perspective → value co-creation and service-based product-development opportunity.

The two perspectives play complementary roles: CJM identifies development points along the visitor journey, while the SDL perspective interprets them in terms of value creation.

3. RESULTS

The integrated application of CJM and SDL was modeled across the complete customer journey of the hypothetical visitor persona defined in the Method section. The analysis demonstrates how visitor goals, difficulties, and development opportunities identified through CJM can be further interpreted through the SDL value-creation perspective and how service-based product-development opportunities can be derived from them.

Table 2 follows the examined persona's visitor journey from recognition to recommendation. The CJM perspective identifies touchpoints and their control, visitor goals and emotional states, potential difficulties, and development opportunities to address them. The SDL perspective interprets the same situations in terms of how value may emerge through interaction between the visitor and the zoo.

Table 2: A possible CJM design and SDL interpretation tailored to a typical zoo visitor persona

Stage	Touchpoints	Visitor goal	Emotional state	Difficulties	CJM opportunity	SDL perspective
Recognition	Social-media advertisements; family blogs	Discover an entertaining outdoor program for children	Curious; excited	Zoo programs do not automatically appear among possible leisure options	Advertisements and blogs increasing the visibility of current zoo programs	The zoo offers a value proposition presenting the visit not merely as a program but as an opportunity for recreation, shared experience, and learning.
Search	Own experience; information sites; family program guides	Find reliable, family-friendly options	Exploratory; curious; uncertain	Limited family-specific details; difficulty finding relevant and credible information	Develop family-friendly content and make previous visitor experiences and reviews accessible	The visitor compares available information and others' experiences with personal needs to interpret what value a zoo visit may have for the family.
Consideration	Online reviews; pricing pages; recommendations from friends	Assess cost and value for the whole family	Hopeful; cautious	Confusing family-ticket options or hidden costs	Provide clear family ticket packages and discounts	The visitor compares the zoo's offering with personal needs and available resources such as time, budget, and family interests to

Stage	Touchpoints	Visitor goal	Emotional state	Difficulties	CJM opportunity	SDL perspective
						judge whether the visit can provide an appropriate experience.
Choice	Telephone enquiry; zoo website	Confirm that the information has been correctly assessed	Determined; interested	Inconsistent information about whether programs suit the age group	Improve accessibility and consistency of information across zoo-controlled channels	The visitor chooses among the zoo's options according to personal needs; the zoo can support value creation by offering programs and services suited to different visitor needs.
Ordering	Online booking	Complete booking easily and without problems	Focused; relieved	Frustration caused by a complicated booking process	Simplified booking interface with family-friendly options	Simple and flexible ordering creates the conditions for the visitor to use the selected service according to personal needs.
Purchase	Online purchase and confirmation email; on-site purchase	Ensure smooth entry	Purposeful; attentive	Overcrowded or confusing entry process	Improve entry with a separate family line	The visitor does not receive finished value through purchase, but access to zoo services and opportunities from which value may emerge during the visit. Waiting and entry can also be used for interactive engagement and

Stage	Touchpoints	Visitor goal	Emotional state	Difficulties	CJM opportunity	SDL perspective
						participation in conservation campaigns.
Consumption (value-in-use)	Entrance gates; animal exhibits; outdoor activities	Enjoy outdoor programs, discover wildlife, and actively involve children	Enthusiastic; caring; responsible; attentive; proud	Insufficient children's activities or lack of rest areas	Add outdoor games and child-friendly zones, rest/refreshment points, and improve visitor-space safety	Zoo-provided opportunities and active visitor participation jointly shape the experience; value emerges through actual use and personal experience. Staff expertise can support varied, age-appropriate, participatory activities.
Active collaboration	Satisfaction email; questionnaires; visitor-initiated email or phone	Provide honest feedback and express opinions freely	Proud; satisfied	No clear opportunity to provide feedback	Timely satisfaction surveys; engagement beyond the visit; rewards, discounts, and competitions	Through participation, feedback, or support, visitors can become actively involved in zoo activities and contribute to value creation. Interactive feedback tools and personal follow-up can maintain the relationship.
Recommendation	Social-media sharing; verbal accounts	Share positive experiences and recommend the zoo to other families	Reflective; enthusiastic; inspiring	Missing follow-up or family-friendly return incentives	Follow-up emails with family discounts and loyalty programs	By sharing experiences and opinions, visitors contribute to shaping the zoo's value proposition and help

Stage	Touchpoints	Visitor goal	Emotional state	Difficulties	CJM opportunity	SDL perspective
						other visitors recognize the value of a zoo visit; communicati on of campaign results can strengthen a sense of belonging and contribution.

The modeling shows that CJM and SDL play different but mutually reinforcing roles along the visitor journey. In pre-purchase stages, CJM primarily makes visible development points related to access to information, decision support, and fit with visitor needs. The SDL perspective complements these by focusing on the value proposition, the visitor's own interpretation of value, and the integration of visitor and zoo resources. Thus, at the recognition stage, it is not enough to increase the visibility of zoo programs; it is also important to communicate the opportunities for recreation, shared experience, and learning that the visit can offer the family.

In the purchase stages, the analysis indicates that booking and purchasing an admission ticket do not in themselves constitute the creation of value. Through purchase, the visitor gains access to services and opportunities from which value can emerge during the actual visit. Booking, purchasing, and entry processes can therefore be interpreted as part of preparing the later experience.

The SDL value-creation perspective becomes particularly prominent in post-purchase stages. During consumption, service opportunities provided by the zoo and visitor participation jointly shape the lived experience, meaning that value emerges through actual use. During active collaboration, visitors can contribute directly to value creation through feedback, participation, or support, while recommendations let their shared experiences shape how other potential visitors interpret value.

Table 3 summarizes the analytical results from a product-development perspective. A dominant SDL value-creation mechanism is assigned to each CJM stage, and the joint interpretation of the two is used to identify service-development opportunities based on value co-creation.

Table 3: Value co-creation in service-based development

CJM development opportunity	SDL perspective in the value-creation process	Value co-creation and product-development opportunity
Stage 1: Recognition — Family-targeted communication and visibility of zoo program opportunities.	Value proposition — The zoo presents the visit as an opportunity for recreation, shared experience, and learning.	Involve visitors in communicating the zoo's value proposition through on-site interviews, visitor experiences, and social-media content, allowing authentic visitor experiences to communicate the zoo's mission and value proposition.
Stage 2: Search — Provide family-friendly, easily accessible, and target-relevant information.	Visitor interpretation of value — The visitor evaluates information and experiences by comparing them with personal needs.	Use visitor ratings and feedback to shape the offering, including ticket options, holiday-related offers, and thematic programs.
Stage 3: Consideration — Transparent family ticket packages, discounts, and clear presentation of price.	Resource integration — The visitor assesses the zoo offering in relation to personal needs, time, budget, and family interests.	Make additional values linked to admission visible—for example support for endangered-species conservation—and emphasize community belonging and contribution to the zoo's mission.

CJM development opportunity	SDL perspective in the value-creation process	Value co-creation and product-development opportunity
Stage 4: Choice — Improve accessibility and consistency of information across channels.	Personalized value proposition — The visitor chooses among the zoo's options according to personal needs.	Use satisfaction data and previous choices to design programs, services, and ticket offers better suited to different visitor groups.
Stage 5: Ordering — Simplified booking process with family-friendly options.	Enabling conditions for value creation — Simple and flexible ordering supports use of the selected service.	Use information from online bookings to align the booking process and capacity with visitor needs, creating a simpler and more flexible process.
Stage 6: Purchase — Simplify entry and reduce waiting.	Access to the value proposition — Purchase provides access to services and opportunities from which value may emerge during the visit.	Use purchase and entry time for interactive content and inform and involve visitors in conservation programs and campaigns.
Stage 7: Consumption (value-in-use) — Child-friendly and interactive activities, rest and refreshment points, safer visitor spaces.	Value co-creation / value-in-use — Zoo opportunities and active visitor participation jointly shape the experience; value emerges through actual use.	Develop activities and programs based on staff expertise and tailored to different age groups, actively involving visitors and transforming learning into a shared, memorable experience.
Stage 8: Active collaboration — Create feedback opportunities, maintain relationships, and enable involvement beyond the visit.	Visitor as an active co-creator of value — Through participation, feedback, or support, the visitor contributes to value creation.	Create interactive feedback and personal follow-up, and maintain relationships through regular information, community programs, VIP discounts, and enhanced participation opportunities.
Stage 9: Recommendation — Encourage sharing of positive experiences, follow-up, and longer-term relationships.	Visitor as a resource in value creation — By sharing experiences and opinions, visitors shape the zoo's value for others.	Involve visitors in communicating social and conservation impacts through campaign reports, acknowledgements, and membership gatherings, strengthening belonging and a sense of contribution to shared achievements.

Table 3 indicates that service-based product development does not mean creating a single new service element but coordinating value-creation opportunities that emerge at different points in the visitor journey. During recognition and search, this means involving visitor experiences in communication and in shaping the offering; during consideration and choice, creating value propositions better aligned with visitor needs and resources; and during ordering and purchase, improving the conditions of access and participation necessary for value creation.

During consumption, active collaboration, and recommendation, product development progressively shifts toward active visitor participation. Interactive programs based on staff expertise, feedback, and longer-term participation opportunities, along with visitor involvement in communicating conservation and social outcomes, help ensure that visitors are not merely recipients but participants in value creation.

The main result of the integrated model is that development points identified through CJM can be reinterpreted through SDL as value-creation processes. CJM shows where in the visitor journey, and in relation to which need or difficulty, development is justified; SDL supports interpreting visitor participation, resource integration, and value-in-use in ways that make development service-based. By linking the two perspectives, traditional visitor-experience development can be broadened into a product-development approach in which the zoo "product" also encompasses experiential, educational, community, and conservation value emerging through interactions between the visitor and the institution.

4. DISCUSSION

The modeling suggests that Customer Journey Mapping and Service-Dominant Logic can be applied complementarily to explore service-based product-development opportunities in zoos. CJM primarily makes visible where in the visitor journey, and in relation to which visitor needs or difficulties, development opportunities arise, while SDL interprets these opportunities in terms of value propositions, resource integration, visitor participation, and value co-creation. CJM therefore provides a practical structure for applying SDL, partially addressing the operational limitations of SDL discussed earlier.

The integrated approach also broadens the interpretation of the zoo "product". The product is not limited to the admission ticket, animal displays, or the physical visit itself; rather, it can be understood as the totality of experiences and values emerging throughout the visitor journey. Value creation may begin before the visit, develop through service use and active visitor participation, and continue after the visit through feedback, collaboration, and recommendation. Service-based product development therefore means deliberately shaping interactions and service opportunities so the visitor experience can also connect to the zoo's educational and conservation objectives. This is consistent with the SDL-based interpretation of the product presented earlier in the study.

A limitation of the model is that it is based on a single hypothetical visitor persona rather than empirical visitor data. The study did not conduct representative sampling, statistical analysis, practical testing, or iteration of the identified development opportunities. Further research should therefore examine the applicability of the integrated model using multiple visitor personas and real visitor data, as well as the practical feasibility of the identified product-development opportunities.

5. CONCLUSIONS

The modeling illustrates that combining Service-Dominant Logic and Customer Journey Mapping may suit the qualitative exploration of service-based product-development opportunities in zoos. The two approaches complement one another by linking development points identifiable along the visitor journey with opportunities for value creation and visitor participation.

Through the SDL perspective, the zoo "product" can be interpreted more broadly than animals and their exhibits: as the totality of value created through attitude-shaping experiences, educational programs, conservation services, and visitor participation. Customer Journey Mapping provides a visitor-centered approach that helps identify touchpoints, visitor needs, and development opportunities that are significant for value creation. Linking the two approaches connects visitor-experience development with educational and conservation objectives, as well as opportunities for value co-creation.

In summary, combining the SDL perspective and Customer Journey Mapping may contribute to an evaluative framework that places services and the value emerging through them at the center, while emphasizing visitor involvement and participation in attitude formation and biodiversity conservation. Reinterpreting the zoo "product" as a value-driven experience and as collaborative participation in conservation may help zoo operations align more closely with sustainability principles and objectives. This perspective extends the role of zoos beyond recreation: by connecting visitor experience, education, and conservation, zoos may strengthen the relationship between people and the natural environment and thereby maintain their social and conservation relevance amid the ecological challenges of the twenty-first century.

REFERENCES

Blazquez-Resino, J. J., Molina, A., & Esteban-Talaya, A. (2015). Service-Dominant Logic in tourism: The way to loyalty. *Current Issues in Tourism*, *18*(8), 706–724. https://doi.org/10.1080/13683500.2013.863853

Brundtland, G. H. (1987). *Our common future world commission on environment and developement*. https://docenti.unimc.it/elena.borin/teaching/2019/21812/files/lessons-and-recommended-readings-1/Our%20Common%20future%201987.pdf

Conway, W. (2003). The role of zoos in the 21st century1. *International Zoo Yearbook*, *38*(1), 7–13. https://doi.org/10.1111/j.1748-1090.2003.tb02059.x

EAZA Advocacy. (n.d.). Retrieved 18 January 2025, from https://www.eaza.net/advocacy/

Greenwell, P. J., Riley, L. M., Lemos De Figueiredo, R., Brereton, J. E., Mooney, A., & Rose, P. E. (2023). The Societal Value of the Modern Zoo: A Commentary on How Zoos Can Positively Impact on Human Populations Locally and Globally. *Journal of Zoological and Botanical Gardens*, *4*(1), 53–69. https://doi.org/10.3390/jzbg4010006

Hancocks, D. (2001). *Different Nature: The Paradoxical World of Zoos and Their Uncertain Future* (D. Hancocks, Ed.). University of California Press. https://doi.org/10.1525/9780520353527

Kankaanpää, K. (2024). *Key performance indicators to enhance customer success management in IT service delivery*. https://lutpub.lut.fi/handle/10024/167816

Kisling, V. N. (2022). Ancient Collections and Menageries. In V. N. Kisling, *Zoo and Aquarium History* (2nd edn, pp. 1–46). CRC Press. https://doi.org/10.1201/9781003282488-1

Lee, H., Calvin, K., Dasgupta, D., Krinmer, G., Mukherji, A., Thorne, P., Trisos, C., Romero, J., Aldunce, P., Barret, K., Blanco, G., Cheung, W. W. L., Connors, S. L., Denton, F., Diongue-Niang, A., Dodman, D., Garschagen, M., Geden, O., Hayward, B., … Zommers, Z. (2023). *Synthesis report of the IPCC Sixth Assessment Report (AR6), Longer report. IPCC.* [Monograph]. Intergovernmental Panel on Climate Change (IPCC). https://mural.maynoothuniversity.ie/id/eprint/17733/

Lemon, K. N., & Verhoef, P. C. (2016). Understanding Customer Experience Throughout the Customer Journey. *Journal of Marketing*, *80*(6), 69–96. https://doi.org/10.1509/jm.15.0420

MacArthur, T. E. (2013). *CIRCULAR ECONOMY TOWARDS THE Economic and business rationale for an accelerated transition 1*. https://api.semanticscholar.org/CorpusID:41439394

Mika, J. (2017). Education in the Sustainability Development Goals (2016-2030), sustainability in the education. *Journal of Applied Technical and Educational Sciences*, *7*(4), Article 4. https://doi.org/10.24368/jates.v7i4.10

Rosa, W. (Ed.). (2017). Transforming Our World: The 2030 Agenda for Sustainable Development. In *A New Era in Global Health*. Springer Publishing Company. https://doi.org/10.1891/9780826190123.ap02

Rothfels, N. (2002). *Savages and beasts: The birth of the modern zoo*. Johns Hopkins University Press.

Vargo, S. L., & Lusch, R. F. (2008). Service-dominant logic: Continuing the evolution. *Journal of the Academy of Marketing Science*, *36*(1), 1–10. https://doi.org/10.1007/s11747-007-0069-6

World Association of Zoos and Aquariums (WAZA). (2020). *Protecting our Planet: The WAZA Sustainability Strategy 2020-2030*. https://www.waza.org/wp-content/uploads/2020/11/F_WAZA-Sustainability-Strategy-2020.pdf

World Bank (Washington, District of Columbia) (Ed.). (2019). *World development report 2020: Trading for development in the age of global value chains*. World Bank Group.

Zsigmond T. (2019). Milyen változást hoz a „service dominant logic" a marketingbe? *Prosperitas*, *6*(2), 116–131. https://doi.org/10.31570/Prosp_2019_02_6

The points of connection between agrotourism and short food supply chains

Eva Bognár[1] **Dunay Anna[2]**

[1] Doctoral School of Management and Business Administration, John von Neumann University, Hungary, bognareva33@gmail.com

[2] Doctoral School of Management and Business Administration, John von Neumann University, Hungary, dunay.anna@nje.hu

Abstract: Agrotourism and short food supply chains (SFSCs) are key elements of sustainable rural development, making the exploration of their common connections in the scientific literature of paramount importance. The aim of the research was to identify the scientific intersections and connections between experience-based agrotourism elements and direct food marketing systems.

The study was based on bibliometric searches conducted in the Clarivate Web of Science (WoS) database, where the authors ran targeted keyword combinations, and the visualisation and comparison of the results were performed using the VOSviewer software.

Network visualisations have clearly demonstrated the close interconnection between the two areas, with their main common intersection being sustainability, rural development, and gastronomic experiences based on local foods. Based on bibliometric data, SSC is not merely a sales channel, but an essential foundation for the tourism product experience and consumer trust. Temporal trends have indicated that post-pandemic, the focus of research has shifted from classical theoretical and sociological approaches to economic diversification, logistical resilience, and targeted business development.

The analysis highlights that SSC provides tangible raw materials, local products, and community resources, which, when built upon, create economic surplus and tourism experiences in agrotourism. The symbiosis of these two areas is an essential element of modern rural development and the key to the long-term competitiveness of rural regions.

Keywords: Short supply chain (SSC), agrotourism, experience-based tourism, local product, rural development, sustainability,

1. INTRODUCTION

With the spread of large food systems and the expansion of industrial-scale agriculture over the past decades, consumers have distanced themselves from the natural environment of food production. However, at the same time, rural areas are facing continuous challenges. The rural population's ability to retain residents is decreasing, and the emigration of the younger generation and the difficulties in earning a living are becoming increasingly challenging. This topic examines the interconnection between the two areas. The authors see success in the symbiosis of sustainable agrotourism and short supply chains (SSC). In the literature, rural development and agricultural economic concepts are often treated separately, but in practice, these two areas are closely integrated and mutually reinforce each other. Its success depends on organizational support and the quality of the offerings.

It is important to highlight that Eurostat data reveals that farms are disappearing in many areas of Europe. Between 2005 and 2023, the European Union lost nearly 39% of its farms. The vast majority of the EU's 8.8million farms, approximately 91-93%, operate as family farms, with 59% engaged in crop production, 21% in livestock farming, and the remainder having mixed profiles. The relationship between the ageing described by Eurostat data, generational change, short supply chains (SSCs), and agritourism is an important strategic issue. Nearly 60% of farmers will retire within 10 years, so appropriate support must be provided to young professionals, for whom agrotourism and SSC can help create a more sustainable local livelihood (Eurostat, 2023).

Covid-19 and the political conflicts of recent years have shown that global supply chains can collapse within days. A stable local agriculture and a short supply system directly support a successful countryside. The countryside can remain competitive against the faster-developing European regions.

2. CONCEPTUAL FRAMEWORK

The chosen topic is well-known in the international literature, as evidence by the appearance of related articles in the Web of Science. Agrotourism and short supply chains also hold significant importance.

In the field of agritourism, Rebecca Sims (2009) is a pioneer, and her study is still the most frequently cited today. The work highlights that local foods play a central role in the development of experience-based tourist destinations. In the author's approach, tasting local foods is not merely about satisfying the basic needs of visitors. Local foods provide a genuine tourist experience that is deeply connected to the traveller. Through our senses, gastronomy becomes an authentic experience. Local food systems serve as a strategic bridge between tourism businesses and local agricultural producers, thereby encouraging close cooperation between the sectors. This approach contributes to rural development by keeping tourists' spending within the local economy, supporting small and medium-sized enterprises, creating jobs, and helping to preserve traditional farming practices. Moreover, it prioritises local ingredients, which shortens the ecological footprint. Connecting the cultural experience with sustainable development (Sims, 2009).

Parilla-Gonzalez et al., (2020) present agritourism through the examples of olive oil production. The authors describe that this branch of tourism creates a direct connection between agricultural production and experience acquisition. The authors' research highlights that visitors today consciously seek authentic, rural-supporting agrotourism programs that provide an experience, in addition to traditional relaxation. In olive-growing regions, tourists are not merely passive observers, but active participants in agricultural processes. Whether it's about grape harvesting, visiting oil mills, or tastings. This experience-based agritourism provides an excellent opportunity for farmers to increase their income sources and sell their quality products on-site. Among the visitors' motivations, sustainability awareness holds a central place. Getting to know the olive groves and passing on the knowledge of local farmers deepens tourists' environmental awareness. The agrotourism offerings will be more than just the local gastronomic heritage. For the participants, gaining professional experiences is a kind of prestige. Returning home enriched with high experiences and quality knowledge from the trip directly supporting rural development. The findings of the study highlight that consciously constructed agritourism services provide a sustainable experience for agricultural producers and travellers seeking experiences (Parilla-Gonzales et al., 2020).

Table 1: The synergy between agritourism and short supply chains results in significant economic and social development for rural communities.

Main advantages	How does it help the development?
Income generation	Direct sales through short supply chains open new revenue sources for family farms. Reducing farmers' market exposure.
Local identity	The preservation of gastronomic identity and the natural environment, along with the respect for traditions, enhances the destination's attractiveness.
Sustainability	Short supply chains and agritourism support the spread of more diverse and sustainable agricultural production and operations.
Social inclusion	The programs promote the professional and social integration of rural communities.
Education	They provide valuable and effective learning experiences for visitors.

Source: Author's own editing

According to the presented framework, the complexity of agritourism and SSC provides development for rural communities. Through direct sales, farms gain supplementary income, which reduces market vulnerability. Moreover, they preserve traditions and increase the region's tourist appeal. Joint cooperation promotes the spread of sustainable agriculture and also provides valuable learning experiences for visitors.

Belligiano et al., (2024) examine dairy models through mountainous communities in Italy, demonstrating how the production and sale of traditional dairy products play a crucial role in sustaining the local economy and preserving the landscape heritage. They state that dairy processing develops tourism in that particular region. More traditional models based on local resources more effectively strengthen the sustainability, cultural identity, and economic resilience of local communities in the face of global market challenges (Belligiano et al., 2024).

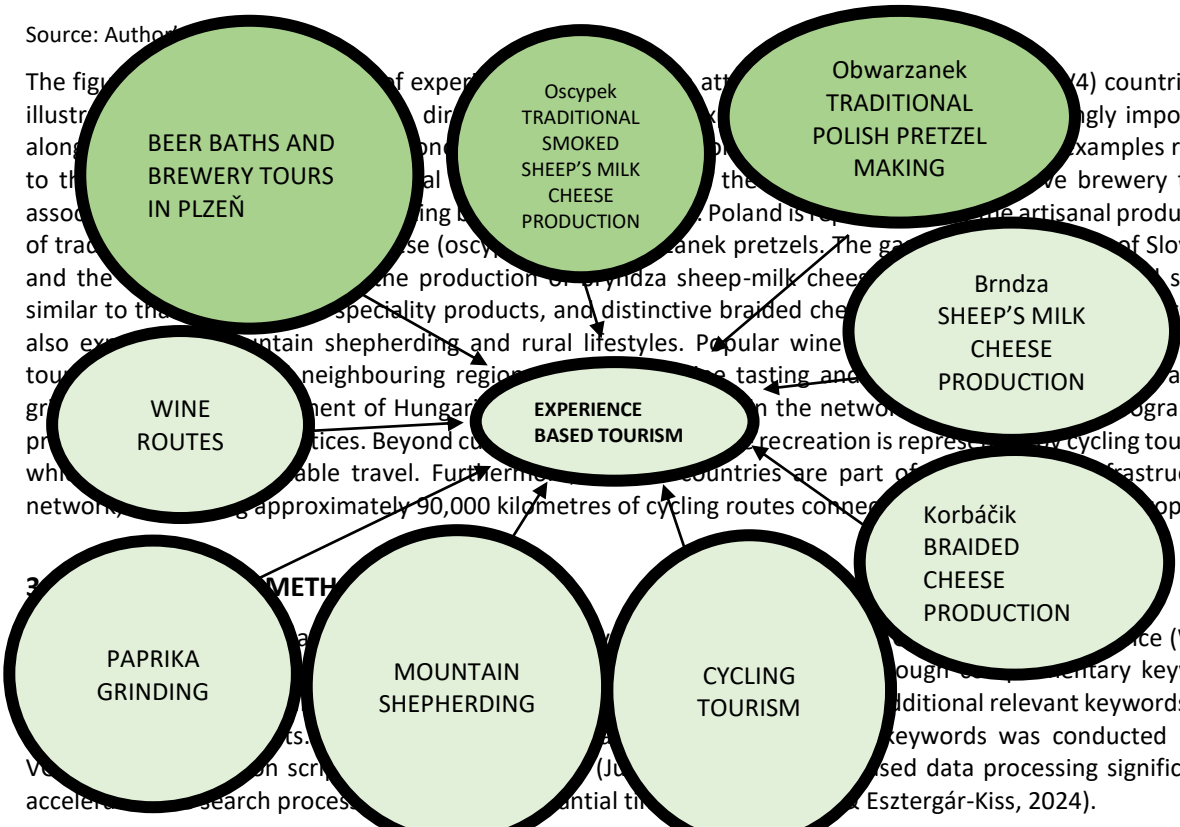
The central element of the short supply chain is sustainability, which is based on direct trust between the producer and consumer (Thome et al., 2021).

The official concept of the short supply chain was established by the European Union's rural development policy for 2014-2020. The legal basis for this was provided by the European Parliament and Council Regulation 1305/2013/EU, which defined the operation of the framework through the regulation of support to be provided from the European Agricultural Fund for Rural Development (EAFRD).

Marsden et al., (2000) categorise the relationship between producer and consumer into three groups. In a personal relationship, the buyer purchases directly from the producer, so trust is based on personal encounters and built on familiarity. In the case of spatial proximity, the product remains in its own region.

Figure 1: Classification of V4 tourist attractions

Source: Author



The figure of experience attractions in the Visegrad Four (V4) countries. It illustrates the direction of the most strongly important along the connections. Examples relate to the cultural attractions, the brewery tours associated with Poland is represented by the artisanal production of traditional cheese (oscypek) and obwarzanek pretzels. The gastronomy of Slovakia and the Czech Republic the production of brynza sheep-milk cheese and status similar to that of speciality products, and distinctive braided cheeses can also exemplify mountain shepherding and rural lifestyles. Popular wine routes with tourists in neighbouring regions wine tasting and the paprika grinding element of Hungarian gastronomy in the network. The programme practices. Beyond cultural recreation is represented by cycling tourism, which enables sustainable travel. Furthermore, countries are part of the infrastructure network, approximately 90,000 kilometres of cycling routes connecting Europe.

3 METHODOLOGY

Web of Science (WoS) through complementary keyword additional relevant keywords and keywords was conducted using VOSviewer software (Jurnal Esztergár-Kiss, 2024).

Table 2: Clusters, coherence and main keywords in the network analysis of short supply chains and agritourism

Cluster ID	rural tourism Average Edge Weight Top 5 Cluster Labels	short food supply chains Average Edge Weight Top 5 Cluster Labels
2	2.9697 authenticity, satisfaction, consumption, destination, experience...	5.3382 alternative food networks, short food supply chains, local food systems, agriculture, agroecology...
3	4.7340 sustainable development, entrepreneurship, competitiveness, diversification, rural tourism	4.5833 short food supply chain, food-supply chains, sustainability, perceptions, preferences...
1	4.8557 community-based tourism, sustainable tourism, protected areas, participation, conservation...	3.3692 short food supply chains (SFSCs), sustainable development, rural development, rural-development, farmers markets...

Cluster ID	rural tourism Average Edge Weight Top 5 Cluster Labels	short food supply chains Average Edge Weight Top 5 Cluster Labels
4	4.9636 tourism development, rural development, perceptions, attitudes, community...	

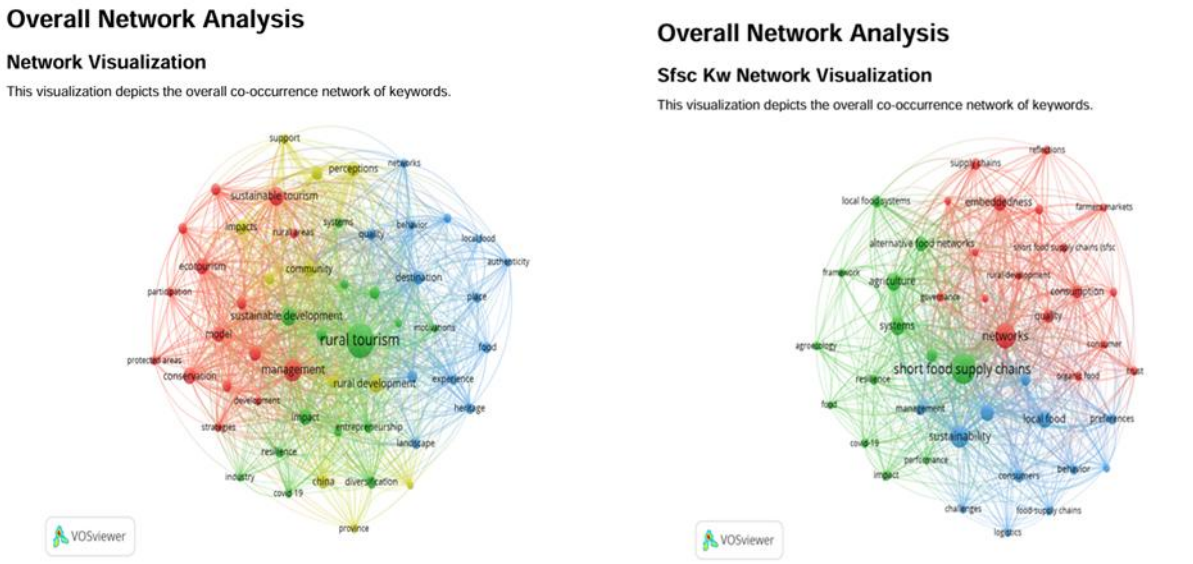
Source: Author's own editing

The network analysis of rural tourism identified four distinct clusters. Cluster 4 (4.9636) exhibited the highest internal coherence, focusing on tourism development, rural development, and the attitudes and perceptions of local communities. It was closely followed by Cluster 1 (4.8557), which links community-based tourism, sustainable tourism, protected areas, public participation and nature conservation. Custer 2 (4.7340) also displayed strong interconnections, encompassing sustainable development, entrepreneurship, competitiveness, diversification and rural tourism. Finally, Cluster 3 (2.9697) focuses on the visitor perspective, bringing together authenticity, visitor satisfaction, consumption, destination and direct experiences.

The network analysis of short supply chains identified three clearly distinguishable clusters with different levels of internal coherence and thematic focus. Cluster 2 had the strongest internal connections and cohesion (5.3382), encompassing alternative food networks, short supply chains, local food systems, agroecology and agriculture. Cluster 3 (4.5833) focused specifically on the operation of short supply chains, food supply chains, sustainability, and consumer perceptions and preferences. Finally, Cluster 1 (3.3692) brought together more structural and policy-oriented themes, highlighting short food supply chains (SFSCs), sustainable and rural development, and the role of farmers' markets.

The network analysis table reveals common themes across the keyword clusters for short supply chains and rural tourism. Rural development features prominently in both networks, indicating that short supply chains and rural tourism are closely linked to the economic and social development of rural areas. Sustainability is also strongly represented in both fields. The clusters include keywords relating to the opinions, attitudes and perceptions of local communities, consumers and tourists, highlighting the crucial importance of involving local stakeholders.

Figure 2: Keyword network according to the Web of Science database



Source: Author's own compilation

The bibliometric network analyses of rural tourism and short food supply chains (SFSCs), together with VOSviewer visualisations, reveal connections between the two fields. A key shared element is the rural regional development framework, demonstrating that both local food supply systems and agritourism play an important role in the economic growth of rural areas. They also contribute to expanding livelihood opportunities. Sustainability provides another link between these processes: sustainable development and sustainability occupy a central position in both networks. Both short supply chains and rural tourism aim to establish a sustainable

ecological and economic balance. Local communities are a major focus. A successful model is based on trust, the provision of authentic experiences and the active participation of local residents. Other key concepts include the local economy, quality and adaptability to crises. Overall, the two fields are clearly interconnected through a dense network of relationships.

4. CONCLUSION

The integration of agritourism and short supply chains represents a viable strategy for rural development, but it cannot be regarded as an automatic solution. Success depends particularly on collective organization among producers and the deliberate branding of distinctive local gastronomic products. Support for the sector is also essential. Agritourism can become a genuine opportunity for agricultural producers when they combine product sales with experience-based services. Experience-based tourism has become one the most important trends in recent years.

REFERENCES

1. Belliggiano A, Ievoli C, Bispini S and Conti M (2024) Food value chains configurations and resilience of rural mountain communities: three dairy business models in central Apennines (Italy). Front. Sustain. Food Syst. 8:1436214. http://dx.doi.org/10.3389/fsufs.2024.1436214
2. Eurostat. (2023, April 20). Farmers and the agricultural labour force - statistics [Archived version; 2020 census data]. Statistics Explained. https://ec.europa.eu/eurostat/statistics-explained/index.php?oldid=430152
3. Juhász, L. P. (2025). VOS_analyser (v0.1.0). Zenodo. https://doi.org/10.5281/zenodo.16759348
4. Marsden, T; Banks, J; Bristow, G: Food supply chain approaches: Exploring their role in rural development (2003). Sociologia Ruralis, 40 (4) https://doi.org/10.1111/1467-9523.00158
5. Parrilla-González, J.A., Murgado-Armenteros, E.M., Torres-Ruiz, F.J. (2020). Characterization of Olive Oil Tourism as a Type of Special Interest Tourism: An Analysis from the Tourist Experience Perspective. Sustainability, 2020, 12(15), 6008. http://doi.org/10.3390/su12156008
6. Sims, R. (2009). Food, place and authenticity: local food and the sustainable tourism experience Journal of Sustainable Tourism, 17(3), 321-336. https://doi.org/10.1080/0966958080235929
7. Thomé, KM; Cappellesso, G; Ramos, ELA; Duarte, SCD (2021). Food Supply Chains and Short Food Supply Chains: Coexistence conceptual framework. Journal of Cleaner Production, 278
8. Toaza, B. & Esztergár-Kiss, D. (2024). Automated bibliometric data generation in Python from a bibliographic database. Software Impacts, 19, Article 100602. https://doi.org/10.1016/J.SIMPA.2023.100602

Generational Renewal As A Land Policy And Sustainability Challenge

Nikolett Faragó[1] **Anna Dunay** **Róbert Magda**

[1] John von Neumann University, Doctoral School of Management and Business, Administration, farago.nikolett.66@gmail.com

Abstract: Generational renewal in agriculture is commonly framed as a response to an ageing farming population. However, the transfer of farms also redistributes land rights, managerial authority, financial obligations and responsibility for natural resources. This paper examines how land policy can connect agricultural succession with economic, social and environmental sustainability. It develops a conceptual framework through a targeted literature review and a comparative documentary analysis of selected policy mechanisms in Hungary, France and Ireland, using a policy reference date of 31 December 2025. The material comprises peer-reviewed research, European Union policy documents, legislation, official programme guidance and published agricultural statistics. The comparison addresses whole-farm transfer arrangements, land-market intermediation, succession partnerships and long-term leasing; it does not estimate their causal effects. The analysis distinguishes the continuity of an individual farm from the renewal of the farming population and from changes in the distribution of land control. Four interacting mechanisms are proposed: access and allocation, security and investment horizons, transfer coordination, and stewardship accountability. Hungary illustrates the coordination of farm transfer and support for the parties involved; France illustrates the potential integration of land allocation with public-interest objectives; and Ireland illustrates the separation and sequencing of ownership, income and managerial responsibilities. Across these mechanisms, preserving business continuity may conflict with access for unrelated entrants, while increasing land mobility does not necessarily improve environmental performance. The paper therefore proposes a sequenced policy approach combining succession preparation, transparent access to land, suitable tenure arrangements, transition finance and measurable stewardship commitments. Its principal conclusion is that generational renewal should be evaluated through effective managerial autonomy, viable livelihoods, equitable entry opportunities and environmental outcomes, rather than through the age of registered farm managers or the number of supported transfers alone.

Keywords: Generational renewal; land policy; farm succession; tenure security; agricultural sustainability

1. INTRODUCTION

Generational renewal raises a question that is simultaneously demographic, institutional and ecological: who will control agricultural resources, under what conditions, and with what capacity to maintain their productive and environmental functions? In the European Union (EU), 11.9% of farm managers were younger than 40 in 2020, while 57.6% were at least 55. These figures refer to managers rather than necessarily to landowners, and they describe an age structure rather than the availability of successors or the quality of future land management (Eurostat, 2023). They establish a policy concern, but they cannot by themselves identify the appropriate response.

The distinction matters because replacing an older registered manager with a younger family member may leave control over investment, income and land use substantially unchanged. Conversely, an older owner can lease land to an independent entrant without transferring ownership. A farm can continue successfully within a family while access to neighbouring land becomes more difficult for unrelated applicants. The relevant policy problem is therefore not simply how to accelerate transfers, but how to enable viable and accountable changes in resource control. The analytical starting point of this paper is that renewal must be assessed through the relationships between people, businesses and land rather than through an age threshold alone.

Research has already challenged a uniform interpretation of the European young-farmer problem. Zagata and Sutherland (2015) emphasise definitional inconsistencies and the need to distinguish young farmers from new entrants. Fischer and Burton (2014) show that succession can develop through the interaction of successor identity and the evolving farm, rather than through a single decision at retirement. These contributions suggest that a payment offered at the point of establishment addresses only one part of a much longer process. They also caution against treating all ageing farm populations as institutionally equivalent.

Land policy provides a particularly useful bridge between these debates and sustainability. Here, land policy means public rules and interventions affecting access, ownership, use, transfer and the distribution of control over agricultural land. It includes more than restrictions on land purchases: leasing arrangements, allocation institutions, succession law and the interaction of support payments with land markets also matter. International guidance on responsible tenure governance connects secure and equitable land rights with livelihoods, environmental protection and the recognition of legitimate rights (Food and Agriculture Organization of the

United Nations [FAO], 2012). Such a perspective makes farm succession a public-policy concern without reducing it to a purely administrative transaction.

The paper asks three research questions. First, through which mechanisms can land policy influence succession and entry into farming? Second, how do selected institutional arrangements in Hungary, France and Ireland address these mechanisms? Third, which criteria can distinguish sustainable generational renewal from a formal change in the age or identity of a beneficiary? The countries are examined as contrasting institutional illustrations, not as a representative sample of Europe or as a ranking of policy performance.

The contribution is a tenure-succession-sustainability framework that separates access and allocation, security and investment horizons, transfer coordination, and stewardship accountability. Its purpose is to identify complementarities and tensions that can be obscured when demographic, land-market and environmental policies are evaluated separately. The argument also qualifies an attractive but insufficient policy assumption: younger management may create opportunities for change, but neither youth nor family ownership guarantees sustainable outcomes. What matters is the combination of authority, resources, incentives and obligations accompanying the transition.

2. CONCEPTUAL FRAMEWORK

2.1. Succession, Entry And The Distribution Of Control

For this analysis, farm succession is a process through which responsibility for an existing farm business passes to another person or group. Inheritance is a legally defined transfer associated with death, whereas inter vivos transfer occurs during the transferor's lifetime. Generational renewal is broader: it includes the continuation of existing farms and the establishment of new decision-makers, including people without a family farm to inherit. These working definitions distinguish analytical categories; they do not replace the specific definitions used in national legislation or support schemes. Table 1 summarises why the categories should not be treated as interchangeable.

Table 1: Distinguishing The Main Objects Of Generational-Renewal Policy

Analytical category	What changes or is assessed	What it does not establish by itself
Farm succession	Responsibility for an existing farm business passes to another operator.	Ownership transfer, independent authority or improved sustainability.
Inheritance	Assets or rights pass under the applicable rules following death.	A prepared successor or an uninterrupted business transition.
New entry	A person establishes an independent farming role, with or without a family farm.	Qualification for a particular age-based support scheme.
Land mobility	Land ownership or use moves between parties.	Entry by a new farmer rather than expansion by an existing operator.
Generational renewal	The population of farming decision-makers is renewed and viable roles are sustained.	Equitable allocation or environmental improvement without separate assessment.

Source: Author’s analytical distinctions, informed by Zagata and Sutherland (2015), Fischer and Burton (2014), and FAO (2012). These are working definitions, not harmonised legal categories.

A further distinction is required between ownership, operational control and beneficial participation. Ownership identifies who holds title; operational control concerns decisions about production, investment and contracting; beneficial participation concerns who receives income, bears risk and can influence the future of the business. These dimensions can move together, but they need not. An evaluation based exclusively on registered title can overlook a meaningful management transition, while a managerial registration can conceal a situation in which a successor has little practical autonomy. The framework therefore treats effective control as an empirical question rather than as an automatic consequence of legal form.

Succession also has a temporal dimension. The formation of a successor's occupational identity can begin well before a formal transfer, while older farmers may continue contributing after withdrawing from executive

responsibility. Conway et al. (2016) identify the importance of symbolic capital and the emotional consequences of retirement in Irish farming. Their findings support taking status and belonging seriously, rather than interpreting delayed retirement solely as a failure to respond to financial incentives. The implication developed here is that a legitimate continuing role for the predecessor should be distinguished from an indefinite right to overrule the successor.

2.2. Three Sustainability Pillars Without Automatic Substitution

The economic pillar concerns the capacity of the farm and participating households to maintain viable livelihoods, service obligations and adapt to shocks. The social pillar concerns fair access, distribution within and beyond the family, working conditions, autonomy and dignified withdrawal. The environmental pillar concerns the maintenance of soil, water, habitats and other ecological functions affected by agricultural management. This three-part organisation is an analytical device, not a claim that sustainability has a single universally accepted definition. Purvis et al. (2019) demonstrate the diverse origins and unresolved conceptual foundations of the familiar three-pillar model.

The pillars are treated here as interdependent but not fully substitutable. Higher turnover cannot automatically compensate for the exclusion of eligible entrants, and a completed transfer cannot compensate for avoidable damage to ecological assets. Equally, environmental requirements that leave no plausible livelihood can undermine the continuity they are intended to support. The approach is therefore to identify minimum acceptable conditions and the trade-offs above them, rather than to collapse all outcomes into an unqualified composite score. Governance is treated as a cross-cutting condition through which these choices are made, documented and reviewed.

This position is consistent with the broader argument that family farming should be evaluated through inclusion and environmental relationships as well as commercial performance (FAO & International Fund for Agricultural Development [IFAD], 2019). It does not presume that smaller farms always outperform larger farms, that family businesses are necessarily equitable, or that consolidation is intrinsically harmful. The scale and direction of effects depend on the production system, local labour market, natural conditions and the distribution of decision rights. These contingencies must remain visible in the analysis.

2.3. Four Connecting Mechanisms

The first mechanism, access and allocation, concerns who can obtain a viable combination of land, buildings, finance and commercial opportunities. A transfer programme can make a known successor's entry easier while leaving the opportunities of an unrelated entrant unchanged. The second mechanism, security and investment horizons, concerns whether the operator can expect to retain control long enough to justify investment and capture its benefits. Importantly, security is not synonymous with ownership. Research on Austrian farming finds only a small tenancy effect on crop choice and highlights the role of perceived security and landlord-tenant relations in soil management (Leonhardt et al., 2019).

The third mechanism, transfer coordination, concerns the timing of management responsibilities, assets, debt, household income and administrative obligations. The fourth, stewardship accountability, concerns how environmental responsibilities are assigned and maintained during and after the transition. Together, these mechanisms provide a causal hypothesis rather than an estimated causal model: land-policy instruments change opportunities and constraints; households and businesses respond; and the resulting production and distribution choices affect sustainability. Feedback is possible because land prices, farm profitability and family expectations can themselves alter subsequent transfer decisions. No single instrument is expected to act independently of this wider setting.

3. MATERIALS AND METHODS

3.1. Research Design And Evidence Base

The study uses a targeted narrative review combined with a qualitative, structured comparison of selected policy mechanisms. It is a documentary and conceptual study, not a survey, a systematic review or an impact evaluation. The policy reference date is 31 December 2025. The examination focuses on legislation and policy designs available by that date, including the November 2025 versions of the Hungarian programme documents and the

July 2025 Irish succession-partnership guidance. Later amendments and implementation outcomes are outside the analytical scope. Institutional webpages are used to explain established functions, not to establish a historical series of programme results.

The source base comprises three complementary categories. Peer-reviewed research addresses succession, retirement, new-entrant collaboration and tenure-related behaviour. Official European and national documents establish the existence, stated objectives and design of the selected instruments. Published Eurostat statistics provide demographic context. Sources were located through targeted web searches, institutional repositories, journal publication records and official public portals, using combinations of farm succession, generational renewal, land tenure, soil conservation, land-market regulation and the names of the relevant national instruments. Selection prioritised direct relevance, identifiable authorship and traceable primary documentation. No exhaustive search denominator or screening flow is claimed.

Evidence is used according to its purpose. A statute establishes legal design, not policy success; administrative guidance explains scheme conditions, not the number of additional transfers caused; and a qualitative study can illuminate a mechanism without establishing its prevalence throughout Europe. The 2020 age figures are used as a common contextual baseline rather than as a current census of all succession opportunities. No unpublished observations, interview material or newly estimated statistics are introduced. The references and the sources accompanying the comparative table identify the documentary basis of the analysis.

3.2. Case Selection And Comparative Procedure

Hungary is selected for its dedicated whole-farm transfer framework and complementary support for transferors and transferees. France is selected for the public-interest land-intermediation functions of the sociétés d'aménagement foncier et d'établissement rural (SAFER). Ireland is selected for succession partnerships and tax-supported long-term leasing. These selections isolate different instruments within a shared EU policy environment. They are not claims that each country relies exclusively on the mechanism highlighted, or that differences in national farm structures can be attributed to that mechanism.

The comparison asks the same questions of each case: which obstacle does the instrument target; which rights or responsibilities can it change; whose entry or exit does it facilitate; what connection to sustainability is explicit in its design; and which risks would require empirical evaluation? Documentary descriptions are presented first, followed by conditional analytical implications. The cross-case synthesis then maps these implications to the four mechanisms in Section 2 and the three sustainability pillars. Table 2 is therefore a policy-design matrix, not a scorecard of observed national performance.

3.3. Interpretation And Scope Conditions

The method can establish that instruments address different parts of the transition and can expose potential conflicts between their objectives. It cannot determine how many farms would have transferred without support, compare environmental outcomes between beneficiaries and non-beneficiaries, or establish the net effect on land concentration. Case selection is purposive, within-country variation remains substantial, and official accounts may emphasise intended benefits. To limit overinterpretation, the paper distinguishes documentary findings, mechanism-based inferences and proposals for future testing. Its conclusions concern policy coherence and evaluation design rather than the superiority of a national model.

4. THE EUROPEAN POLICY CONTEXT

4.1. Common Support, Different National Institutions

The Common Agricultural Policy (CAP) provides a shared framework, but it does not eliminate differences in inheritance, land regulation, taxation or retirement arrangements. Regulation (EU) 2021/2115 identifies attracting and sustaining young and new farmers as a specific objective. Its architecture includes complementary income support for young farmers under Article 30, support for setting up under Article 75, and cooperation under Article 77 (European Parliament & Council of the European Union, 2021). These are distinct intervention channels, and national implementation remains central to how they connect with land access and farm transfer.

The analytical implication is that the existence of a common funding framework does not imply a common transition pathway. A prospective farmer needs more than eligibility for an establishment payment: a workable land arrangement, sufficient authority and a business capable of meeting ongoing obligations are also necessary. Where these elements are supplied by family resources, public support may reinforce an already feasible transfer. Where they are absent, the same payment can be insufficient to enable entry. This is a question of additionality and institutional complementarity, not a reason to assume that all income support is ineffective.

The European Court of Auditors (2017) identified weaknesses in the targeting and specification of results in the support it examined. Its findings concern the programmes and period covered by that audit and should not be presented as a verdict on the 2023-2027 CAP. Nevertheless, the distinction between distributing funds and demonstrating effective renewal remains methodologically relevant. It supports evaluating whether assistance changes the timing, accessibility or durability of a transition, rather than treating expenditure as a sufficient measure of success.

4.2. Land Markets And The 2025 Renewal Strategy

National land-policy choices also operate within EU law. The European Commission's (2017) interpretative communication recognises that agricultural land has particular public-interest characteristics while explaining the relevance of free movement and proportionality to restrictions on acquisition. The point for this paper is not to determine the legality of any individual national rule. It is that access-oriented policy must combine legitimate objectives with transparent, proportionate and non-discriminatory implementation. Protecting agricultural use and preserving opportunity for future farmers should not be treated as synonymous with protecting every incumbent from competition.

The Commission's Strategy for Generational Renewal in Agriculture, adopted in October 2025, links land access, finance, skills, rural living conditions and succession. It sets an ambition to approximately double the share of young farmers by 2040 and proposes more coordinated support, including land-market transparency and national strategic action (European Commission, 2025). These are policy ambitions and proposals, not evidence of achieved outcomes or a basis for assuming that all post-2027 measures were already binding at the reference date. The strategy strengthens the relevance of examining the institutional connections between entry and retirement.

A further interaction arises through land prices. Baldoni and Ciaian (2021) find that CAP payments can be capitalised into rents, with results differing by payment design and estimation model. Their estimates for land values are less consistent. A related meta-analysis also finds substantial variation across studies and subsidy types (Baldoni et al., 2021). Accordingly, this paper does not assume a fixed rate of subsidy capture. It treats capitalisation as a risk to investigate when support increases purchasing power without increasing the supply of accessible land or changing the terms on which entrants can obtain it.

5. COMPARATIVE ANALYSIS OF SELECTED NATIONAL MECHANISMS

5.1. Hungary: Coordinating The Transfer Of A Functioning Farm

Hungarian land policy combines regulation of transactions in agricultural and forestry land with a dedicated framework for farm transfer. Act CXXII of 2013 sets out public objectives relating to viable holdings, rural livelihoods and sustainable land use. Act CXLIII of 2021 on the transfer of agricultural holdings treats the farm as an assemblage of assets, rights and obligations and seeks to facilitate its continuation by another generation (Hungarian National Assembly, 2013, 2021). The relevance of the latter framework is its attention to the continuity of an operating economic unit rather than only to the transfer of individual parcels. This description does not imply unrestricted access to the statutory arrangement.

Two 2025 CAP calls illustrate the connection between legal transfer and transition assistance. KAP-RD07-1-25 supports farm-transfer cooperation and identifies the transferor as the beneficiary; its rationale includes preparation, transition-period livelihood security and mentoring of the recipient. KAP-RD06-1-25 supports the transferee and links assistance to an approved farm-transfer contract and continued operation (Hungarian Ministry of Agriculture, 2025a, 2025b). The two instruments should therefore be distinguished rather than described as a single young-farmer grant. Their documented design addresses different sides of the same transition, although their actual combined effects require evaluation.

The mechanism-based advantage is coordination. A farm can lose operational value when land, machinery, contracts and managerial responsibility are transferred on incompatible schedules. A whole-farm approach can make these relationships visible and create an occasion to resolve them together. However, the integrity of the business should not be confused with the permanent preservation of every inherited production decision. A recipient may need to alter enterprise composition, employment arrangements or environmental management. Continuity of responsibility can be valuable precisely because it makes an orderly adaptation possible.

Two questions follow for evaluation. First, does the successor gain genuine decision-making authority, or does administrative completion precede practical autonomy by several years? Second, do the instruments improve the options of those outside established transfer relationships? A policy focused on known transferors and recipients may work well for them while leaving unrelated entrants with unresolved land-access barriers. This is not evidence that the Hungarian arrangements exclude all non-family pathways; it is a reminder that facilitating a particular transfer and widening entry opportunities are different outcomes. Environmental performance likewise needs independent measurement rather than being inferred from continued operation.

5.2. France: Land Intermediation And Public-Interest Allocation

France offers an institutional illustration in which land allocation can be connected directly to several public objectives. In its version applicable from February 2025, Article L141-1 of the Rural and Maritime Fishing Code assigns SAFER functions relating to agricultural establishment, viable holdings, diversity of production systems, environmental protection and transparency of rural land markets. It also permits the acquisition and subsequent allocation of rural assets within this framework (French Republic, 2025). The legal mandate thus recognises economic, social and environmental considerations within the same institutional setting.

SAFER's own description distinguishes negotiated acquisition from the use of a legally bounded pre-emption right and describes the subsequent allocation of land to projects serving public-interest objectives. Its stated missions also include supporting young farmers and farm transfer, protecting natural resources and improving land-market information (Fédération nationale des Safer, n.d.-a, n.d.-b). Pre-emption should not be understood as an unrestricted power to intervene in every transaction. Nor does the existence of this authority establish that any particular applicant or environmental objective necessarily prevails.

The analytical attraction is the possibility of addressing allocation rather than merely subsidising demand. When a parcel or holding becomes available, an intermediary can consider competing uses and applicants against explicit objectives. This may create an opportunity to evaluate an entrant's viable project without treating the highest immediate offer as the only relevant criterion. It can also make environmental commitments part of the allocation discussion. These are institutional possibilities; demonstrating whether they materialise requires information on applicants, decisions, prices and subsequent land management.

The corresponding risk is discretion. If selection procedures are opaque, complex or dominated by established interests, an intervention justified as supporting entry may not reach less-connected applicants. The proposed safeguard is therefore reasoned allocation, published criteria, accessible review procedures and monitoring of actual beneficiaries. A land intermediary also needs sufficient capacity to assess business plans and environmental commitments without making application costs disproportionate. The transferable lesson is not that another country should reproduce SAFER unchanged, but that land-market information and allocation procedures can form part of a renewal policy rather than remaining separate from it.

5.3. Ireland: Sequencing Management, Income And Ownership

Irish succession partnerships illustrate a staged approach to transfer. Revenue's July 2025 guidance describes an annual tax credit of up to EUR 5,000 for a qualifying succession farm partnership, divided between partners under the relevant rules. The arrangement connects collaboration between an experienced farmer and a trained younger farmer with a specified future asset transfer (Revenue Commissioners, 2025b). It is a conditional fiscal instrument, not an unconditional payment to every farming household. Its analytical significance lies in linking a period of joint activity to an agreed transition rather than requiring all responsibilities and assets to move on the same day.

Long-term leasing provides a different route. Revenue guidance describes income-tax relief for qualifying leases of Irish farmland, with a written or evidenced lease of at least five years and restrictions concerning connected parties (Revenue Commissioners, 2025a). This mechanism supports land use without necessarily transferring

ownership. It can therefore be relevant to an owner who wishes to retain an asset while reducing active farming responsibilities, and to an operator who cannot or does not wish to purchase land. Whether an entrant can obtain an affordable lease remains a separate market question.

Teagasc's 2025 work on entry, progression and succession discusses collaborative models, financial planning and the involvement of several advisers (Teagasc, 2025). However, collaboration cannot be reduced to contract availability. Ingram and Kirwan's (2011) study of joint ventures in Cornwall, outside the Irish case, shows why interpersonal relationships and differing expectations matter when matching entrants with established farmers. Used as mechanism evidence rather than as an evaluation of Ireland, this research supports asking who takes decisions, how disagreements are resolved and whether the younger participant has a credible route to greater responsibility.

The fiscal dimension must also be interpreted carefully. Leonard et al. (2017), using Irish farm data and hypothetical transfer scenarios, show that the relative financial attractiveness of transfer can depend on how policy affects the income streams of both generations. Their scenarios are not current tax calculations and are not applied here as such. They support the more general proposition that a transfer policy can fail when it improves the successor's position but leaves the predecessor facing an unacceptable income loss. Conversely, rewarding an owner's long-term lease does not by itself demonstrate that the tenant has gained secure, environmentally appropriate and commercially viable control.

5.4. Cross-Case Synthesis

Table 2: Selected National Mechanisms And Questions For Evaluation

Case	Documented mechanism	Potential contribution	Risk or question to evaluate
Hungary	Whole-farm transfer framework; distinct 2025 support instruments for transfer cooperation and the transferee.	Coordination of the operating unit, preparation and continued management.	Does formal completion deliver autonomy? Does assistance widen entry beyond an existing transfer relationship?
France	SAFER land intermediation and allocation under a public-interest mandate.	Connection of land access with viable projects, environmental objectives and market information.	Are criteria accessible, decisions transparent and benefits open to less-connected entrants?
Ireland	Qualifying succession partnerships and tax relief for eligible long-term leases.	Staged management and asset transfer; access to land use without immediate purchase.	Are income and decision rights workable for both parties? Does secure access remain affordable?

Source: Hungarian National Assembly (2021); Hungarian Ministry of Agriculture (2025a, 2025b); French Republic (2025); Revenue Commissioners (2025a, 2025b). Contributions and risks are analytical interpretations, not measured programme effects.

The comparison identifies complementary points of intervention rather than a single best system. Hungary's selected instruments focus on coordinating an identified transfer; France's highlighted institution can intervene in access and allocation; and Ireland's selected arrangements illustrate the sequencing or separation of ownership, management and income. Every case still requires attention to the other mechanisms. A well-coordinated transfer can occur in an exclusionary land market; transparent allocation can produce an unviable business; and a long lease can secure control without ensuring responsible environmental management. Policy coherence therefore depends on the relationships between instruments, not on the presence of a particular legal label.

6. SUSTAINABILITY TRADE-OFFS AND AN INTEGRATED ASSESSMENT

6.1. Economic Viability Beyond Transfer Completion

The first economic issue is the difference between preserving asset value and maintaining a viable livelihood. A holding may be valuable on paper but unable to finance debt service, successor remuneration and the

predecessor's retirement needs simultaneously. For evaluation, the relevant test is not whether a transfer document was signed, but whether the resulting business and household arrangements remain workable under plausible price and yield shocks. This paper proposes assessing cash flow and repayment capacity alongside the division of income and the cost of essential reinvestment. These are assessment criteria, not results derived from a new farm-level dataset.

A second issue is the distinction between reducing transaction costs and creating additional opportunity. Assistance with valuation, contracts and administrative continuity may make an intended transfer smoother. It may not change who can enter farming. Conversely, a financing instrument may increase access while exposing a new farmer to substantial fixed obligations. The capitalisation literature discussed in Section 4 reinforces the need to examine who retains the benefit of assistance, but it does not justify assuming that every euro of support raises rent by the same amount. Measures should be compared against realistic alternative uses of the resources and the likely behaviour of both owners and operators.

6.2. Social Sustainability Within And Beyond The Family

The social assessment must consider several parties rather than treating the farm family as a single interest. Successors need recognised authority and acceptable working conditions; predecessors need dignity and credible income arrangements; other family members may have legitimate claims that should not disappear from the analysis. Non-family workers and unrelated entrants also have interests in the distribution of opportunity. Responsible tenure governance explicitly addresses non-discrimination and gender-sensitive recognition of rights (FAO, 2012). The policy inference is that succession advice should examine participation and consent, not merely identify a person able to sign the transfer agreement.

Intergenerational fairness does not require the predecessor to disappear from farm life. It requires clarity about the difference between a valued advisory role and continued executive control. Similarly, fairness among heirs need not be equated with mechanically dividing every productive asset into equal physical parts. The appropriate arrangement depends on applicable law and the parties' circumstances. The analytical requirement is to make the trade-off visible: preserving a viable unit, recognising non-successor interests and avoiding unsustainable repayment burdens cannot always be achieved by the same financial arrangement. These are questions for transparent negotiation and case-specific advice, not universal prescriptions.

6.3. Environmental Sustainability As A Separate Outcome

Environmental improvement should not be inferred from a successor's age, formal agricultural qualification or ownership status. These characteristics may affect opportunity and capability, but environmental effects depend on actual management choices and the conditions under which they are made. The Austrian evidence discussed earlier is particularly useful because it challenges an automatic contrast between careful owners and short-term tenants (Leonhardt et al., 2019). The relevant question is whether the operator expects to benefit from good management and has the rights, resources and incentives necessary to undertake it.

Succession can be a practical occasion to review land-management responsibilities. The proposed review would record baseline conditions, existing environmental commitments, planned investments, the allocation of costs and the treatment of improvements at the end of a lease. Soil management, water protection and habitat maintenance may require different observation periods and indicators. A support condition should therefore specify what is expected and how it will be assessed. It should not assume that participation in a scheme proves additional environmental benefit, or require an entrant to accept an obligation that the tenure arrangement makes impossible to fulfil.

6.4. A Multi-Dimensional Dashboard

Table 3: Proposed Dashboard For Evaluating Sustainable Generational Renewal

Dimension	Illustrative indicators	Interpretation and required comparison
Economic	Post-transfer operating cash flow; debt-service capacity; operator remuneration; continued independent operation.	Compare with the pre-transfer position and plausible non-supported pathways; distinguish farm viability from asset value.
Social	Documented decision authority; predecessor livelihood security; working conditions; beneficiary and applicant profiles by gender and entry route.	Assess both generations and non-successors; report access alongside the composition of the eligible population.
Environmental	Locally appropriate soil-condition measures; nutrient balance; habitat retention; fulfilment of agreed land-management commitments.	Use a baseline and suitable observation period; separate practice adoption from actual environmental outcomes.
Cross-cutting governance	Tenure duration and expected security; clear investment rights; transfer milestones; decision transparency and dispute resolution.	Assess whether rights and obligations can be exercised in practice; do not substitute document completion for effective control.

Source: Author's proposed assessment framework, informed by FAO (2012), Purvis et al. (2019), Leonhardt et al. (2019), and European Court of Auditors (2017). No indicator values, weights or validated thresholds are claimed.

The dashboard deliberately separates transition processes from final outcomes. A signed contract, a completed training course or a supported hectare may show that an intervention was delivered. They do not establish that a viable independent operator emerged or that environmental conditions improved. Indicators should therefore be examined together, with baselines, time horizons and clearly defined populations. Reporting the share of women or unrelated entrants among beneficiaries, for example, is informative only when the eligible and applicant populations are also considered. Otherwise, differences in application and selection can remain concealed.

A non-compensatory interpretation is recommended. Serious failure in a minimum safeguard, such as the absence of genuine consent or the inability to comply with binding environmental obligations, should not be hidden by a favourable average score elsewhere. Beyond those safeguards, policymakers can compare alternative packages and make trade-offs explicit. The framework does not supply universal thresholds or weights, because those require legal, ecological and social justification in the setting concerned. Its contribution is to specify the dimensions that need to be examined before a transfer is described as sustainable.

7. POLICY IMPLICATIONS AND RESEARCH AGENDA

7.1. Sequence Support Around The Transition

The first proposed step is early preparation. A transition review should identify the people involved, the assets and contracts concerned, the predecessor's income needs and the successor's desired role. It should also establish whether a family succession is actually intended. Where no willing and capable successor is identified, advice should include leasing, collaboration and transfer outside the family rather than treating the absence of an heir as the end of the policy conversation. Preparation should remain voluntary and informed; the objective is to expand feasible choices, not to pressure an older farmer into a predetermined exit.

The second step is to secure a workable allocation of rights. Land access, business control, use of buildings and responsibility for debt need to fit together. A prospective operator should not be required to commit major funds before essential permissions and tenure arrangements are reasonably clear. Equally, a lease should allocate responsibilities for investments whose benefits outlast the initial term. The three cases suggest different institutional resources for this task, but the recommended function is common: convert an intention to transfer into a feasible and understandable package of responsibilities.

The third step is targeted finance and advice. Funding should respond to a diagnosed constraint, such as transition liquidity, business reorganisation or a specific environmental investment, rather than being justified solely by age. Advice needs to coordinate legal, financial, agricultural and interpersonal issues while respecting their different professional competences. A single access point can help applicants navigate the system, but it should not eliminate independent advice where the parties' interests differ. The purpose is coordination without concealing conflicts of interest.

The fourth step is follow-through. Support should be accompanied by proportionate checks on effective management, business continuity and agreed stewardship actions. A staged arrangement needs decision points at which authority and obligations change in a documented way. Programme design should also anticipate illness, changed family circumstances and business failure, with fair procedures for amendment or exit. This proposal treats a succession agreement as a supported transition process rather than as a one-time administrative achievement.

7.2. Four Propositions For Empirical Testing

Proposition 1 concerns complementarity: assistance that combines transfer preparation with workable land and management rights is expected to produce more durable independent operation than an equally resourced payment without those complementary arrangements. Testing this requires distinguishing genuinely integrated assistance from the coincidental receipt of several unrelated measures. It also requires measuring independence and survival after the initial support period, not merely at establishment.

Proposition 2 concerns distribution: support tied only to an existing transfer relationship is expected to have a different beneficiary profile from support combined with transparent, open land-access mechanisms. The prediction is not that family succession is undesirable. It is that preserving existing pathways and widening opportunity should be measured separately. Relevant outcomes include applications and successful entry by unrelated farmers, rather than only the total number of completed transfers.

Proposition 3 concerns environmental conditionality: the environmental contribution of renewal is expected to depend more directly on decision rights, sufficiently secure tenure and explicit management commitments than on a younger manager's age alone. Testing this proposition would require land-management observations before and after transition, information on tenure and a comparison that accounts for pre-existing differences. It should permit heterogeneous effects across production systems rather than imposing a single direction of change.

Proposition 4 concerns retirement security: a credible arrangement for the predecessor's livelihood and continuing non-executive role is expected to improve the feasibility of timely managerial transfer. The research challenge is to distinguish financial adequacy, attachment to the farm and practical control, since these may move independently. Each proposition is derived from the conceptual synthesis; none is presented as an estimated or statistically confirmed result of this paper.

7.3. Evaluation Design And Remaining Limitations

A future empirical programme could follow cohorts of applicants, recipients and comparable non-recipients, linking administrative information to repeated household and farm observations. Outcomes should include who ultimately manages the holding, the durability of tenure, business viability, distributional effects and environmental indicators appropriate to the production system. Such a design would need to address selection into support: better-prepared families may both apply earlier and achieve smoother transitions. Before-and-after improvement among beneficiaries alone would therefore be insufficient evidence of programme additionality.

The counterfactual should be explicit. Without support, a holding might have transferred later, continued under the predecessor, been leased to an existing neighbour or left active production. These alternatives have different implications for farm numbers, concentration and stewardship. Additionality may involve a different recipient, a different timetable or a different management trajectory, not merely one extra transfer. Where data permit, comparison-group methods could be combined with interviews to examine both effects and mechanisms; ethical access, consent and confidentiality would remain necessary.

The present analysis leaves these effects unresolved. It does not map all national rules, quantify the incidence of the identified risks or measure programme take-up. Its European cases also cannot stand in for tenure contexts with different institutional foundations. The proposed mechanisms are intended to guide context-sensitive research, not to justify exporting a national institution unchanged. For international land-policy research, the

most useful next comparison would examine which functions are transferable, which require local institutional capacity and which depend on country-specific social arrangements.

8. CONCLUSION

Generational renewal is a land-policy and sustainability challenge because it changes the distribution of rights, responsibilities and opportunities associated with agricultural resources. Demographic renewal, the survival of a particular business and equitable access to land are related but distinct objectives. A younger registered manager is not sufficient evidence that authority has changed, and a completed transfer is not sufficient evidence that the resulting arrangement is economically viable, socially fair or environmentally beneficial.

The comparative documentary analysis shows that the selected instruments act at different points in the transition. Hungary illustrates the coordination of a functioning farm's transfer and support for its participants; France illustrates public-interest intermediation in land allocation; and Ireland illustrates staged collaboration and the separation of land use from ownership. These observations establish differences in design, not comparative effects. They suggest that the relevant policy question is how to combine necessary functions rather than which national model to replicate.

The paper's proposed framework connects access and allocation, security and investment horizons, transfer coordination, and stewardship accountability with the three sustainability pillars. It favours early preparation, transparent opportunities, workable tenure, targeted transition support and proportionate follow-up. Its central evaluative principle is to assess the quality and durability of the resulting resource control: who can enter, who can decide, who can earn a viable livelihood, who bears the risks and how natural resources are managed. Sustainable generational renewal is consequently best understood not as an isolated transfer between age groups, but as a coordinated institutional transition whose public value must be demonstrated beyond the transfer itself.

REFERENCES

Baldoni, E., & Ciaian, P. (2021). *The capitalisation of CAP subsidies into land rents and land values in the EU: An econometric analysis*. Publications Office of the European Union. https://doi.org/10.2760/404465

Baldoni, E., Kancs, D., Ciaian, P., & Drabik, D. (2021). *The capitalisation of agricultural subsidies into farmland prices: A meta-analysis of empirical literature*. Publications Office of the European Union. https://doi.org/10.2760/028215

Conway, S. F., McDonagh, J., Farrell, M., & Kinsella, A. (2016). Cease agricultural activity forever? Underestimating the importance of symbolic capital. *Journal of Rural Studies, 44*, 164-176. https://doi.org/10.1016/j.jrurstud.2016.01.016

European Commission. (2017). Commission interpretative communication on the acquisition of farmland and European Union law (2017/C 350/05). *Official Journal of the European Union, C 350*, 5-20. https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52017XC1018(01)

European Commission. (2025). *Strategy for generational renewal in agriculture* (COM(2025) 872 final). https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52025DC0872

European Court of Auditors. (2017). *EU support to young farmers should be better targeted to foster effective generational renewal* (Special Report No. 10/2017). https://op.europa.eu/webpub/eca/special-reports/young-farmers-10-2017/en/

European Parliament & Council of the European Union. (2021). Regulation (EU) 2021/2115 of 2 December 2021 establishing rules on support for strategic plans to be drawn up by Member States under the common agricultural policy (CAP Strategic Plans). *Official Journal of the European Union, L 435*, 1-186. https://eur-lex.europa.eu/eli/reg/2021/2115/oj/eng

Eurostat. (2023, April 20). *Farmers and the agricultural labour force - statistics* [Archived version; 2020 census data]. Statistics Explained. https://ec.europa.eu/eurostat/statistics-explained/index.php?oldid=430152

Fédération nationale des Safer. (n.d.-a). *Nos 2 métiers*. https://www.safer.fr/les-safer/nos-2-metiers/

Fédération nationale des Safer. (n.d.-b). *Nos 4 missions*. https://www.safer.fr/les-safer/nos-4-missions/

Fischer, H., & Burton, R. J. F. (2014). Understanding farm succession as socially constructed endogenous cycles. *Sociologia Ruralis, 54*(4), 417-438. https://doi.org/10.1111/soru.12055

Food and Agriculture Organization of the United Nations. (2012). *Voluntary guidelines on the responsible governance of tenure of land, fisheries and forests in the context of national food security*. https://www.fao.org/fileadmin/user_upload/nr/land_tenure/pdf/VG_Tenure_ENG.pdf

Food and Agriculture Organization of the United Nations & International Fund for Agricultural Development. (2019). *The future of family farming in the context of the 2030 Agenda*. https://openknowledge.fao.org/handle/20.500.14283/ca4778en

French Republic. (2025). *Code rural et de la pêche maritime, article L141-1* [Version in force from 16 February 2025]. Légifrance. https://www.legifrance.gouv.fr/codes/article_lc/LEGIARTI000051203644/2025-02-16

Hungarian Ministry of Agriculture. (2025a). *Gazdaságátadási együttműködés támogatása* [Support for farm-transfer cooperation; Call KAP-RD07-1-25, November 2025 version]. https://kap.gov.hu/tamogatas/kap-rd07-1-25

Hungarian Ministry of Agriculture. (2025b). *Generációs megújulás gazdaságátvevő támogatásával* [Generational renewal through support for the farm transferee; Call KAP-RD06-1-25, November 2025 version]. https://kap.gov.hu/tamogatas/kap-rd06-1-25

Hungarian National Assembly. (2013). *2013. évi CXXII. törvény a mező- és erdőgazdasági földek forgalmáról* [Act CXXII of 2013 on transactions in agricultural and forestry land]. Nemzeti Jogszabálytár. https://njt.jog.gov.hu/jogszabaly/2013-122-00-00

Hungarian National Assembly. (2021). *2021. évi CXLIII. törvény az agrárgazdaságok átadásáról* [Act CXLIII of 2021 on the transfer of agricultural holdings]. Nemzeti Jogszabálytár. https://njt.jog.gov.hu/jogszabaly/2021-143-00-00

Ingram, J., & Kirwan, J. (2011). Matching new entrants and retiring farmers through farm joint ventures: Insights from the Fresh Start Initiative in Cornwall, UK. *Land Use Policy, 28*(4), 917-927. https://doi.org/10.1016/j.landusepol.2011.04.001

Leonard, B., Kinsella, A., O'Donoghue, C., Farrell, M., & Mahon, M. (2017). Policy drivers of farm succession and inheritance. *Land Use Policy, 61*, 147-159. https://doi.org/10.1016/j.landusepol.2016.09.006

Leonhardt, H., Penker, M., & Salhofer, K. (2019). Do farmers care about rented land? A multi-method study on land tenure and soil conservation. *Land Use Policy, 82*, 228-239. https://doi.org/10.1016/j.landusepol.2018.12.006

Purvis, B., Mao, Y., & Robinson, D. (2019). Three pillars of sustainability: In search of conceptual origins. *Sustainability Science, 14*, 681-695. https://doi.org/10.1007/s11625-018-0627-5

Revenue Commissioners. (2025a, December 8). *Leasing farm land*. https://www.revenue.ie/en/self-assessment-and-self-employment/farm/farming-tax-reliefs/leasing-farm-land.aspx

Revenue Commissioners. (2025b, July). *Tax credit for succession farm partnerships* (Tax and Duty Manual, Part 23-02-11). https://www.revenue.ie/en/tax-professionals/tdm/income-tax-capital-gains-tax-corporation-tax/part-23/23-02-11.pdf

Teagasc. (2025, May 26). *Entry, progression and succession pathways for dairy farm businesses - Open day*. https://www.teagasc.ie/publications/entry-progression-and-succession-pathways-for-dairy-farm-businesses-open-day-php/

Zagata, L., & Sutherland, L.-A. (2015). Deconstructing the 'young farmer problem in Europe': Towards a research agenda. *Journal of Rural Studies, 38*, 39-51. https://doi.org/10.1016/j.jrurstud.2015.01.003

A Bibliometric Analysis of the Human Organisational and Institutional Dimensions of Artificial Intelligence in Healthcare

Ilona Gál[1] **Bálint Csaba Illés**[1] **László Pataki**[1]

[1] John von Neumann University, Doctoral School of Management and Business Administration, Infopark sétány 1., 1117 Budapest, Hungary, Corresponding author's e-mail: ilona.gal@kronet.hu

Abstract: Artificial intelligence (AI) in healthcare is increasingly studied beyond algorithmic performance, yet its links to institutional decision-making and realised organisational value remain insufficiently understood. This study maps the technological–clinical and governance–institutional dimensions of healthcare AI through a bibliometric analysis of two partially overlapping Web of Science Core Collection corpora containing 2,359 and 3,128 documents. Searches reflect the database state on 7 August 2026. Publication and citation patterns, disciplinary categories, and VOSviewer keyword co-occurrence networks and temporal overlays were examined. Both corpora show rapid publication growth, particularly in 2025, and strong connections between healthcare and computer science. Machine learning and clinical prediction dominate the technological and clinical corpus, while explainability, ethics, privacy and trustworthiness are prominent in the governance and institutional network. Procurement and institutional value are less central in the reported networks, suggesting a need to investigate how technical, human and governance considerations connect to institutional choices and organisational outcomes. These patterns do not establish causal relationships or demonstrate the absence of integrated decision models. The findings provide a conceptual basis for developing multidimensional AI assessment criteria and subsequent empirical research on institutional value realisation. For healthcare managers, the analysis highlights the relevance of assessing workflow compatibility, human oversight, training needs and governance responsibilities alongside clinical performance. Future empirical studies should examine how these dimensions influence implementation and relate to measurable institutional outcomes, including workload, quality assurance requirements and total costs. This would help translate the mapped research themes into evidence for organisational decision-making. Interpretation is constrained by database and search term selection, corpus overlap and partial year data for 2026.

Keywords: artificial intelligence; healthcare governance; bibliometric analysis; technology adoption; institutional value

JEL Classification: I11; M15; O33

1. INTRODUCTION

Healthcare institutions face rising demand for care while operating with limited financial and workforce capacity. The adoption of artificial intelligence (AI) is therefore an institutional and management issue as well as a technological one. Its value needs to be assessed in terms of patient care, clinical workflows and resource use (Allers et al., 2025; OECD, 2023).

Much of the research on clinical AI focuses on algorithmic performance. In radiotherapy, automated contouring and treatment planning already offer practical applications (Jia et al., 2025; Rong et al., 2024). Technical performance alone, however, does not ensure that these applications deliver benefits in routine practice. Appropriate validation, integration into clinical workflows, user acceptance and organisational support are also required (Kelly et al., 2019; Lambert et al., 2023).

Studies of user preferences highlight the importance of time savings, explainability and compatibility with existing systems alongside accuracy (Lewandowska et al., 2025; von Wedel & Hagist, 2022). At the institutional level, it remains necessary to establish how these considerations relate to selection and procurement decisions and to the organisational outcomes of implementation. The literature on technology assessment and implementation supports examining these relationships together (Cangelosi et al., 2023; Roppelt et al., 2024).

This study uses bibliometric analysis of two partially overlapping Web of Science corpora to examine the structure of research on the technological–clinical and governance–institutional dimensions of healthcare AI. It maps publication activity, dominant thematic clusters and keyword relationships, with particular attention to trust, institutional governance, procurement and institutional value. The analysis examines how closely these dimensions are connected within a shared research landscape; it does not establish the causal or economic effects of AI adoption.

2. RESEARCH METHODOLOGY AND BIBLIOMETRIC ANALYSIS

2.1. Bibliometric Research Questions

The study addresses the following questions across the technological–clinical and governance–institutional dimensions of healthcare AI:

1. How have publication activity and citation patterns changed in the technological–clinical and governance–institutional corpora?

2. What dominant thematic clusters and conceptual structures can be identified in the two corpora?

3. What relationships can be observed between technological–clinical concepts and trust, governance, organisational performance, procurement and institutional value?

4. To what extent do these patterns suggest that technological, human and institutional dimensions are examined together?

2.2. Methods

The bibliometric analysis draws on the Web of Science Core Collection. The searches reflect the state of the database on 7 August 2026. Publication data for 2026 therefore cover only part of the year and must be interpreted accordingly when compared with previous full calendar years. The study does not seek to provide a systematic review of the entire healthcare AI literature. Its purpose is to map the bibliometric and conceptual structure of the research fields relevant to the research questions.

Both searches began with the terms “AI” and “healthcare”, supplemented by terms representing the dimensions under investigation and combined using the OR operator. Searches were conducted in the Web of Science Topic field. No exclusions were applied by document type or language. The Early Access designation refers to work that has already been published electronically but has not yet been assigned to a final volume and issue; it does not indicate a manuscript still under review. The two corpora overlap, so their document counts cannot be added together.

VOSviewer network and overlay visualisations were used to examine the conceptual structure of the literature. In the keyword co-occurrence networks, nodes represent keywords, links represent their co-occurrence, and clusters identify groups of concepts with denser connections to one another. Cluster labels are therefore interpretive descriptions of the networks rather than thematic categories assigned by the software. Overlay visualisations were used to examine shifts in topics over time. Neither network proximity nor co-occurrence is treated as evidence of a causal relationship.

The documents identified through the search strategy were analysed in terms of:

Annual publication activity

The 20 most highly cited publications

Distribution by document type

Distribution by country or region

Leading research areas

The 10 countries with the highest publication counts

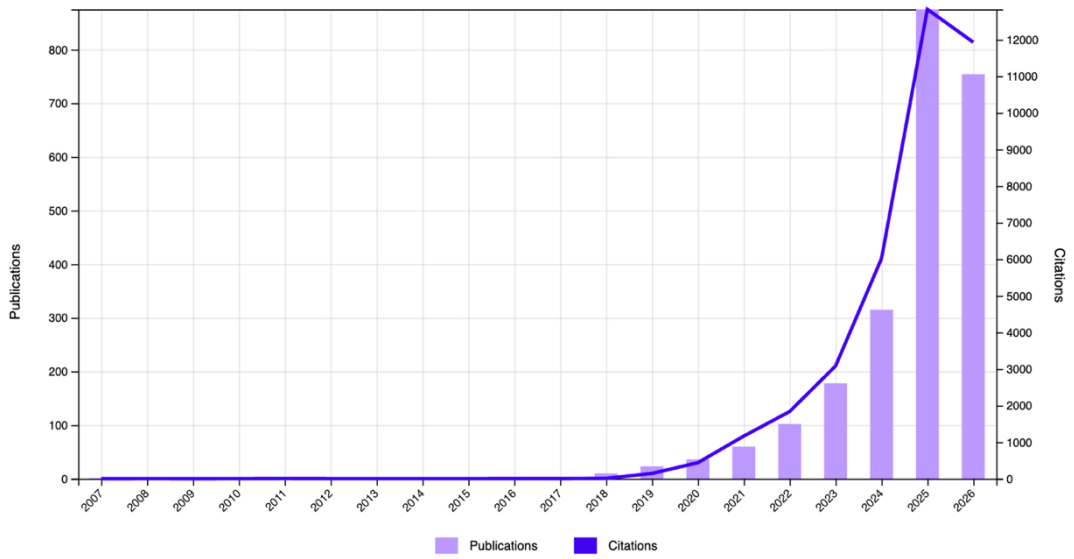
Web of Science subject categories

Keyword networks and thematic clustering

2.3. The Integrated Research Field with 2,359 Publications

The integrated research field was examined using the query “AI” AND “healthcare” AND (“radiotherapy” OR “auto-contouring” OR “clinical decision support”). The search identified 2,359 relevant documents, which formed the corpus for this analysis.

Figure 1. Annual publications (purple bars) and citations (blue line)



Source: Web of Science.

The first relevant publication appeared in 2007 and the next in 2010, with publication activity increasing more noticeably from 2018 onwards. The largest annual increase occurred in 2025, when the number of documents rose from 315 to 875, an increase of 177.8%. A further 754 publications had appeared by the search date of 7 August 2026. Of the 2,359 documents in the corpus, 13.35% were published in 2024, 37.09% in 2025 and 31.96% in 2026 up to the search date. As the 2026 figure covers only part of the year, it is not suitable for direct year-on-year comparison.

Citation activity has risen sharply since 2022. Publications in the corpus received a total of 35,318 citations, excluding self-citations, in the Web of Science Core Collection. The h-index was 83, meaning that at least 83 publications had received at least 83 citations each. This indicates the field's visibility within the research literature, but should not be interpreted on its own as direct evidence of the importance of the research topic.

The search covered the period from 1975 to 2026; the earliest relevant publication in the corpus appeared in 2007.

Table 1. The 20 most highly cited articles

No.	Article title	Authors	Citations
1	Revolutionizing healthcare: the role of artificial intelligence in clinical practice	Alowais, SA; Alghamdi, SS; (...); Albekairy, AM, 2023	1,810
2	Artificial intelligence in healthcare	Yu, KH; Beam, AL and Kohane, IS, 2018	1,804
3	Explainability for artificial intelligence in healthcare: a multidisciplinary perspective	Amann, J; Blasimme, A; (...); Madai, VI, 2020	1,303
4	The role of artificial intelligence in healthcare: a structured literature review	Secinaro, S; Calandra, D; (...); Biancone, P, 2021	571
5	Designing Theory-Driven User-Centric Explainable AI	Wang, DD; Yang, Q; (...); Lim, BY, 2019	564
6	Ethical and regulatory challenges of AI technologies in healthcare: A narrative review	Mennella, C; Maniscalco, U; (...); Esposito, M, 2024	518
7	AI applications to medical images: From machine learning to deep learning	Castiglioni, I; Rundo, L; (...); Sardanelli, F, 2021	466
8	Evaluation and accurate diagnoses of pediatric diseases using artificial intelligence	Liang, HY; Tsui, BY; (...); Xia, HM, 2019	436
9	Artificial Intelligence (AI) and Internet of Medical Things (IoMT) Assisted Biomedical Systems for Intelligent Healthcare	Manickam, P; Mariappan, SA; (...); Thipperudraswamy, SP, 2022	360

No.	Article title	Authors	Citations
10	Use of AI-based tools for healthcare purposes: a survey study from consumers' perspectives	Esmaeilzadeh, P, 2020	332
11	Generative AI in healthcare: an implementation science informed translational path on application, integration and governance	Reddy, S, 2024	325
12	A scoping review of artificial intelligence in medical education: BEME Guide No. 84	Gordon, M; Daniel, M; (...); Thammasitboon, S, 2024	323
13	Artificial intelligence-enabled healthcare delivery	Reddy, S; Fox, J and Purohit, MP, 2019	292
14	U-Sleep: resilient high-frequency sleep staging	Perslev, M; Darkner, S; (...); Igel, C, 2021	287
15	Improving health literacy using the power of digital communications to achieve better health outcomes for patients and practitioners	Fitzpatrick, PJ, 2023	270
16	An integrative review on the acceptance of artificial intelligence among healthcare professionals in hospitals	Lambert, SI; Madi, M; (...); Stephan, A, 2023	249
17	Artificial Intelligence -based technologies in nursing: A scoping literature review of the evidence	von Gerich, H; Moen, H; (...); Peltonen, LM, 2022	244
18	Explainable AI for Healthcare 5.0: Opportunities and Challenges	Saraswat, D; Bhattacharya, P; (...); Sharma, R, 2022	244
19	Reinforcement learning for intelligent healthcare applications: A survey	Coronato, A; Naeem, M; (...); Paragliola, G, 2020	233
20	AI-Driven Clinical Decision Support Systems: An Ongoing Pursuit of Potential	Elhaddad, M and Hamam, S, 2024	216

Source: Web of Science.

The most highly cited publication in the corpus is Alowais et al. (2023), “Revolutionizing healthcare: The role of artificial intelligence in clinical practice”, with 1,810 Web of Science citations. The study supports the view that the effectiveness of healthcare AI cannot be inferred from technical performance alone. Human factors, workflow conditions, governance and organisational arrangements mediate the relationship between technological capability and clinical or organisational outcomes. However, Alowais et al. do not integrate these factors into an institutional selection and procurement model or operationalise the outcomes realised at the institutional level through AI adoption.

The second most highly cited publication is Yu et al. (2018), “Artificial intelligence in healthcare”, with 1,804 Web of Science citations. Writing at an early stage in the development of healthcare AI, the authors distinguish algorithmic performance from its practical clinical use. Their review argues that expert-level diagnostic performance does not, by itself, guarantee clinical applicability. Representative data, appropriate validation, interpretability, interoperability and integration into clinical workflows are also needed. The authors emphasise the importance of prospective clinical evaluation. From an organisational perspective, workflow integration is particularly important because it can generate additional work, alert overload and new patient safety risks. The study nevertheless does not develop an integrated institutional decision framework that jointly assesses technical performance, interpretability, the human role, workflow compatibility, costs and organisational outcomes when selecting and procuring AI systems.

The third most highly cited publication is Amann et al. (2020), “Explainability for artificial intelligence in healthcare: A multidisciplinary perspective”, with 1,303 Web of Science citations. The authors bring together technological, legal, medical and patient perspectives in a multidisciplinary conceptual analysis, then assess explainability using the four bioethical principles associated with Beauchamp and Childress. Explainability is more than a technical property: it relates to model validation, the identification of errors and bias, clinical judgement, informed consent, autonomy, legal responsibility and trust in AI systems. The study therefore provides a basis for examining how different levels of explainability can be assessed institutionally alongside performance, workflow effects, governance risks and resource requirements.

Also relevant is Esmaeilzadeh (2020), "Use of AI-based tools for healthcare purposes: A survey study from consumers' perspectives". The author goes beyond a theoretical discussion of acceptance, trust, risk and governance by developing an empirical model and testing the relationships between these factors using structural equation modelling. The findings suggest that AI acceptance reflects the combined assessment of technological, human, trust-related and regulatory factors, rather than technical performance alone. The value-based approach also supports the use of multi-attribute decision-making, since decisions about AI involve trade-offs between benefits and risks. It offers a partial theoretical basis for a subsequent preference study using a discrete choice experiment (DCE).

Lambert et al. (2023), "An integrative review on the acceptance of artificial intelligence among healthcare professionals in hospitals", examine AI acceptance in an integrative review of 42 hospital studies. They organise the findings around the performance expectancy, effort expectancy, social influence and facilitating conditions dimensions of the Unified Theory of Acceptance and Use of Technology (UTAUT). Acceptance is influenced by expected performance as well as workflow compatibility, ease of use, professional autonomy, training, clarity of legal responsibility, organisational culture and adequate technical and financial infrastructure. The review does not, however, extend to institutional AI selection and procurement, or connect acceptance and facilitating conditions to measurable organisational performance or institutional outcomes after implementation. This limitation relates directly to the question of integration at the institutional decision-making level.

Articles account for 56.973% of the corpus (1,344 documents), reviews for 30.564% (721 documents), and proceedings papers for 10.174% (240 documents). English-language publications represent 98.559% of the corpus (2,325 documents), while each other language accounts for less than 1%. English therefore clearly dominates this research field.

Figure 2. Distribution of publications by country or region



Source: Web of Science.

The United States leads with 609 documents (25.816%), followed by the United Kingdom with 245 (10.386%), China with 226 (9.580%), Italy with 220 (9.326%), India with 218 (9.241%), Saudi Arabia with 151 (6.401%) and Germany with 143 (6.062%).

Table 2. Distribution of publications by Web of Science subject category (N = 2,359)

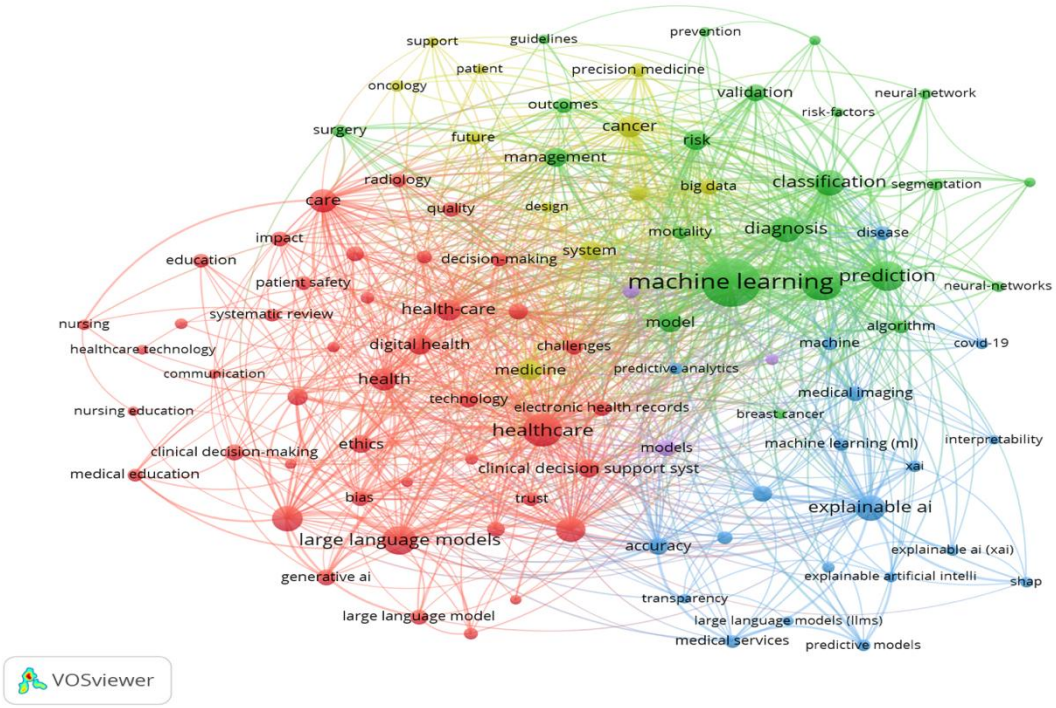
No.	Web of Science subject category	Records	% of 2,359 records*
1	Health Care Sciences & Services	359	15.22%
2	Medical Informatics	355	15.05%
3	Computer Science, Artificial Intelligence	290	12.29%
4	Computer Science, Information Systems	281	11.91%
5	Medicine, General & Internal	249	10.56%
6	Computer Science, Interdisciplinary Applications	212	8.99%
7	Computer Science, Theory & Methods	155	6.57%
8	Health Policy & Services	125	5.30%
9	Public, Environmental & Occupational Health	118	5.00%
10	Engineering, Electrical & Electronic	112	4.75%

No.	Web of Science subject category	Records	% of 2,359 records*
11	Engineering, Biomedical	108	4.58%
12	Nursing	90	3.82%
13	Radiology, Nuclear Medicine & Medical Imaging	90	3.82%
14	Multidisciplinary Sciences	80	3.39%
15	Oncology	71	3.01%

Note. Percentages may sum to more than 100% because a publication can be assigned to more than one Web of Science category.

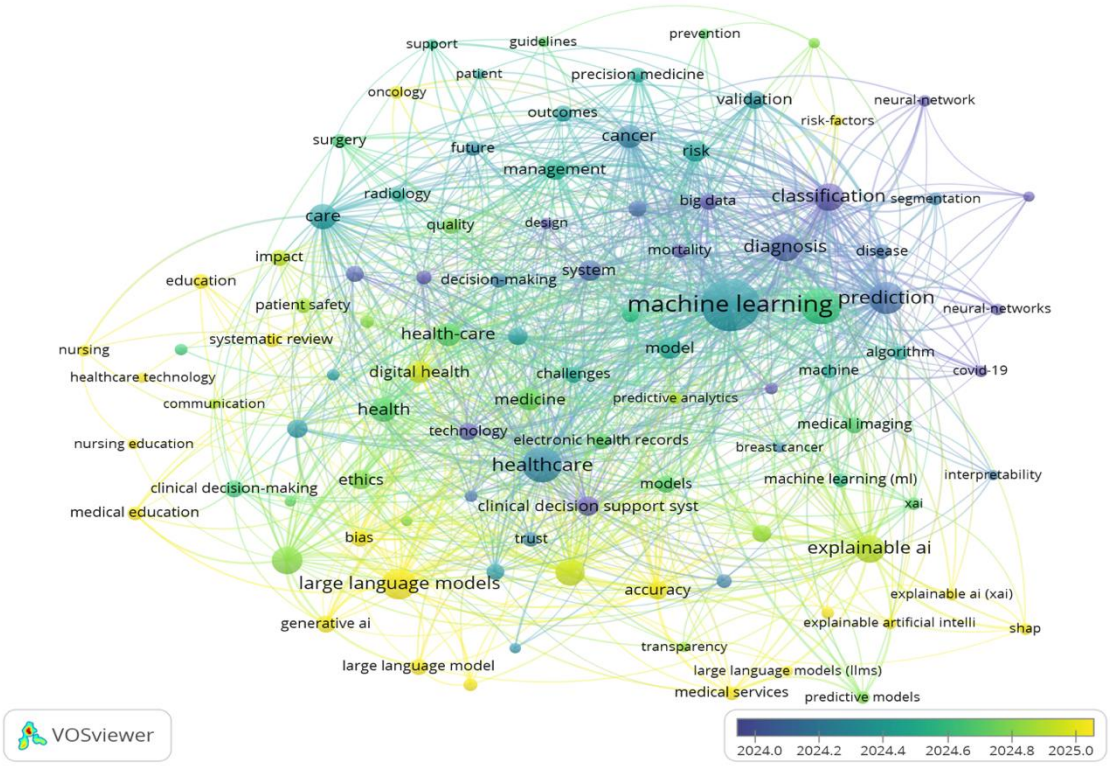
Table 2 shows that the integrated corpus has a distinctly interdisciplinary profile. Alongside Health Care Sciences & Services and Medical Informatics, it includes several computer science categories, health policy, engineering, radiology and oncology. Healthcare AI research therefore encompasses technological, clinical and health service perspectives.

Figure 3. Keyword network of the integrated research field



Source: Authors' visualisation using VOSviewer.

Figure 4. Temporal overlay of the integrated research field



Source: Authors' visualisation using VOSviewer.

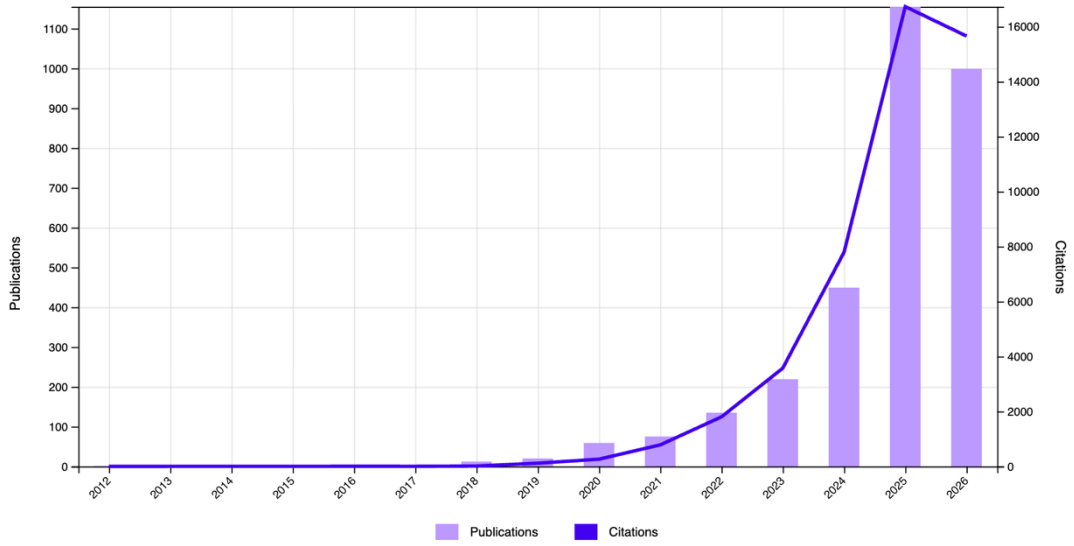
The integrated keyword network contains 99 nodes and 2,443 links, with VOSviewer identifying five clusters. The dominant node is machine learning (434 occurrences; total link strength [TLS] = 1,070), followed by deep learning (210; TLS = 542), healthcare (200; TLS = 539), prediction (165; TLS = 543), large language models (151; TLS = 291), explainable AI (125; TLS = 291), diagnosis (124; TLS = 385) and classification (117; TLS = 386). The field thus retains a technological–clinical core, to which concepts relating to decision support, human factors and implementation are directly connected.

Cluster 1 can be interpreted as a group concerned with healthcare applications and implementation, encompassing healthcare, care, large language models, clinical decision support systems, health, ChatGPT and performance. Cluster 2 forms the conventional predictive and diagnostic core, comprising machine learning, prediction, deep learning, classification, diagnosis, model, risk and validation. Cluster 3 covers the interface between the technical and human dimensions of explainability and reliability, linking explainable AI to accuracy, medical imaging and predictive analytics. Cluster 4 brings together cancer, medicine, system, big data and precision medicine in a group concerned with clinical and system-level issues. High model accuracy is not equivalent to clinical or institutional benefit: the literature emphasises external validation, workflow integration, human oversight and post-deployment monitoring (Alowais et al., 2023; Kelly et al., 2019; Mackay et al., 2026).

2.4. Governance and Institutional Dimensions with 3,128 Publications

The second bibliometric analysis examined dimensions relevant to user acceptance, governance and institutional applicability beyond the technical characteristics of healthcare AI software. The query was "AI" AND "healthcare" AND ("trust" OR "governance" OR "organisational performance" OR "procurement" OR "institutional value"). The search identified 3,128 relevant documents.

Figure 5. Annual publications (purple bars) and citations (blue line)



Source: Web of Science.

The first relevant publication appeared in 2012 and the next in 2014, with publication activity increasing more noticeably from 2018 onwards. The largest annual increase occurred in 2025, when the number of documents rose from 449 to 1,155, an increase of 157.2%. A further 988 publications had appeared by 7 August 2026. Of the 3,128 documents in the corpus, 14.35% were published in 2024, 36.92% in 2025 and 31.59% in 2026 up to the search date. The 2026 figure covers only part of the year.

Citation activity has risen sharply since 2022. Publications in the corpus received a total of 42,384 citations, excluding self-citations, in the Web of Science Core Collection. The h-index was 97, meaning that at least 97 publications had received at least 97 citations each. This indicates substantial visibility within the research literature, but does not, by itself, establish the causal or institutional significance of individual thematic dimensions.

The search covered the period from 1975 to 2026; the earliest relevant publication in the corpus appeared in 2012.

Table 3. The 20 most highly cited articles

No.	Article title	Authors	Citations
1	Revolutionizing healthcare: the role of artificial intelligence in clinical practice	Alowais, SA; Alghamdi, SS; (...); Albekairy, AM, 2023	1,809
2	The ethics of AI in health care: A mapping review	Morley, J; Machado, CC; (...); Floridi, L, 2020	585
3	Mapping the challenges of Artificial Intelligence in the public sector: Evidence from public healthcare	Sun, TQ and Medaglia, R, 2019	545
4	Artificial Intelligence and Human Trust in Healthcare: Focus on Clinicians	Asan, O; Bayrak, AE and Choudhury, A, 2020	521
5	The impact of big data analytics and artificial intelligence on green supply chain process integration and hospital environmental performance	Benzidia, S; Makaoui, N and Bentahar, O, 2021	519
6	Ethical and regulatory challenges of AI technologies in healthcare: A narrative review	Mennella, C; Maniscalco, U; (...); Esposito, M, 2024	518
7	Application of explainable artificial intelligence for healthcare: A systematic review of the last decade (2011-2022)	Loh, HW; Ooi, CP; (...); Acharya, ÚR, 2022	511

No.	Article title	Authors	Citations
8	A governance model for the application of AI in health care	Reddy, S; Allan, S; (...); Cooper, P, 2020	506
9	Trustworthy Artificial Intelligence: A Review	Kaur, D; Uslu, S; (...); Durresi, A, 2023	502
10	A Review of the Role of Artificial Intelligence in Healthcare	Al Kuwaiti, A; Nazer, K; (...); Al-Muhanna, FA, 2023	456
11	Canadian Association of Radiologists White Paper on Artificial Intelligence in Radiology	Tang, A; Tam, R; (...); Geis, R, 2018	355
12	Second opinion needed: communicating uncertainty in medical machine learning	Kompa, B; Snoek, J and Beam, AL, 2021	343
13	The roles of trust, personalization, loss of privacy, and anthropomorphism in public acceptance of smart healthcare services	Liu, KF and Tao, D, 2022	340
14	A review of Explainable Artificial Intelligence in healthcare	Sadeghi, Z; Alizadehsani, R; (...); Pardalos, PM, 2024	337
15	The promise of artificial intelligence: a review of the opportunities and challenges of artificial intelligence in healthcare	Aung, YYM; Wong, DCS and Ting, DN, 2021	332
16	Use of AI-based tools for healthcare purposes: a survey study from consumers' perspectives	Esmaeilzadeh, P	332
17	Generative AI in healthcare: an implementation science informed translational path on application, integration and governance	Reddy, S	325
18	Ethics and governance of trustworthy medical artificial intelligence	Zhang, J and Zhang, ZM, 2023	322
19	Governing artificial intelligence: ethical, legal and technical opportunities and challenges Introduction	Cath, C, 2018	313
20	Agentic AI: Autonomous Intelligence for Complex Goals-A Comprehensive Survey	Acharya, DB; Kuppan, K and Divya, B, 2025	296

Source: Web of Science.

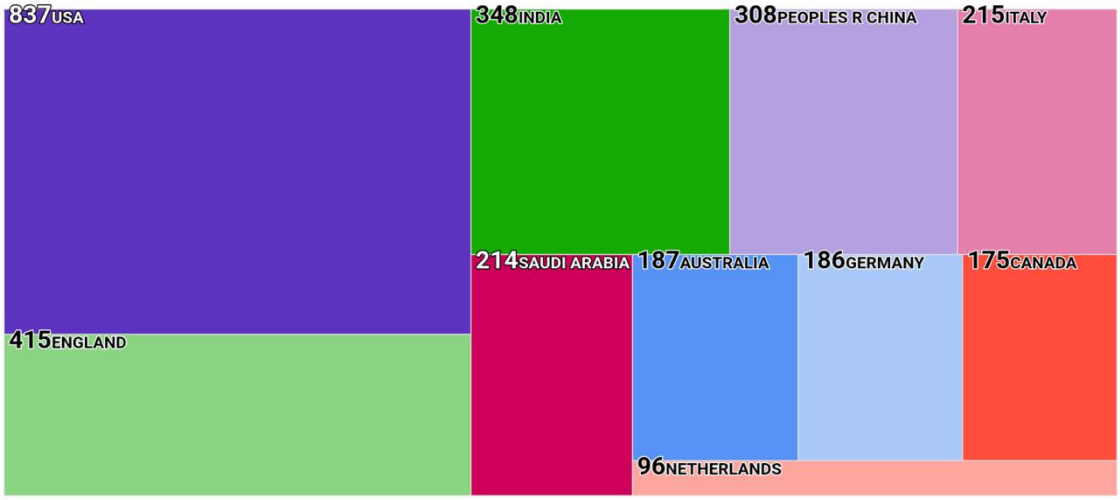
The most highly cited publication in this corpus is again Alowais et al. (2023), “Revolutionizing healthcare: The role of artificial intelligence in clinical practice”, with 1,809 Web of Science citations.

The second most highly cited publication is Morley et al. (2020), “The ethics of AI in health care: A mapping review”, with 585 Web of Science citations. The authors classify the ethical risks of healthcare AI into epistemic, normative and traceability-related concerns, examining them at six levels of analysis, from the individual to institutional, sectoral and societal levels. A central implication is that the consequences of AI adoption cannot be inferred solely from the properties of the technology. The same algorithmic problem may have different effects on individuals, clinician–patient relationships, institutions and the healthcare system. At the institutional level, for example, flawed or misleading algorithmic evidence may create patient safety problems as well as misallocate resources and waste funds.

Particularly relevant is Petersson et al. (2022), “Challenges to implementing artificial intelligence in healthcare: A qualitative interview study with healthcare leaders in Sweden”. With 275 Web of Science citations, it is the 21st most highly cited publication in the corpus. The qualitative study examines implementation challenges from the perspectives of 26 Swedish healthcare leaders. The authors treat AI as a complex sociotechnical intervention whose successful clinical use cannot be inferred from technical performance alone. They identify three main groups of challenges: conditions external to the healthcare system, internal capacity for strategic change management, and changes to healthcare professions and workflows.

Articles account for 61.221% of this corpus (1,915 documents), reviews for 21.739% (680 documents), and proceedings papers for 14.258% (446 documents). English-language publications represent 98.945% of the corpus (3,095 documents), while each other language accounts for less than 1%. English is therefore also clearly dominant in this corpus.

Figure 6. Distribution of publications by country or region



Source: Web of Science.

The United States leads with 837 documents (26.758%), followed by the United Kingdom with 415 (13.267%), India with 348 (11.125%), China with 308 (9.847%), Italy with 215 (6.873%), Saudi Arabia with 214 (6.841%), Australia with 187 (5.978%), Germany with 186 (5.946%), Canada with 175 (5.595%) and the Netherlands with 96 (3.069%).

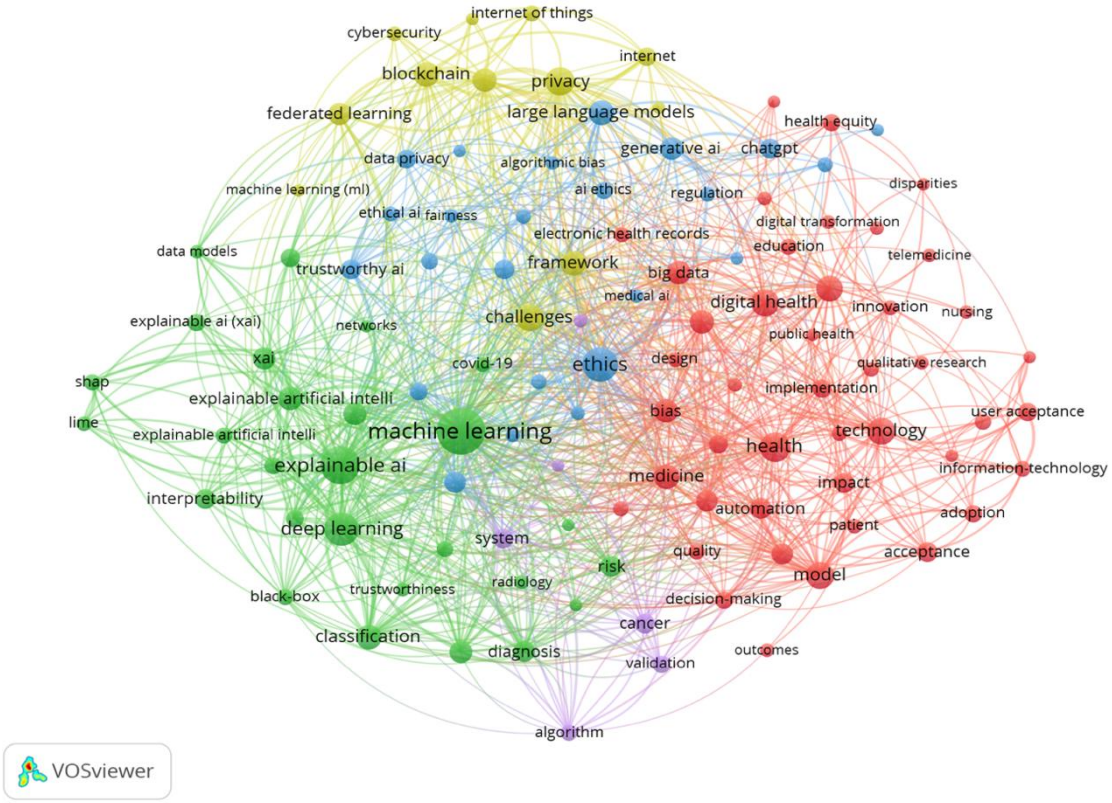
Table 4. Distribution of publications by Web of Science subject category (N = 3,128)

No.	Web of Science subject category	Records	% of 3,128 records*
1	Computer Science, Artificial Intelligence	534	17.07%
2	Computer Science, Information Systems	467	14.93%
3	Health Care Sciences & Services	460	14.71%
4	Medical Informatics	399	12.76%
5	Computer Science, Interdisciplinary Applications	348	11.13%
6	Computer Science, Theory & Methods	290	9.27%
7	Engineering, Electrical & Electronic	215	6.87%
8	Public, Environmental & Occupational Health	204	6.52%
9	Health Policy & Services	200	6.39%
10	Medicine, General & Internal	198	6.33%
11	Telecommunications	161	5.15%
12	Multidisciplinary Sciences	110	3.52%
13	Engineering, Biomedical	107	3.42%
14	Nursing	102	3.26%
15	Ethics	96	3.07%

Note. Percentages may sum to more than 100% because a publication can be assigned to more than one Web of Science category.

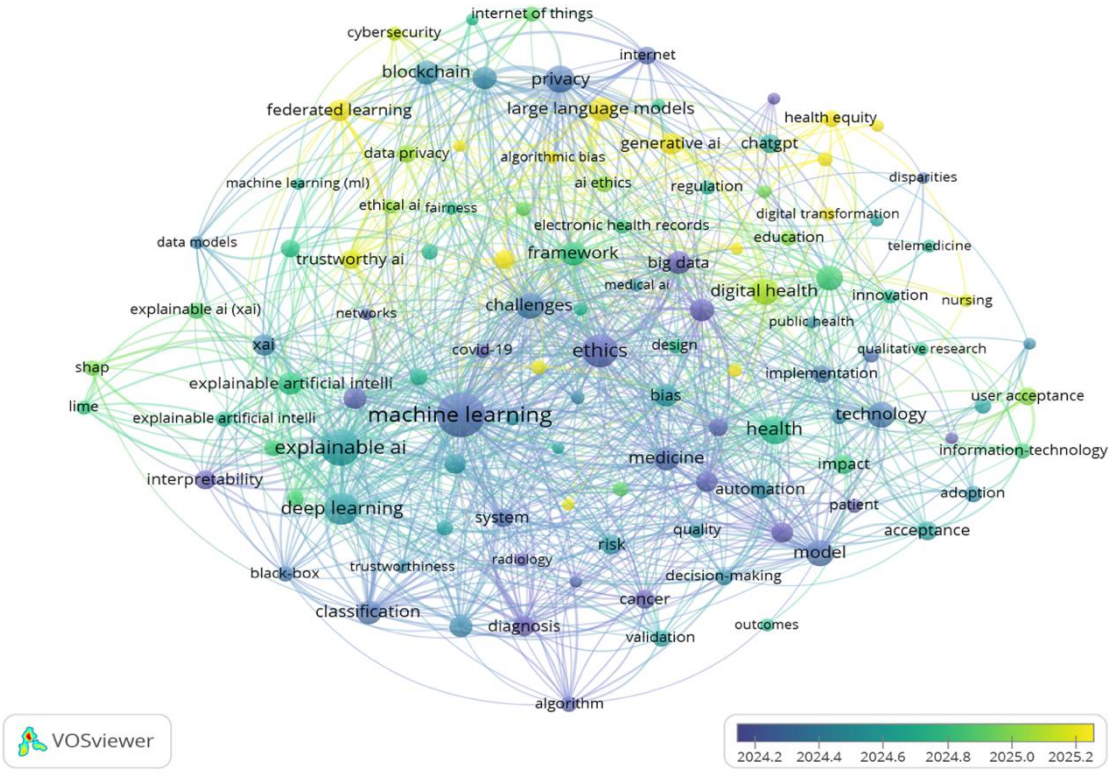
The disciplinary profile in Table 4 differs from that of the integrated corpus of 2,359 records. Whereas Health Care Sciences & Services and Medical Informatics rank first and second in the integrated corpus, Computer Science, Artificial Intelligence and Computer Science, Information Systems occupy these positions in the governance–institutional corpus. This suggests that research on governance and related concepts is also strongly connected to the technology and information systems literature.

Figure 7. Keyword network of the governance and institutional dimensions



Source: Authors' visualisation using VOSviewer.

Figure 8. Temporal overlay of the governance and institutional dimensions



Source: Authors' visualisation using VOSviewer.

The governance corpus contains 113 nodes and 3,219 links, organised into five clusters. Alongside machine learning (315 occurrences; TLS = 768), explainable AI (222; TLS = 482), ethics (181; TLS = 509), privacy (118; TLS = 418) and challenges (115; TLS = 400) have substantial weight in the network. Governance is therefore closely embedded in the technological discourse rather than confined to its margins.

The cluster structure distinguishes five groups: (1) applications, performance and the healthcare system; (2) technical reliability and explainability; (3) ethics, transparency and trustworthy AI; (4) privacy, security and data governance infrastructure; and (5) clinical validation. Fairness, transparency, trustworthiness and accountability emerge as governance dimensions relevant to safe institutional use (Reddy et al., 2020). Procurement and institutional value do not, however, form an equally central and consolidated network core. This suggests weaker conceptual and research integration, rather than an absence of these topics.

3. CONCLUSION

The two bibliometric analyses reveal connected research structures with different emphases. In the technological–clinical corpus of 2,359 documents, machine learning, prediction, diagnosis and clinical applications form the network core. In the governance–institutional corpus of 3,128 documents, explainability, ethics, privacy and trustworthiness also carry substantial weight. Both corpora show strong publication growth, particularly in 2025. The presence of healthcare and computer science categories in both confirms the interdisciplinary character of the research field.

Governance and related human dimensions are therefore well-established parts of the healthcare AI discourse. Procurement and institutional value are less central in the networks presented. This raises a question for further investigation: how can technological capabilities and user considerations be connected to institutional decisions and actual organisational outcomes? Keyword networks alone establish neither the absence of integrated models nor causal relationships between the dimensions examined.

For managers and procurement decision-makers, the findings support the development of multidimensional assessment criteria that consider workflow compatibility, human oversight, training and IT resource requirements, and governance responsibilities alongside clinical performance. Subsequent empirical research should relate institutional value to measurable outcomes, such as time requirements, workload, quality assurance needs and the total cost of implementation and use. The present analysis offers a conceptual basis for this work, but neither validates a procurement model nor estimates a return on investment.

The conclusions are limited by the use of a single database, the selection effects of the search terms, the dominance of English-language publications and overlap between the corpora. The 2026 data cover only part of the year, and citation counts also depend on publication age. Differences in keyword terminology and network thresholds may affect the visibility of particular topics. The next step is a targeted content review of less closely connected themes, followed by institutional data collection and preference research to examine the conditions under which AI delivers organisational and institutional value.

4. REFERENCES

Allers, S., Eijkenaar, F., van Raaij, E. M., & Schut, F. T. (2025). Patterns in the influence of funding and reimbursement on the development and implementation of healthcare innovation: A systematic review. *Journal of Open Innovation: Technology, Market, and Complexity, 11*(1), Article 100490. https://doi.org/10.1016/j.joitmc.2025.100490

Alowais, S. A., Alghamdi, S. S., Alsuhebany, N., Alqahtani, T., Alshaya, A. I., Almohareb, S. N., Aldairem, A., Alrashed, M., Bin Saleh, K., Badreldin, H. A., Al Yami, M. S., Al Harbi, S., & Albekairy, A. M. (2023). Revolutionizing healthcare: The role of artificial intelligence in clinical practice. *BMC Medical Education, 23*(1), Article 689. https://doi.org/10.1186/s12909-023-04698-z

Amann, J., Blasimme, A., Vayena, E., Frey, D., Madai, V. I., & Precise4Q consortium. (2020). Explainability for artificial intelligence in healthcare: A multidisciplinary perspective. *BMC Medical Informatics and Decision Making, 20*(1), Article 310. https://doi.org/10.1186/s12911-020-01332-6

Cangelosi, M., Chahar, A., & Eggington, S. (2023). Evolving use of health technology assessment in medical device procurement—Global systematic review: An ISPOR Special Interest Group report. *Value in Health, 26*(11), 1581–1589. https://doi.org/10.1016/j.jval.2023.06.005

Esmaeilzadeh, P. (2020). Use of AI-based tools for healthcare purposes: A survey study from consumers' perspectives. *BMC Medical Informatics and Decision Making, 20*(1), Article 170. https://doi.org/10.1186/s12911-020-01191-1

Jia, X., Rong, Y., Wu, Q., Cardenas, C. E., Court, L. E., Hrinivich, W. T., Kang, H., Kovalchuk, N., Whitaker, T. J., Xiao, Y., Zhang, P., & Chen, Q. (2025). NRG Oncology assessment of artificial intelligence for automatic treatment planning in radiation

therapy clinical trials: Present and future. *International Journal of Radiation Oncology*Biology*Physics, 123*(1), 282–295. https://doi.org/10.1016/j.ijrobp.2025.03.045

Kelly, C. J., Karthikesalingam, A., Suleyman, M., Corrado, G., & King, D. (2019). Key challenges for delivering clinical impact with artificial intelligence. *BMC Medicine, 17*(1), Article 195. https://doi.org/10.1186/s12916-019-1426-2

Lambert, S. I., Madi, M., Sopka, S., Lenes, A., Stange, H., Buszello, C.-P., & Stephan, A. (2023). An integrative review on the acceptance of artificial intelligence among healthcare professionals in hospitals. *npj Digital Medicine, 6*(1), Article 111. https://doi.org/10.1038/s41746-023-00852-5

Lewandowska, M., Street, D., Yim, J., Jones, S., & Viney, R. (2025). Artificial intelligence in radiation therapy treatment planning: A discrete choice experiment. *Journal of Medical Radiation Sciences, 72*(Suppl. 2), S42–S51. https://doi.org/10.1002/jmrs.843

Mackay, K., Banfill, K., Bernstein, D., Daniel, J., Diez, P., Gwynne, S., Hoole, A., Jena, R., Marchant, T., Nix, M., Price, G., Teo, M., Boon, I., Hindocha, S., Wang, J., Zucker, K., & Taylor, A. (2026). Royal College of Radiologists guidance statements on the use of auto-contouring in radiotherapy. *Clinical Oncology, 50*, Article 104004. https://doi.org/10.1016/j.clon.2025.104004

Morley, J., Machado, C. C. V., Burr, C., Cowls, J., Joshi, I., Taddeo, M., & Floridi, L. (2020). The ethics of AI in health care: A mapping review. *Social Science & Medicine, 260*, Article 113172. https://doi.org/10.1016/j.socscimed.2020.113172

OECD. (2023). *Health at a glance 2023: OECD indicators*. OECD Publishing. https://doi.org/10.1787/7a7afb35-en

Petersson, L., Larsson, I., Nygren, J. M., Nilsen, P., Neher, M., Reed, J. E., Tyskbo, D., & Svedberg, P. (2022). Challenges to implementing artificial intelligence in healthcare: A qualitative interview study with healthcare leaders in Sweden. *BMC Health Services Research, 22*(1), Article 850. https://doi.org/10.1186/s12913-022-08215-8

Reddy, S., Allan, S., Coghlan, S., & Cooper, P. (2020). A governance model for the application of AI in health care. *Journal of the American Medical Informatics Association, 27*(3), 491–497. https://doi.org/10.1093/jamia/ocz192

Rong, Y., Chen, Q., Fu, Y., Yang, X., Al-Hallaq, H. A., Wu, Q. J., Yuan, L., Xiao, Y., Cai, B., Latifi, K., Benedict, S. H., Buchsbaum, J. C., & Qi, X. S. (2024). NRG Oncology assessment of artificial intelligence deep learning–based auto-segmentation for radiation therapy: Current developments, clinical considerations, and future directions. *International Journal of Radiation Oncology*Biology*Physics, 119*(1), 261–280. https://doi.org/10.1016/j.ijrobp.2023.10.033

Roppelt, J. S., Kanbach, D. K., & Kraus, S. (2024). Artificial intelligence in healthcare institutions: A systematic literature review on influencing factors. *Technology in Society, 76*, Article 102443. https://doi.org/10.1016/j.techsoc.2023.102443

von Wedel, P., & Hagist, C. (2022). Physicians' preferences and willingness to pay for artificial intelligence-based assistance tools: A discrete choice experiment among German radiologists. *BMC Health Services Research, 22*(1), Article 398. https://doi.org/10.1186/s12913-022-07769-x

Yu, K.-H., Beam, A. L., & Kohane, I. S. (2018). Artificial intelligence in healthcare. *Nature Biomedical Engineering, 2*(10), 719–731. https://doi.org/10.1038/s41551-018-0305-z

Plastic Pollution in the Oceans and the Most Polluting Countries

Prof. Dr. Nurcan Özkan[1]

[1] University of Trakya, Faculty of Education, Department of Mathematics and Science Education, nurcanozkan@hotmail.com, ORCID: 0000-0001-5045-6186

Abstract: The future of our planet, three-quarters of which is covered by water, is largely threatened by the plastic waste dumped into these bodies of water. The primary source of plastic pollution in the oceans is mismanaged waste on land, which eventually reaches the ocean via rivers, lakes, and other waterways. According to the United Nations Environment Programme, between 19 and 23 million tons of plastic waste end up in rivers, lakes, and oceans worldwide every year. This is equivalent to a garbage truck entering the water every minute. The amount of plastic in the oceans, floating on the surface alone, ranges from 82 to 358 trillion, and concentrations have been rapidly increasing since 2005. Many people believe that the countries that pollute the oceans the most with plastic are also the countries that produce the most plastic waste, but this is not the case. The Philippines tops the list of countries polluting the oceans, dumping more than 356,371 tons of plastic into the sea every year. It is followed by countries such as India, Malaysia, and China, with a total recorded amount of plastic waste in the oceans reaching 1,012,500 metric tons. Preventing plastic pollution in the oceans requires a collective effort from all sectors of society to achieve holistic environmental sustainability. This necessitates that governments, businesses, communities, and individuals work together to reduce and effectively manage plastic waste. This study examines plastic pollution in the oceans, the countries that contribute most to this pollution, waste exports, and how global citizens can contribute to stopping plastic pollution in the oceans.

Keywords: Oceans, Plastic Pollution, Waste Export, Pollution Prevention

Okyanuslarda Plastik Kirliliği ve En Çok Kirleten Ülkeler

Özet: Dörtte üçü sularla kaplı olan gezegenimizin geleceği, buralara atılan plastik atıklar ile büyük ölçüde tehdit edilmektedir. Okyanuslardaki plastik kirliliğinin temel kaynağı, karada yanlış yönetilen atıklardır ve bu atıklar sonunda nehirler, göller ve diğer suyolları aracılığıyla okyanusa ulaşmaktadır. Birleşmiş Milletler Çevre Programı'na göre, her yıl dünya genelinde 19 ila 23 milyon ton plastik atık nehirlere, göllere ve okyanuslara karışmaktadır. Bu, her dakika bir çöp kamyonunun suya karışmasına eşdeğerdir. Okyanuslardaki plastik miktarı ise sadece yüzeyde yüzen 82 ila 358 trilyon arasında değişmekte ve 2005 yılından bu yana konsantrasyonlar hızla artmaktadır. Birçok insan okyanusları en çok plastik bakımından kirleten ülkelerin aynı zamanda en çok plastik atık üreten ülkeler olduğunu düşünmekte, ancak durum böyle değildir. Okyanusları kirleten ülkeler açısından listenin başında Filipinler bulunmakta ve her yıl 356.371 tondan fazla plastiği denize dökmektedir. Filipinleri; Hindistan, Malezya, Çin gibi ülkeler takip ederken okyanuslardaki toplam plastik atık miktarı ise 1.012.500 metrik ton olarak kaydedilmiştir. Okyanuslardaki plastik kirliliğini önlemek, bütüncül bir çevresel sürdürülebilirliğe ulaşmak için toplumun tüm kesimlerinden kolektif bir çaba gerektirir. Bu, plastik atıkları azaltmak ve etkili bir şekilde yönetmek için hükümetlerin, işletmelerin, toplulukların ve bireylerin birlikte çalışması gereklidir. Bu çalışmada okyanuslardaki plastik kirliliği ve en çok katkı sağlayan ülkeler, atık ihracatı, küresel bir vatandaş olarak okyanuslardaki plastik kirliliğini durdurmaya katkı sağlama konuları ele alınmaktadır.

Anahtar Kelimeler: Okyanuslar, Plastik Kirliliği, Atık İhracatı, Kirliliği Önleme

1. INTRODUCTION

The future of our planet—three-quarters of which is covered by water—is significantly threatened by plastic waste that is discarded into or drifts into these waters. Therefore, this study addresses the sources of plastic pollution in the oceans, the annual volume of plastic entering the oceans, plastic waste recycling, takeout services, waste exports, and the countries that pollute the oceans the most.

1.1. Sources of Ocean Plastic Pollution

The primary source of plastic pollution in the oceans is mismanaged waste on land, which eventually reaches the ocean via rivers, lakes, and other waterways. These waste materials include plastic bags, bottles, food packaging, and other single-use plastic products. Once in the ocean, plastic breaks down into smaller particles known as microplastics, which can be ingested by marine animals—potentially entering the food chain and posing a risk to human health.

Addressing plastic pollution in the oceans requires a collective effort from all segments of society to achieve holistic environmental sustainability. This entails governments, businesses, communities, and individuals working together to reduce and effectively manage plastic waste.

However, there is an ongoing debate regarding which countries are responsible for the vast majority of plastic pollution in the oceans. B While some argue that developed countries are responsible for generating more plastic waste per capita, others contend that developing countries bear the burden of the problem due to inadequate waste management infrastructure. To clarify this, it is necessary to know where the majority of plastic waste in the oceans originates.

Scientists analyzed 573 kilograms of dry, hard plastic waste collected in 2025 with the help of The Ocean Cleanup organization. Researchers found that more than a quarter of the fragments originated from discarded and lost fishing gear (URL 1).

According to a study, it has been determined that the plastic waste polluting the oceans originates primarily from plastic food and beverage containers. Pointing out that between 307 and 925 million such plastic pieces enter the oceans each year, experts identified the most common plastics as single-use bags, plastic bottles, plastic containers, and food packaging.

In the study, macro-plastics larger than 3 centimeters—primarily stemming from fishing activities—were detected in the open ocean. Fishing gear such as lines, nets, and floats accounts for two-thirds of the macro-debris. On the other hand, global studies indicate that 86 percent of plastic pollution in the oceans originates from Asian countries, particularly China (URL 2).

Single-use plastics are extremely dangerous because it takes 300 years for a plastic bag—used for only one hour—to decompose. Forty percent of the plastic produced worldwide is single-use. Five trillion plastic bags are used annually. Every year, 500 billion plastic bottles are thrown away.

Single-use plastic bags account for the largest share of plastic waste documented in the oceans, at 14.1 percent. Plastic bottles rank second at 11.9 percent, while food containers and cutlery follow at 9.4 percent. Other common waste materials are listed as plastic packaging (9.1%), synthetic ropes (7.9%), fishing gear (7.6%), plastic caps (6.1%), industrial packaging (3.4%), glass bottles (3.4%), and beverage cans (3.2%) (URL 3).

Another study in the same journal examined the debris entering the ocean from 42 rivers in Europe. It was determined that Türkiye, Italy, and the UK were the three countries contributing the most to floating marine debris.

Plastic bags and bottles are the most common types of litter found on beaches; it has been proven that these deter tourists and negatively impact local economies. For instance, Geoje Island in South Korea suffered a loss of $37 million due to beach pollution.

1.2. How much plastic ends up in the ocean each year?

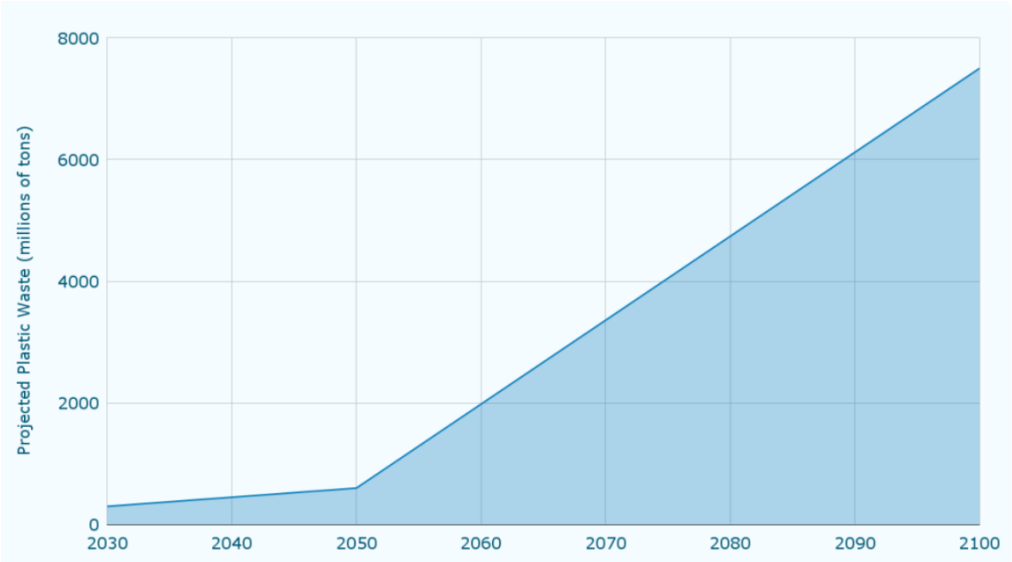
Plastic pollution in the oceans is negatively affecting the travel industry, as travel destinations that once inspired awe no longer exist or are in danger of disappearing. Polluted beaches, damaged ecosystems and vanished marine life appear where attractions once stood. As a community of travel enthusiasts, individuals should support environmentally conscious tourism, reduce the use of single-use plastics, and raise awareness to help protect the places we love to explore!

Imagine arriving at your dream beach destination—sunny skies, turquoise waters… and plastic bags tangled in the tide. Every year, 11 million tons of plastic end up in the ocean, and the world's most beautiful shores are slowly turning into polluted beaches. From Southeast Asia to the Mediterranean, plastic waste threatens the places travelers cherish most, transforming once-idyllic beaches into trash-strewn warning signs of what the future may hold.

The human brain cannot accurately estimate the scale of ocean pollution because it is unable to visualize the magnitude of eleven million tons of plastic. For this reason, there are striking comparisons to help paint a clearer picture. For instance, the result is staggering if one imagines the equivalent of 30 Empire State Buildings—made entirely of plastic—being dumped into the ocean every year. Every minute, 21 tons of plastic waste enter the ocean. This is considered equivalent to two garbage trucks dumping plastic into the ocean every minute for a year.

Plastic pollution in the oceans is expected to double by 2030 compared to 2025 levels, reaching 300 million tons. Pollution is expected to triple compared to 2025 levels, reaching 450 million tons by 2040, while the amount of plastic waste in the oceans is projected to quadruple relative to 2025 levels, reaching 600 million tons by 2050. It is estimated that plastic pollution in the oceans will increase fiftyfold compared to 2025, reaching a staggering

7.5 billion tons by the year 2100 (Graph 1). Given this growth projection, it is evident that within a short time, most beaches will be covered in plastic, and a beach vacation will become a luxury accessible only to the world's wealthiest 1%. Any other outcome is impossible without the responsible use of plastics. Where we can go tomorrow depends on how well we manage our plastics today (URL 4).



Graph 1. Projected growth of ocean plastic pollution (Source URL 4)

1.3. Composition of Ocean Plastic Waste

Examining specific types of plastic waste will help identify which substances contribute most to pollution. Every year, 65 billion plastic bottles end up in the ocean (Figure 1). Plastic bottles account for 6% of global plastic waste, which translates to 660,000 tons of plastic bottles entering the ocean annually. It takes between 50 and 1,000 years for plastic to break down in the ocean. Plastic degrades much more slowly in the ocean due to lower temperatures and exposure to UV rays (URL 4).

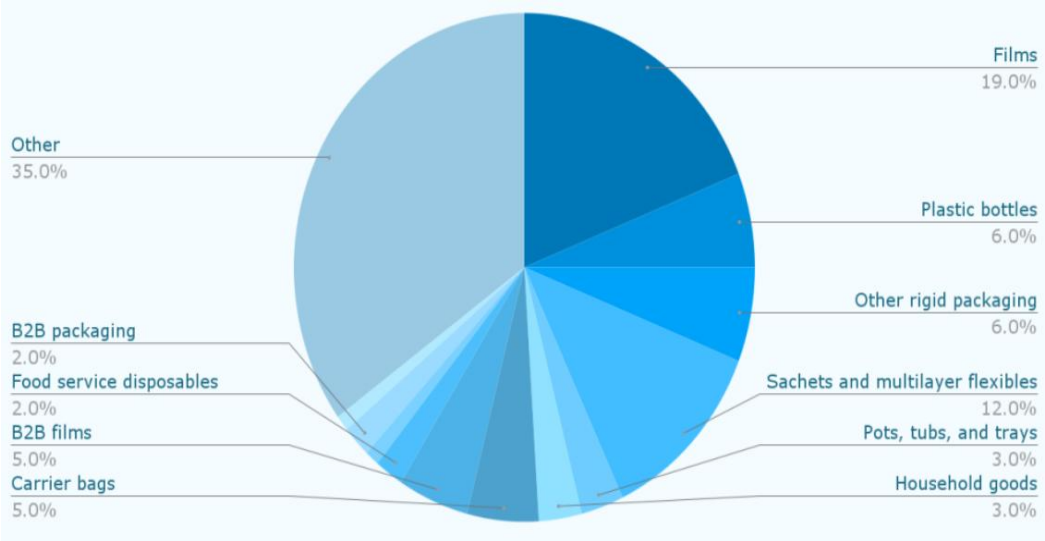


Figure 1. Plastic waste levels in the oceans (Source: URL 4).

1.4. What percentage of plastics is recycled worldwide?

Only 9% of the plastic produced worldwide is recycled, even though 90% of it is recyclable. It is now known that a plastic bag used for just 20 minutes can persist for hundreds of years—especially in the ocean, where decomposition is even slower. Societies need to be informed about why recycling and waste sorting are so essential (URL 4).

1.5. Plastic Waste Exports

Another common misconception regarding the promotion of environmental sustainability is that the export of plastic waste from Global North countries to the Global South is a significant source of plastic pollution in the oceans. Statistics from Our World in Data show that most countries export their waste within the same region. For instance, European countries mostly export within the European region, while Asian countries mostly export within the Asian region (URL 5).

These countries dispose of the majority of their plastic waste domestically and export a relatively small amount. For instance, the UK—one of the largest exporters of plastic waste—exported 838,000 tons of its 4.93 million tons of plastic waste in 2010. This figure represents 17% of its total plastic waste. By comparison, the Netherlands exported 14% of its plastic waste, France 11%, and the USA only about 5% (URL 5).

The study argues that the export of plastic waste may contribute to an uncontrolled increase in plastic waste entering the ocean, but that this proportion is relatively low—at approximately 5%. This implies that even if the plastic waste trade were completely halted, the impact on reducing ocean plastic pollution and improving environmental sustainability would be limited (URL 5).

In a report released in April 2021, Greenpeace Mediterranean highlighted that Turkey was once again the leading recipient of plastic waste from Europe in 2020. According to the report, there was a 13 percent increase in plastic waste imports compared to the previous year. Plastic waste imports are also cited as one of the primary causes of plastic pollution in Turkey (URL 2).

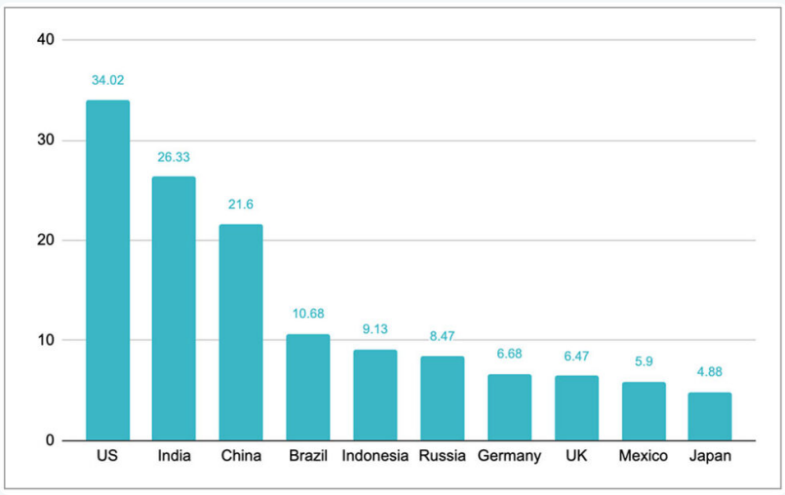
1.6. The World's Top Contributors to Ocean Plastic Pollution, for the Sake of Excellent Environmental Sustainability

According to a study by Science Advances in 2021, the Philippines ranks first among the 10 countries that release the most waste into the oceans, releasing an estimated 356,371 MT of plastic waste into the oceans. This is followed, in order, by India (126,513 MT), Malaysia (73,098 MT), China (70,707 MT), Indonesia (56,333 MT), Myanmar (40,000 MT), Brazil (37,799 MT), Vietnam (28,221 MT), Bangladesh (24,640 MT), and Thailand (22,806 MT) (Figure 2). With the exception of Brazil, the countries contributing most to ocean plastic pollution are concentrated in developing Asia. The research highlights that countries with smaller land areas, longer coastlines, higher precipitation levels, and inadequate waste management infrastructure are more likely to see their plastic waste enter the ocean (URL 1; 5; 6).



Figure 2: Countries that pollute the oceans the most (Source: URL 1).

According to the world population survey, the USA ranks first among the top 10 countries that produce the most plastic waste, producing 34 billion kilograms of plastic waste annually. India ranks second with 26.3 billion kilograms of plastic waste, followed by China (21.6 billion kilograms), Brazil (10.6 billion kilograms), Indonesia (9.1 billion kilograms), Russia (8.4 billion kilograms), Germany (6.6 billion kilograms), the UK (6.4 billion kilograms), Mexico (5.9 billion kilograms), and Japan (4.8 billion kilograms) (Graph 2).



Graph 2: Top 10 countries in plastic waste generation (total in billion kilograms, 2016) (Source: URL 5)

While India, China, Brazil, and Indonesia rank among the top 10 countries for both generating the most plastic waste and contributing the most to ocean plastic pollution, the remainder of the list consists primarily of high-income countries from the Global North. Although the populations of these developed countries generate large amounts of plastic waste, they possess better waste management infrastructure and plastic recycling facilities compared to middle- and low-income countries. Consequently, developing countries tend to generate higher quantities of mismanaged plastic waste that ends up in the ocean (URL 5).

Every year, millions of tons of plastic flow into the oceans, marine life suffocates, ecosystems are poisoned, and the plastic circulates around the globe in invisible waves of waste (URL 1). A research team from the U.S. and Australia, led by environmental engineer Jenna Jambeck from the University of Georgia, analyzed plastic waste levels in the world's oceans. They found that China and Indonesia are the largest sources of the plastic bottles, bags, and other trash clogging global waterways. According to a report in the Wall Street Journal, these two countries together account for more than one-third of the plastic waste in global waters.

In 2010, 8.8 million metric tons of mismanaged plastic waste originated from China, with an estimated 3.53 million metric tons entering the oceans. A total of 3.2 million metric tons of mismanaged plastic waste came from Indonesia, contributing an estimated 1.29 million metric tons to marine pollution. The United States is also responsible for polluting the oceans with plastic, though at a much lower level than China; 0.11 million metric tons of waterborne plastic waste originate from the United States annually.

According to the United Nations Environment Programme, between 19 and 23 million tons of plastic waste enter rivers, lakes, and oceans worldwide each year. This is equivalent to a garbage truckload entering the water every minute. The amount of plastic in the oceans—specifically floating on the surface—ranges from 82 to 358 trillion pieces, and concentrations have been rising rapidly since 2005 (URL 1).

Data from a study examining trash flowing from 42 European rivers into the oceans has been published in the environmental journal Nature Sustainability. According to the study—the findings of which were reported by the British newspaper The Guardian and the German news portal Spiegel—16 percent of the trash drifting from rivers into the sea originates in Turkey. Researchers point out that plastic use is the primary factor contributing to marine pollution.

In the ranking of source countries, Italy follows Turkey in second place with 11.3%, the UK ranks third with 8.4%, and Spain fourth with 8.21%. Germany, which has a shorter coastline, is responsible for approximately 2% of the trash carried from rivers into the seas.

1.7. The Impact of Ocean Plastic Pollution at the National Level

Countries have varying laws and policies regarding plastic pollution. Interestingly, although the United States generates the most plastic waste in the world, it does not rank among the top 10 countries that pollute the oceans the most. India discharges 126.5 million kg of plastic waste into the ocean annually, while China discharges 70.7 million kg and Indonesia 56.333 million kg (Figure 3).

It should be noted that, despite environmental degradation, India, China, and Indonesia have recorded significant growth in their tourism sectors. Goa, Bali, and certain regions of India have been the subject of negative media reports regarding plastic pollution, yet this has not affected tourism growth. The reason for this is that plastic pollution in the oceans has a delayed impact. As pollution gradually accumulates, it may go unnoticed until its impact reaches a critical level, potentially triggering a sudden crisis in these regions. It is easy to see why this situation can be so baffling at first. Why is plastic pollution so widespread in places like Goa and Bali, even as tourism thrives? This state of affairs is only temporary; within a few decades, all this beauty could be buried under mountains of plastic (URL 4).

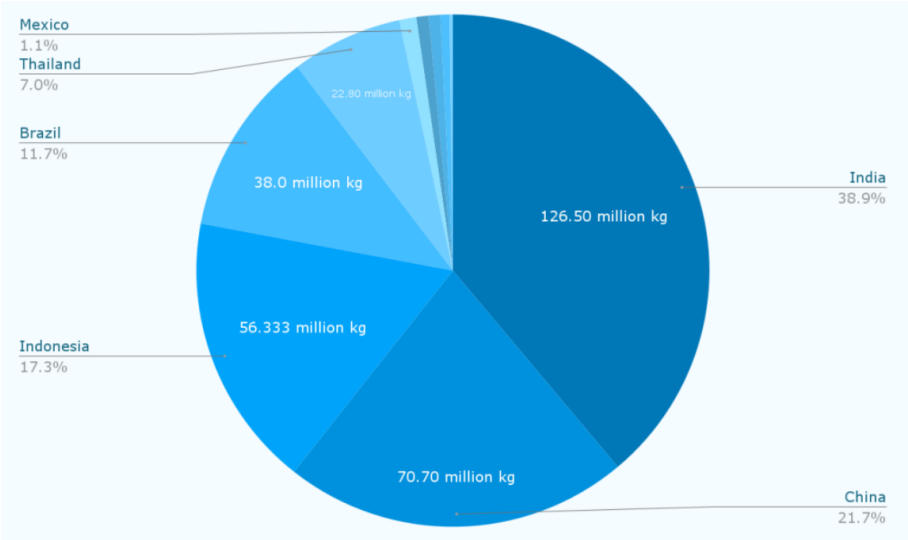


Figure 3: Ocean pollution by country (Source: URL 4)

CONCLUSION AND DISCUSSION

The issue of plastic waste in the seas has gained prominence in recent years due to rising pollution levels and mounting evidence of harm to wildlife. Beaches strewn with tons of plastic waste and the increasing number of dead animals found with stomachs full of plastic have sparked a global movement. Consequently, many countries have banned plastic bags. However, the volume of waste entering the sea remains extremely high (URL 7).

However, at the macro level, governments and institutions should focus on investing in better plastic waste management systems and educating vulnerable communities about the threats posed by plastic pollution. Yet, developing countries lack the necessary resources to establish adequate waste infrastructure in their communities.

For this reason, Plastic Bank works with a global community of Ocean Stewards to establish ethical plastic collection points within 50 kilometers of coastlines and waterways in vulnerable regions across Southeast Asia, Latin America, and Africa. Members of the collection community gather plastic waste directly from local beaches, riverbanks, neighborhoods, and even households, thereby stopping plastic from entering the ocean right at the sourceThe collected material is exchanged for life-enhancing benefits such as secure income, health, job, and life insurance, social assistance, digital connectivity, and access to banking services. We must work hand in hand to stop ocean plastic pollution, alleviate poverty in developing countries, and promote environmental sustainability. Stopping plastic pollution in the oceans is a responsibility we all share, and together we can achieve this faster and more effectively. Everyone—whether as individuals or businesses—should be encouraged to participate in social recycling activities (URL 5).

As a citizen, you can contribute to stopping plastic pollution in the oceans in the following ways:

▪ Reducing our consumption of single-use plastics and promoting environmental sustainability,

▪ Ensuring the proper disposal and recycling of our plastic waste and supporting eco-friendly alternatives,

▪ Being a conscious consumer and creating demand for products made from recycled materials, such as Plastic Bank's Social Plastic,

• Participating in global campaigns (URL 8).

States have begun working on a Global Ocean Treaty. A robust treaty resulting from this process could pave the way for vast ocean sanctuaries that protect at least one-third of the seas (URL 9).

Every small step taken to reduce plastic contributes to protecting our oceans and marine life, and to ensuring a healthy planet for future generations. We owe all life on Earth to our oceans, and now it is our turn to protect them. We must take action and breathe new life into our oceans.

REFERENCES

McCarthy, N. (2020). The Countries Polluting The Oceans The Most. https://www.statista.com/chart/12211/the-countries-polluting-the-oceans-the-most/

URL 1. Okyanusları En Çok Kirleten Ülkeler. 05 Kasım 2025, https://www.facebook.com/100041293692623/posts/-okyanuslar%C4%B1m%C4%B1z%C4%B1-en-%C3%A7ok-kirleten-%C3%BClkeler-her-y%C4%B1l-milyonlarca-ton-plastik-okyanus/1710376307015476/

URL 2. Doğa ve Çevre/Avrupa. Avrupa'da denizleri en çok kirleten ülke Türkiye, 11.06.2021. https://www.dw.com/tr/avrupada-nehir-%C3%A7%C3%B6p%C3%BCyle-denizleri-en-%C3%A7ok-kirleten-%C3%BClke-t%C3%BCrkiye/a-57856832

URL 3. VeriDETAY. Okyanusları Kirleten En Yagın 10 Çöp Türü. Carmen Caselles, 30 Eylül 2021. https://veridetay.com/infografikler/okyanuslari-kirleten-en-yaygin-10-cop-turu/

URL 4. Freetour.com, Her yıl okyanusa ne kadar plastik karışıyor? Alexandra Dubakova, https://www.freetour.com/blog/much-plastic-goes-ocean-every-year

URL 5. Doğa ve Çevre Avrupa, 16 Mart 2023. https://plasticbank.com/blog/which-country-is-the-most-accountable-for-ocean-plastic/

URL 6. Plastik atıklarla okyanusları en çok kirleten ülkeler. https://dogruveri.com/plastik-atiklarla-okyanuslari-en-cok-kirleten-ulkeler/

URL 7. Independent Türkçe. 16 Haziran 2019, Harry Cockburn, https://www.indyturk.com/node/42396/d%C3%BCnya/g20-okyanuslar%C4%B1-kirleten-plastik-at%C4%B1klarla-m%C3%BCcadele-etmek-i%C3%A7in-uluslararas%C4%B1

URL 8. Okyanuslardaki Plastik Kirliliği Krizi – 2025 Gerçekleri (Pınar Toy). 30 Ekim 2025, https://www.facebook.com/groups/433850977179784/posts/1933533337211533/

URL 9. Greenpeace, Okyanusları Koru. https://imza.greenpeace.org/okyanuslari-koru?gad_source=1&gad_campaignid=22477532835&gbraid=0AAAAA-5DqM_O6LhIJEwcQxjlEaLa43MNh&gclid=CjwKCAjwhZDUBhBGEiwAbi5bjqlFIdfJfCpdaFgIFzvsVf3fHyLVhOxUoC8NDbBxVkv_SpX0_L_EThoC7hYQAvD_BwE

Yeşil Sigortacılığın Sürdürülebilir Kalkınmaya Katkısı

Doç. Dr. Resül Yazıcı[1]

[1] Bilecik Şeyh Edebali Üniversitesi, İİBF, İktisat Bölümü, resul.yazici@bilecik.edu.tr, ORCID: 0000-0002-7875-3331

Özet: İklim değişikliği, doğal afetlerin sıklığında ve şiddetinde meydana gelen artış, biyolojik çeşitlilik kaybı ve çevresel risklerin büyümesi, sigorta sektörünün risk değerlendirme ve yönetim süreçlerinde sürdürülebilirlik yaklaşımını daha gerekli yapmıştır. Bu süreçte sigortacılık sektörü, yalnızca risk transferi sağlayan geleneksel işlevinin ötesine geçerek iklim risklerinin yönetimi, sürdürülebilir yatırımların desteklenmesi ve çevre dostu davranışların teşvik edilmesi gibi alanlarda stratejik bir aktör olarak öne çıkmaktadır.

Bu çalışmanın amacı, yeşil sigortacılığın sürdürülebilir kalkınmaya katkısını kavramsal ve kurumsal boyutlarıyla incelemek; politika önerileri geliştirmektir. Araştırmada nitel araştırma yöntemiyle Avrupa Birliği Yeşil Mutabakatı, sürdürülebilir finans politikaları, ESG (Çevresel, Sosyal ve Yönetişim) yaklaşımı ve uluslararası sigortacılık ilkeleri dikkate alınarak yeşil sigorta ürünleri, iklim risklerinin yönetimi, doğal afet sigortaları, yenilenebilir enerji yatırımlarının sigortalanması ve sürdürülebilir risk yönetimi uygulamaları incelenmektedir.

Çalışma sonucunda yeşil sigortacılık uygulamalarının iklim risklerinin yönetilmesine katkı sağladığı, çevresel yatırımların finansmanını desteklediği, işletmelerin sürdürülebilirlik performansını teşvik ettiği ve sigorta sektörünün uzun dönemli finansal dayanıklılığını güçlendirdiği değerlendirilmektedir. Bununla birlikte Türkiye'de yeşil sigortacılığın gelişimi açısından düzenleyici çerçevenin güçlendirilmesi, ESG odaklı sigorta ürünlerinin yaygınlaştırılması ve sürdürülebilirlik raporlaması ile güvence uygulamalarının geliştirilmesi gerektiği sonucuna ulaşılmıştır. Çalışmanın yeşil sigortacılığı bütüncül bir bakış açısıyla ele alması ve sigorta sektörünün sürdürülebilir kalkınmadaki stratejik rolünü ortaya koyması bakımından literatüre kavramsal katkı verecektir. Çalışmada nitel araştırma yöntemi benimsenmiş; literatür taraması, ulusal ve uluslararası düzenlemelerin karşılaştırmalı analizi ve sektörel raporların içerik analizi birlikte kullanılmıştır.

Anahtar Kelimeler: Yeşil Sigortacılık, Sürdürülebilir Kalkınma, ESG, İklim Riski, Risk Yönetimi

The Contribution of Green Insurance to Sustainable Development

Abstract: Climate change, the increase in the frequency and severity of natural disasters, the loss of biodiversity and the growing environmental risks have made a sustainability approach all the more essential in the insurance sector's risk assessment and management processes. In this context, the insurance sector is emerging as a strategic actor in areas such as the management of climate risks, the support of sustainable investments and the promotion of environmentally friendly behaviour, moving beyond its traditional function of merely facilitating risk transfer.

The aim of this study is to examine the contribution of green insurance practices to sustainable development from both conceptual and institutional perspectives; to develop policy recommendations by conducting a comparative assessment of international practices against the current situation in Türkiye. Using qualitative research methods, the study examines green insurance products, the management of climate risks, natural disaster insurance, the insurance of renewable energy investments and sustainable risk management practices, taking into account the European Green Deal, sustainable finance policies, the ESG (Environmental, Social and Governance) approach and international insurance principles. Furthermore, by comparing current regulations in Türkiye with European Union practices, the contribution of the insurance sector to sustainable development goals is assessed.

The study concludes that green insurance practices contribute to the management of climate risks, support the financing of environmental investments, encourage businesses' sustainability performance, and strengthen the long-term financial resilience of the insurance sector. However, it was concluded that, for the development of green insurance in Türkiye, the regulatory framework needs to be strengthened, ESG-focused insurance products need to be more widely adopted, and sustainability reporting and assurance practices need to be developed. This study will contribute to the literature by addressing green insurance from a holistic perspective and highlighting the insurance sector's strategic role in sustainable development. A qualitative research method was adopted for the study, utilizing a combination of a literature review, a comparative analysis of national and international regulations, and a content analysis of sectoral reports

Keywords: Green Insurance, Sustainable Development, ESG, Climate Risk, Risk Management.

1. GİRİŞ

İktisadi hayatın gittikçe zorlaşan doğasında sürekli bir istikrarın sağlanması güçleştiği için risk yönetimi bilincinin gerçek ve tüzel kişilerde oluşması gerekmektedir. Özellikle iklim krizi, jeopolitik tehdit, teknolojik gelişmelere uyumda gecikme gibi başlıklarda karşı karşıya kalınan risklerin artan sayı ve etkileri sonucunda katlanılacak

maliyetlerin yönetimi zorlaşmaktadır. Bu yüzden gerçek ve tüzel kişilerin faaliyetlerinin sürekliliği, varlıklarının korunması veya zararlarının yerine konulabilmesi için risk yönetimi ve aktarımı gittikçe önemli olmaktadır.

Mikro ve makro ölçekteki tüm yapılarda, şirket miyopluğu veya sistemik riskler gibi çeşitli olumsuzlukların satılması veya teknik ifadesiyle sistemik ve sistemik olmayan risklerin yönetimi konularında gerekli alanın doldurulmasında finansal sistemin önemli tamamlayıcılarından olan sigortacılık sektörüne önemli görevler düşmektedir. Genellikle öngörülmesi ve yönetilebilmesi zor olan riskleri şu ana başlıklarda toplayabiliriz:

- İktisadi yapı riskleri

- Piyasa riskleri

- İklim değişikliği riskleri

Diğer risklerin de nedeni olabilen iklim değişikliği, ekonomik ve sosyal sistemlerin karşı karşıya kaldığı en önemli kısa ve uzun vadeli risk alanlarından biri olmuştur.

Bu çerçevede sigorta sektörü özel bir konuma sahiptir. Sigortacılık, ekonomik kayıpların farklı aktörler arasında paylaşılması yoluyla ekonomik faaliyetlerin devamlılığını desteklemektedir. Ancak günümüzde sektörün işlevi yalnızca risk gerçekleştikten sonra zararları tazmin etmekle sınırlı değildir. Sigorta şirketlerinin riskleri fiyatlandırması, sigortalıları belirli davranışlara yönlendirmesi, büyük yatırım portföylerini yönetmesi ve afetlerden sonra ekonomik toparlanmayı desteklemesi, sektörü sürdürülebilir kalkınmanın önemli aktörlerinden biri durumuna getirmektedir (Pfeifer and Langen, 2021).

Bu dönüşümün kurumsallaşmasında, 2012 yılında Birleşmiş Milletler (BM) Sürdürülebilir Kalkınma Konferansı'nda (the United Nations Conference on Sustainable Development, the UNEP FI Principles for Sustainable Insurance - PSI) oluşturulan UNEP FI Sürdürülebilir Sigorta İlkeleri; sigorta sektörünün çevresel, sosyal ve yönetişimsel riskleri ve fırsatları ele alması için küresel bir çerçeve görevi görmektedir. PSI, bu risk faktörlerinin sigorta şirketlerinin karar alma süreçlerine entegre edilmesini, müşteriler ve iş ortaklarıyla risk azaltıcı uygulamaların geliştirilmesini, kamu ve diğer paydaşlarla iş birliğini ve uygulamaların şeffaf biçimde raporlanmasını öngören küresel bir çerçeve sunmaktadır. PSI, sigorta sektörü için geliştirilmiş ilk küresel sürdürülebilirlik çerçevesi niteliğindedir (UNEP FI, 2012).

Literatürde yeşil sigorta, sürdürülebilir sigorta, çevresel sigorta ve iklim sigortası gibi kavramlar zaman zaman birbirlerinin yerine kullanılabilmektedir. Bununla birlikte yeşil sigortacılık dar anlamda yalnızca elektrikli araç, yenilenebilir enerji veya yeşil bina gibi çevre dostu faaliyetlere yönelik sigorta ürünlerini değil; daha geniş anlamda sürdürülebilirlik ilkelerinin sigorta şirketinin bütün değer zincirine entegrasyonunu ifade etmektedir. Bu çerçevede yeşil sigortacılık, poliçe düzenlemeyle sınırlı olmayan; ürün geliştirme, yatırım yönetimi, risk değerlendirme gibi faktörlerin şirket stratejisiyle birlikte dönüşmesi gereken bir yönetim alanı olarak değerlendirilmektedir (Stricker et al., 2022).

Bu dönüşümü merkeze alan çalışmanın amacı, yeşil sigortacılığın sürdürülebilir kalkınmaya katkısını incelemek ve Türkiye'deki mevcut uygulamaların gelişim potansiyelini değerlendirmektir. Bu kapsamda üç temel soruya cevap aranmaktadır:

- Yeşil sigortacılık sürdürülebilir kalkınmayı hangi mekanizmalarla desteklemektedir?

- Uluslararası düzenlemeler ve uygulamalar hangi temel eğilimleri ortaya koymaktadır?

- Türkiye'de yeşil sigortacılığın geliştirilmesi için hangi alanlarda politika ve uygulama kapasitesinin güçlendirilmesine ihtiyaç bulunmaktadır?

2. KAVRAMSAL ÇERÇEVE VE LİTERATÜR

Gerçek ve tüzel kişilerin kontrolünde olmayan tehlike ve risklere karşı korunma hizmeti veren sigorta sektörünün temel işlevi, olumsuzluk gerçekleştiğinde poliçe sahiplerinin zararlarını tazmin ederek toparlanma süreçlerine destek olmaktır. "Kimi zaman riziko ve tehlike ifadeleri birbirleri ile ya da risk ile değişimli kullanılabilmektedir. Aslında tehlike bir zararın sebebidir, riziko (risk) ise bir tehlike sebebi ile meydana gelebilecek ya da olumsuz etkileri arttıracak zarar durumunu ifade eder. Bir vaka hem tehlike hem de riziko olabilir. Örneğin, hastalık finansal bir zarara sebep olan bir tehlike olup aynı zamanda vefat tehlikesi nedeniyle zararın ihtimalini artıran bir rizikodur" (Özcan, 2024: 57). Bu çerçevede sigortacılığın iki temel fonksiyonu vardır.

- Birincisi, sigorta şirketlerinin risk yöneticisi ve risk taşıyıcısı olmaları.

- İkincisi ise özellikle hayat ve emeklilik alanlarında uzun vadeli fon yöneten kurumsal yatırımcılar olarak sermaye piyasalarındaki rolleridir.

2.1. Yeşil Sigortacılık Kavramı

İklim değişikliğine karşı şimdiye kadar verilen tepkiler, yapılan eylemler, sürdürülebilirlik riskleri ve fırsatların yönetimine yönelik olmuştur. Denetim otoriteleri tarafından da çeşitli yasama girişimlerinin geliştirilmesi bunlara eşlik etmiştir. Ancak yalnızca bu yönlere odaklanmak, BM tarafından formüle edilen sürdürülebilir kalkınma hedeflerinin diğer önemli ekonomik ve sosyal yönlerini gözden kaçırır. Bu tür unsurlar, Avrupa sigorta sektörü için Solvency II projesiyle ilgili Avrupa Komitesi'nin odağına yakın zamanda girmiştir. Bu kapsamda hedef sürdürülebilir kalkınmanın sigorta sektöründe yalnızca iklim riskleriyle sınırlandırılamayacağını; ekonomik ve sosyal sürdürülebilirlik boyutlarının da risk yönetimine dâhil edilmesi gerektiğini vurgulamaktadır (Pfeifer and Langen, 2021).

Nobanee et al., (2022) tarafından yapılan yeşil, çevresel ve sürdürülebilirlik sigortalarının politika etkilerini kaleme alan makaleleri inceleyen bibliyometrik araştırma da; yeşil ve sürdürülebilir sigortacılık literatürünün risk yönetimi, iklim değişikliği, çevresel sigorta ürünleri ve sürdürülebilirlik politikaları etrafında giderek genişlediğini göstermektedir. Araştırmada bu alandaki çalışmaların yedi temel araştırma kümesi etrafında toplandığı ve gelecekte özellikle yeşil sigortanın etkilerinin ve ölçüm araçlarının geliştirilmesine ihtiyaç olduğu belirtilmektedir (Nobanee et al., 2022). Bu bağlamda yeşil sigortacılık; ESG risklerinin sigortalama sürecine entegrasyonu, sürdürülebilir faaliyetlerin sigortalanması, çevresel riskleri azaltan davranışların teşvik edilmesi, sürdürülebilir yatırımların desteklenmesi ve iklim değişikliğine karşı ekonomik dayanıklılığın artırılması olarak tanımlanabilir.

BM Çevre Programı'nın Sürdürülebilir Sigorta İlkeleri Girişimi tarafından geliştirilen küresel sigorta sektörü için ilk ESG kılavuzu (UNEP, 2020), risk değerlendirmesi ve sigorta poliçesi düzenlenmesinde ESG risklerini yönetmek için küresel kılavuzu geliştirmek üzere çok yıllık bir PSI girişiminin sonucudur. Başlangıçta mülk ve kaza sigortası olarak da bilinen hayat dışı sigorta işine odaklanmıştır. Rehber, iklim değişikliği, ekosistem bozulması, kirlilik, insan hakları ve yolsuzluk gibi ESG konularının sigorta şirketleri açısından finansal olarak önemli risklere dönüşebileceğini ve bu nedenle risk kabul süreçlerine sistematik biçimde entegre edilmesi gerektiğini ortaya koymaktadır.

2.2. İklim Riski ve Sigorta Koruma Açığı

Sigortalanabilir kayıpların ekonomik olan kayıplara oranının düşük olması “sigorta koruma açığı” olarak ifade edilmektedir. İklim değişikliğinin de etkisiyle Avrupa'da doğal afetlerin sıklığının ve şiddetinin artması, giderek büyüyen bir sigorta koruma açığını ortaya çıkarmıştır. EIOPA'nın gösterge paneline göre, geçmişte AB'deki aşırı hava olaylarından kaynaklanan kayıpların yalnızca yaklaşık %25'i sigortalıydı. Bu durum, yalnızca bireysel ve işletme dayanıklılığını değil, aynı zamanda makroekonomik istikrarı ve kamu maliyesini de tehdit etmektedir. Bu zorluğun üstesinden gelmek; düzenleyici çerçeveleri, ulusal planları ve AB düzeyindeki mekanizmaları içeren koordineli, çok katmanlı bir yaklaşım gerektirmektedir (EIOPA, 2025).

Sigortacılar için Avrupa Birliği'nin (AB) ihtiyatlılık çerçevesi olan Solvency II, sigortacıların mali sağlamlığını güvenceye almada ve riske duyarlı sermaye gereksinimlerini teşvik etmede temel bir rol oynamaktadır. Afet risk modellemesini daha iyi entegre etmek ve risk azaltma çabalarını ödüllendirmek için Solvency II'yi geliştirmek gerekmektedir. Çünkü sermaye gereksiniminin yeterli olmasını sağlamak için riski uygun şekilde yansıtmak çok önemlidir. Örneğin iklim değişikliği, yeni bilimsel bilgiler ve son felaket olayları kapsamında standart formülün, doğal afet parametrelerinin kalibrasyonunun sağlanması önemlidir. EIOPA yakın zamanda doğal afet riski standart formül sermaye yükümlülüklerinin yeniden değerlendirmesini gerçekleştirdi. Ek olarak iklim adaptasyonunu fiyatlandırma ve teminatlara entegre eden etki odaklı sigortacılık, finansal teşvikleri toplumsal dayanıklılıkla uyumlu hale getirebilir. Düzenleyiciler, adaptasyon önlemlerinin sermaye gereksinimlerindeki risk azaltma etkisini tanıyarak bunu destekleyebilir. Bu bağlamda EIOPA şu anda Solvency II kapsamında doğal afet sigortasında adaptasyon önlemlerinin ihtiyatlı muamelesinin değerlendirilmesi üzerinde çalışmaktadır (Hielkema, 2025: 176).

Bu çerçevede 1994 yılında kurulan IAIS da (International Association of Insurance Supervisors - IAIS), sigorta sektörünün denetimi için ilkeler, standartlar ve kılavuzların yanı sıra destekleyici materyallerin geliştirilmesinden ve uygulanmasına yardımcı olmaktan sorumlu küresel standart belirleme organıdır. IAIS'in misyonu, poliçe sahiplerinin yararı ve korunması için adil, güvenli ve istikrarlı sigorta piyasaları geliştirmek ve sürdürmek amacıyla sigorta sektörünün etkin ve küresel olarak tutarlı denetimini teşvik etmek ve küresel finansal istikrara katkıda

bulunmaktır. IAIS'ın yayımladığı güncel uygulama belgesi, iklimle bağlantılı risklerin, sigorta şirketlerinin kurumsal yönetişim, risk yönetimi, iç kontrol, yatırım, değerleme, kamuyu aydınlatma ve senaryo analizi süreçlerine entegre edilmesini denetim açısından önemli bir gereklilik olarak değerlendirmektedir (IAIS, 2025).

3. YEŞİL SİGORTACILIĞIN SÜRDÜRÜLEBİLİR KALKINMAYA KATKILARI

3.1. Risklerin Önlenmesi ve Azaltılması

Bugünün karmaşık ekonomik sisteminde sigorta, diğer aktörlere göre daha az görünür olan ancak oldukça önemli işlevlere sahip bir sektördür. Sigortacılar yalnızca bireylere ve kurumlara finansal güvence sağlamakla kalmaz, aynı zamanda sürdürülebilir büyümeyi ve piyasa istikrarını da destekler (Meral, 2024: 293). Bu çerçevede sigortanın temel işlevi, genellikle kişilerin ve işletmelerin kontrolünde olmayan durumlara karşı korunma sağlamak olarak bilinmektedir. Risk gerçekleştiğinde sigorta, kişilerin ve işletmelerin toparlanma sürecine destek olmalıdır. Riskten koruma ve risklerin hafifletilmesi sigortanın asıl işlevi olsa da, topluma sundukları bunlarla sınırlı değildir. Küçük işletmeler için sigorta, bir doğal afet sonrası birikimlerin korunması; hayat sigortası ise kişinin vefatı durumunda ailesine yeterli gelir sağlanması anlamına gelmektedir. Sigortanın devlet, finans sektörü, işletmeler ve kamu için değeri bu temel işlevinden gelse de koruma sağlanmasından daha geniş çaplı bir etkisi vardır. Sigortalıların risklerini yönetmesi, dağıtması ve üstlenmesi sebebiyle; bir ev satın almak, iş kurmak veya büyütmek gibi diğer üretken faaliyetler için bir ön koşuldur.

Özetle gerçek ve tüzel kişilerin, bireysel yaşamlarında veya kurumsal faaliyetlerinde dikkate alınması gereken risk ve belirsizliğin sebep olacağı kayıp ve zararların ortadan kaldırılması veya azaltılmasında hizmet veren Türk Sigorta Sektörü, Sigortacılık ve Özel Emeklilik Düzenleme ve Denetleme Kurumu (SEDDK) sistemi düzenler ve denetler.

3.2. Sürdürülebilir Yatırımların Desteklenmesi

Sigorta sektörünün sürdürülebilir kalkınmaya katkısı yalnızca sigorta poliçeleri üzerinden gerçekleşmemektedir. Sektör şirketlerinin tahsil ettiği primlerden yönlendirerek sahip oldukları uzun vadeli yatırım portföylerinin; yenilenebilir enerji, sürdürülebilir altyapı, enerji verimliliği ve diğer düşük karbonlu faaliyetlere yönlendirilmesi sürdürülebilir yatırımların desteklenmesinde önemlidir.

3.3. Yeşil Ürünlerin Geliştirilmesi

Geleneksel sigortacılıkta, risk gerçekleştikten sonra finansal kaybın karşılanması temel işlevdir. Yeşil sigortacılık yaklaşımında ise sigorta şirketlerinin risk gerçekleşmeden önce risk azaltıcı davranışları teşvik etmesi önem kazanmaktadır. Kısacası iklim değişikliğine uyum yoluyla risk azaltımı, gelecekteki iklim hasarları ve kayıplarındaki artışı ve sigorta piyasalarındaki potansiyel aksamaları sınırlamanın tek sürdürülebilir yolu olacaktır. Örneğin yangın, sel veya iklim riskini azaltan teknik yatırımları gerçekleştiren işletmelere daha avantajlı sigorta koşulları sağlanması risk azaltımı için ekonomik teşvik oluşturabilir (OECD, 2023).

3.4. Afet Sonrası Dayanıklılık Kazandırılması

Sigorta sektörü, afet sonrasında hanehalklarının ve işletmelerin finansal kaynaklara hızlı erişmesini sağlayarak ekonomik toparlanmayı desteklemektedir. Ancak sürdürülebilirlik açısından hedef, afet sonrasında yalnızca eski yapıların tekrar oluşturulması değil, daha dayanıklı biçimde yeniden inşa edilerek ekonomiye kazandırılmasıdır.

3.5. ESG'nin Yaygınlaştırılması

Yeşil sigortacılığın etkinliği şirketlerin ESG yaklaşımını kurumsal yönetişim sistemlerine ne ölçüde entegre ettiğiyle de ilişkilidir. Yönetim kurullarının iklim ve sürdürülebilirlik risklerini gözetmesi, sigorta kabul politikalarında açık ESG kriterlerinin bulunması, yatırım kararlarının sürdürülebilirlik açısından değerlendirilmesi ve uygulamaların kamuya açıklanması bu sürecin temel bileşenleridir. Kısacası ESG'nin yaygınlaştırılması aslında kurumsal kültür dönüşümü olarak değerlendirilmelidir.

3. SONUÇ

İklim değişikliğinin sebep olduğu fiziksel riskler, düşük karbonlu ekonomiye geçişten kaynaklanan baskılar ve doğa olaylarının sebep olduğu yıkımlara bağlı ekonomik kayıplar, sigortacılık sektörünün geleneksel işlevlerinin yeniden değerlendirilmesini gerektirmektedir. Sigorta şirketleri bir taraftan iklim ve hava hareketleri risklerinden doğrudan etkilenen finansal kuruluşlarken, diğer taraftan bu risklerin belirlenmesi, fiyatlandırılması, paylaşılması ve azaltılmasında önemli araçlara sahip kurumsal yapılardır. Bu konum sigorta sektörünü sürdürülebilir kalkınmanın yalnızca destekleyici unsurlarından biri değil aynı zamanda yeşil dönüşümün yönünü ve hızını etkileyebilecek stratejik bir aktöre dönüştürmektedir.

Bu çerçevede çalışma, yeşil sigortacılığın sürdürülebilir kalkınmaya katkısını kavramsal ve uygulamalı boyutlarıyla değerlendirmiştir. Araştırma sonucunda yeşil sigortacılığın yalnızca çevre dostu sigorta ürünlerinden oluşmadığı; risk değerlendirmesi, poliçe düzenlenmesi, yatırım, hasar yönetimi ve kurumsal yönetişim süreçlerini kapsayan bütüncül bir sigortacılık yaklaşımı olduğu sonucuna ulaşılmıştır.

Sonuç olarak yeşil sigortacılık, risk yönetimi, yatırım kararları, çevresel teşvikler, iklim değişikliğine uyum ve ESG odaklı kurumsal yönetişim mekanizmaları aracılığıyla sürdürülebilir kalkınmanın ekonomik, çevresel ve sosyal boyutlarına çok yönlü bir katkı sağlamaktadır. Bu durum, sigorta sektörünün gelecekte yalnızca finansal sistemin bir parçası değil, sürdürülebilir dönüşümün stratejik aktörlerinden biri olacağını göstermektedir.

KAYNAKÇA

EIOPA. (2025). Bridging insurance protection gaps: Regulation, incentives and coordination. https://www.eiopa.europa.eu/publications/bridging-insurance-protection-gaps-regulation-incentives-and-coordination_en?utm_ EIOPA.

Hielkema, P. (2025). Insurance Protectıon Gaps. https://www.eiopa.europa.eu/document/download/37982c72-9f92-473a-87f4-f60657f9e457_en?filename=eurofi-september2025-protection-gaps.pdf

IAIS. (2025). IAIS publishes comprehensive Application Paper on the supervision of climate-related risks in the insurance sector. https://www.iais.org/2025/04/iais-publishes-comprehensive-application-paper-on-the-supervision-of-climate-related-risks-in-the-insurance-sector/?utm_source

Meral, H. (2024). Türkiye'nin Kalkınmasında Stratejik Bir Alan: Sigorta Sektörü. Ed. Behlül Ersoy, Yüzüncü Yılda Türk Sigorta Sektörü Kapsamlı Bir Bakış ve Politika Önerileri, ss. 291-305. Türkiye Sigorta Birliği, İstanbul: Nobel Akademik Yayıncılık.

Nobanee, H., Elsaied, F.A., Alhammadi, N., & Wazir, N. (2022). Bibliometric analysis and visualization of green, sustainable, and environmental insurance research. Journal of Financial Services Marketing, Palgrave Macmillan, 28(4), 631-648. https://doi.org/10.1057/s41264-022-00185-6

OECD. (2023). Enhancing the insurance sector's contribution to climate adaptation. OECD Business and Finance Policy Papers. https://www.oecd.org/en/publications/enhancing-the-insurance-sector-s-contribution-to-climate-adaptation_0951dfcd-en.html

Özcan, H. (2024). Sigortacılıkta Sistematik Risklerin Yönetimi. Ed. Hasan Meral, 21. Yüzyılda Türk Sigorta Sektörüne 21 Tavsiye, 3. Basım, ss. 55-65. Türkiye Sigorta Birliği, İstanbul: Nobel Bilimsel Eserler.

Pfeifer, D., & Langen, V. (2021). Insurance business and sustainable development. Risks, 9(2), 40. Chapters, in: Muddassar Sarfraz & Larisa Ivascu (ed.), Risk Management, IntechOpen. https://arxiv.org/pdf/2102.02612

Stricker, L., Pugnetti, C., Wagner, J., & Zeier Röschmann, A. (2022). Green Insurance: A Roadmap for Executive Management. Journal of Risk and Financial Management, 15(5), 221. https://doi.org/10.3390/jrfm15050221

Sümer, G., & Polat, Y. (2016). Dünyada Tarım Sigortaları Uygulamaları ve TARSİM. Gazi Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi, 18(1), 236-263. https://izlik.org/JA83NG33AT

UNEP FI. (2012). The Principles for Sustainable Insurance. https://www.unepfi.org/insurance/

UNEP. (2020). Managing environmental, social and governance risks in non-life insurance business. PSI ESG Guide for Non-Life Insurance: Version 1.0. https://www.unepfi.org/psi/wp-content/uploads/2020/06/PSI-ESG-guide-for-non-life-insurance.pdf

The Importance of Wetlands and Ramsar Sites in Turkey

Prof. Dr. Nurcan Özkan[1]

[1] University of Trakya, Faculty of Education, Department of Mathematics and Science Education, nurcanozkan@hotmail.com, ORCID: 0000-0001-5045-6186

Abstract: Wetlands are landscape areas defined by the presence of water. Within wetlands are mangroves, peatlands and marshes, rivers and lakes, deltas, floodplains and flooded forests, rice fields, and even coral reefs. Wetlands are teeming with biodiversity. They are part of our natural infrastructure, providing essential protection against climate change, floods, drought, and pollution. They are also vital for our health and well-being. Healthy wetlands store carbon, regulate the water cycle, and support 40% of the world's biodiversity. Turkey is considered relatively rich in wetlands compared to European and Middle Eastern countries. With a total of 481 bird species, Turkey's wetlands are of vital importance, especially for migratory species. Turkey, having become a signatory to the Ramsar Convention in 1994, has committed to protecting and rationally utilizing its wetlands. According to data from the Turkish Ministry of Agriculture and Forestry, there are 14 registered Ramsar sites of international importance in Türkiye. These areas are protected for the conservation of waterbirds and endemic species. This study examines the importance of wetlands for life and the significance and current status of Ramsar sites in Turkey.

Keywords: Wetlands, Ramsar Convention, Waterbirds

Sulak Alanların Önemi ve Türkiye'deki Ramsar Alanları

Özet: Sulak alanlar, suyun varlığıyla tanımlanan manzara bölümleridir. Sulak alanlar içinde mangrovlar, turbalıklar ve bataklıklar, nehirler ve göller, deltalar, taşkın yatakları ve su basmış ormanlar, pirinç tarlaları ve hatta mercan resifleri yer alır. Sulak alanlar biyolojik çeşitlilikle doludur. İklim değişikliğine, sellere, kuraklığa ve kirliliğe karşı temel koruma sağlayan doğal altyapımızın bir parçasıdırlar. Ayrıca sağlığımız ve refahımız için de hayati öneme sahiptirler. Sağlıklı sulak alanlar karbon depolar, su döngüsünü düzenler ve dünyadaki biyolojik çeşitliliğin %40'ını destekler. Türkiye sulak alanlar açısından Avrupa ve Ortadoğu ülkelerine göre zengin sayılabilecek bir konumdadır. Toplam 481 kuş türünün bulunduğu Türkiye'deki sulak alanlar özellikle göçmen türler için yaşamsal öneme sahiptir. Türkiye 1994 yılında taraf olduğu Ramsar Sözleşmesi kapsamında sahip olduğu sulak alanları korumayı ve akılcı kullanmayı taahhüt etmiştir. Türkiye'de uluslararası öneme sahip T.C. Tarım ve Orman Bakanlığı verilerine göre tescilli 14 Ramsar alanı bulunmaktadır. Bu alanlar su kuşları ve endemik türlerin korunması amacıyla güvence altındadır. Bu çalışmada, sulak alanların yaşam için ne kadar öneme sahip olduğu ve Türkiye'de bulunan Ramsar alanlarının önemi ve durumu ele alınmaktadır.

Anahtar Kelimeler: Sulak Alanlar, Ramsar Sözleşmesi, Su Kuşları

1. INTRODUCTION

Wetlands are transitional zones between terrestrial and aquatic ecosystems where water covers the soil—or lies very close to the surface—either throughout the year or during specific periods of the year. These unique habitats include mangroves, peatlands and marshes, rivers and lakes, deltas, floodplains and flooded forests, rice paddies, and even coral reefs. Healthy wetlands play a central role in addressing the interconnected climate, biodiversity, and water crises (URL 1).

Many wetlands are transition zones between terrestrial and aquatic ecosystems; however, some are found scattered across the landscape in terrestrial depressions where water accumulates or in areas where groundwater emerges at the surface. The amount of water in wetlands can vary significantly. While some wetlands remain permanently inundated, others are submerged only seasonally, yet their soil remains saturated during the periods when they are not underwater. Some wetlands are only infrequently inundated, yet they experience saturated soil conditions long enough to support wetland-adapted vegetation and allow for the development of hydric soil characteristics. Hydric soils develop when chemical changes occur in the soil due to low-oxygen conditions associated with prolonged saturation.

1.1. Why Are Wetlands Important?

Wetlands are highly complex natural systems that provide a wide range of services to local communities and the country as a whole, possessing functions and values unparalleled by any other ecosystem on Earth. Wetlands are the ecosystems with the highest biodiversity after tropical forests. Wetlands, which provide suitable environments for feeding, breeding, and shelter for a wide variety of living organisms, are regarded as museums

of natural wealth—not only for the countries where they are located but for the entire world. Wetlands—which play a significant role in the lives of local communities and contribute to regional and national economies—also hold a distinct and important place among ecosystems in terms of preserving natural balance and biodiversity. Wetlands, which are highly productive ecosystems, are of great importance for both maintaining ecological balance and preserving biodiversity.

Different plant communities can be found in different types of wetlands, and each type has adapted to the local hydrology (the amount, distribution, and movement of water in a specific area). Wetland plants are generally referred to as hydrophytes because they are specially adapted to grow in saturated soils. Many bird, insect, and other wildlife species depend entirely on wetlands for critical stages of their life cycles, while many others utilize wetlands for feeding, resting, or other life activities (URL 1).

Almost all of the world's fresh water is supplied directly from wetlands. Wetlands play a crucial role in water purification, storage, and flood control. Peatlands act like sponges; they absorb excess water during periods of heavy rainfall and slowly release it during times of drought. Seagrasses and mangrove roots remove impurities and salts from seawater (URL 1).

1.2. Wetlands in Turkey

Turkey is in a position that can be considered rich in terms of wetlands compared to European and Middle Eastern countries. In a country home to a total of 481 bird species, wetlands are of vital importance, particularly for migratory species. The primary reason for the international significance of the country's wetlands is that two of the most important bird migration routes in the Western Palearctic region pass through Turkey. As the impacts of climate change on humans and wildlife intensify, the ability of wetlands to adapt to rapidly changing conditions emerges as an indispensable factor. Consequently, it is natural to see an increase in research worldwide regarding the value placed on wetlands and their functions.

Resources must be protected to develop wetlands and ensure water supply. The identification, planning, and protection of wetlands are carried out by the Wetlands Branch Directorate under the Department of Sensitive Areas of the General Directorate of Nature Conservation and National Parks, within the Ministry of Agriculture and Forestry (URL 2). In this context, Turkey became a party to the Convention on Wetlands (Ramsar Convention) in 1994 and had 14 wetlands, with a total area of 184,487 hectares (Sultan Marshes, Lake Seyfe, Lake Burdur, Lake Manyas (Bird Lake) and Göksu Delta, Akyatan Lagoon, Kızılırmak Delta, Lake Uluabat and Gediz Delta, Yumurtalık Lagoon, Lake Meke, Kızören Sinkhole, Lake Kuyucuk, and Nemrut Caldera)—included in the convention's list as "Ramsar sites." In addition to these areas, 91 new wetlands—comprising 59 wetlands of national importance and 32 wetlands of local importance—were designated between 2014 and 2023. As of today, there are a total of 105 wetlands covering an aggregate area of 1,146,420 hectares. Notable among these wetlands are Lakes Akşehir and Eber (117,779 hectares), Lake İznik (61,606 hectares), and Acıgöl (55,000 hectares).

With the growing interest in birdwatching and nature photography in the country, a need has arisen for ecotourism facilities in wetland areas. There are 69 birdwatching towers, 9 walking trails, and 13 visitor centers across 55 wetland sites (Çalkaya, 2023).

1.3. Rehabilitation and Restoration Works in Wetlands

Rehabilitation and restoration efforts to combat climate change are ongoing. Water retention has been restored at Lake Avlan in Antalya, and at Lake Akgöl and the Ereğli Marshes in Konya. Rehabilitation works were carried out at Sultan Sazlığı in Kayseri, Kaz Lake in Tokat, Kuyucuk Lake in Kars, and the Karakuyu Wetlands and Eber Lake in Afyonkarahisar (Çalkaya, 2023).

According to data from the Republic of Turkey Ministry of Agriculture and Forestry, 14 Ramsar sites of international importance in Türkiye are under protection to safeguard waterfowl and endemic species (URL 3).

1.4. List of Ramsar Sites in Turkey

The Ramsar Convention an—agreement concerning wetlands of international importance, particularly as habitats for waterfowl—is an international treaty that aims to ensure the conservation and susteinable use of wetlands of international importance (URL 4). The Ramsar Convention is an international agreement signed in

the Iranian city of Ramsar in 1971 that aims to protect wetlands. February 2nd is celebrated annually as Word Wetlands Day to draw attention to wetlands that are increasingly dwindling due to global climate change and the irresponsinle ose of water (Okutan, 2021). There are a total of fourteen Ramsar sites in Turkey, the first of which was added to the list in 1994 and the last in 2013 (URL 5; 6).

Turkey's first Ramsar site is the Göksu Delta in Mersin, designated on July 13, 1994. On the same date, Lake Burdur, Lake Seyfe, Lake Manyas (Kuş Gölü), and Sultan Sazlığı were also included in the list; however, the Göksu Delta appears first in the official records (URL 4).

The Ramsar sites in Turkey, which is a party to the Ramsar Convention (signed by 170 countries and entered into force in 1977), are: Göksu Delta (Mersin), Lake Burdur (Burdur), Lake Seyfe (Kırşehir), Lake Manyas/Bird Lake (Balıkesir), Sultan Marshes (Kayseri), Kızılırmak Delta (Samsun), Akyatan Lagoon (Adana), Lake Uluabat (Bursa), Gediz Delta (İzmir), Yumurtalık Lagoon (Adana), Meke Maar (Konya), Kızören Sinkhole (Konya), Lake Kuyucuk (Kars), and Nemrut Caldera (Bitlis) (Güzel, 2025).

► Göksu Delta Ramsar Site

It is located approximately 80 km from the province of Mersin and 17 km from the Silifke district center. It is situated where the Göksu River flows into the Mediterranean Sea. It is the first Ramsar site designated in Turkey under the Ramsar Convention. It is a wetland of international importance that was placed under protection by the Ramsar Convention on July 13, 1994. It provides wintering and breeding grounds for hundreds of different bird species. Two important lagoons, named Paradeniz and Akgöl, are located within the delta. In 1990, the Göksu Delta was declared a "Specially Protected Area." It has been identified by the European Union for Coastal Conservation as one of the significant sites in the Eastern Mediterranean due to the diversity of its dune ecosystem, dune habitats, undisturbed delta structure, and the dynamic functioning of its ecosystems (Mengüllüoğlu, 2017). It is an important wetland for many migratory birds. The Göksu Delta constitutes one of the most important primary nesting grounds in the Mediterranean for the sea turtles *"Caretta caretta*" and "*Chelonia mydas*" to lay their eggs. It is also one of the nesting sites for the soft-shelled Nile Soft-shelled Turtle (*Trionyx triunguis*). A total of 507 plant taxa are found in the Göksu Delta Specially Protected Area; of these, 10 are endemic, and 43 are rare within the country (URL 7).

► Sultan Sazlığı Ramsar Site

Sultan Sazlığı is a site of international importance—designated as both a National Park and a Ramsar site—located within the borders of Kayseri province among the districts of Yeşilhisar, Develi, and Yahyalı; it encompasses both freshwater and saltwater ecosystems. It was included under the Ramsar Convention in 1994 and declared a national park in 2006. The wetland serves as a feeding, breeding, and resting ground for 428 native plant species and 301 bird species. The area is characterized primarily by extensive reed beds and marshy terrain (Figure 1). It encompasses a variety of habitats and serves as the intersection point of two major migration routes used by migratory birds traveling between Africa and Europe (URL 8).

► Lake Manyas Ramsar Site

Manyas (Bird) Lake wasincluded under the Ramsar Convention in 1998 as a wetland of international importance. It is located within the borders of Balıkesir, between the districts of Bandırma and Manyas. It is one of Turkey's most important breeding and stopover sites for waterbirds. The area also houses the "Kuşcenneti National Park," which was designated as the country's fourth national park in 1959. It provides breeding, resting, and wintering habitats for many different bird species. Therefore, it is known as Bird Sanctuary. The national park is also the breeding ground for 105 definite or probable breeding bird species, especially the Dalmatian pelican, cormorant, little cormorant, mallard, teal, gray heron, spoonbill, paddy, night heron, little egret, egret and bittern. Kuş Cenneti National Park has been awarded a Class A Diploma by the Council of Europe—under the "European Diploma for Protected Landscapes, Reserves and Natural Features" scheme—in recognition of its scientific, cultural, aesthetic, and/or recreational qualities. The Class A Diploma represents the highest level of protection; the area may be used solely for scientific research and educational activities, such as birdwatching, scientific studies, and biodiversity education (URL 9).



Figure 1: Kayseri Sultan Sazlığı National Park (URL 10)



Figure 2. Manyas Bird Paradise National Park (URL 11)

► Kızılırmak Delta Ramsar Site

The Kızılırmak Delta Ramsar Site is a wetland of international importance, located within the boundaries of the Bafra, 19 Mayıs, and Alaçam districts of Samsun, and designated under the Ramsar Convention in 1998. It was formed by the alluvium carried by the Kızılırmak River. The Kızılırmak Delta Ramsar Site encompasses 14 different habitat types, including reed beds, brackish and freshwater lakes, wet meadows, agricultural lands, mixed broad-leaved floodplain forests, dune areas, salt marshes, and watercourses. It offers breeding, stopover, and wintering grounds for hundreds of different bird species. Covering the largest area in Turkey, it is one of the country's richest wetlands in terms of its ecosystem. It holds the distinction of being the largest wetland in the Black Sea Region (URL 12; 13). A total of 358 bird species have been identified within the Kızılırmak Delta Ramsar Site, and significant species—such as the Common Crane (Gruidae), Purple Swamphen (*Porphyrio porphyrio*), Purple Heron (*Bournei*), Eurasian Spoonbill (*Platalea*), Gadwall (*Mareca strepera*), Garganey (*Spatula querquedula*), Red-crested Pochard (*Netta rufina*), Common Pochard (*Aythya ferina*), and Ferruginous Duck (Aythya nyroca)—offer a visual feast for visitors (Figures 3 and 4). Within the Wildlife Development Area located in the Kızılırmak Delta, there are a visitor center, a video monitoring center, bird-watching towers, and a cafeteria, as well as a bird-ringing station and a wildlife first-aid clinic. Activities such as bird-watching, hiking, cycling tours, picnicking, nature and bird photography, and plant and wildlife observation can be enjoyed (URL 12).



Figure 3: Kızılırmak Delta Ramsar Site (Source: URL 14)



Figure 3: Kızılırmak Delta Ramsar Site (Source: URL 14)

► Akyatan Lagoon Ramsar Site

The Akyatan Lake Ramsar Site covers an area of 14,700.00 hectares. It is located in the Karataş district of Adana. Akyatan Lake Ramsar Site, designated on April 15, 1998, was registered as a “Wildlife Development Area” on October 16, 2005. The Ramsar site is located approximately 18 km from the Karataş district center and 56 km from the Adana city center. Waterbirds constitute a significant portion of the site's resource value. Akyatan Lagoon is one of the primary sites in Turkey where the highest numbers of waterbirds overwinter. It is also one of the country's most important overwintering grounds for the endangered crane. They are Important Bird Areas and wetland ecosystems of international importance according to international criteria. The area features day-use zones, bird-watching points, and walking trails. There are two bird-watching towers and a structure where experts stay while working during the sea turtle breeding season. Additionally, there is a fire lookout tower in the wooded area within the site. Many activities, such as hiking, wildlife watching, birdwatching, nature education, botanical tours, scientific tours, and photo safaris, can be carried out in the area (URL 3).

► Yumurtalık Lagoon Ramsar Site

The Yumurtalık Lagoon Ramsar Site covers an area of 19,853.00 hectares. It is located in the Yumurtalık district of Adana. The Yumurtalık Lagoon Ramsar Site, announced on July 21, 2005, was registered as a "Nature Conservation Area" on July 8, 1994. The Yumurtalık Lagoon Ramsar Site is located 30 km from the Yumurtalık district center, 30 km from the Karataş district center, and 70 km from the Adana city center. The area boasts a rich flora and fauna. The Yumurtalık Lagoon is one of the wetland ecosystems in Turkey where ecological relationships are both the most delicate and the most complex among the country's lagoon systems. There are numerous lakes and lagoons in the area—whether interconnected or linked to the sea—that are either temporary or permanent. The lagoons are quite shallow, with depths ranging from 20 to 60 cm. Yumurtalık Lagoon boasts one of the country's largest natural dune systems. The sand dunes, which are also highly impressive in terms of their landscape value, are remarkably rich in both plant diversity and the habitats they provide for wildlife. Of the 12 priority plant species found in the area, nine are located in the sand dunes. The dunes serve as a breeding ground for many bird species. The Yumurtalık Lagoon Ramsar Site features an administrative building and a bird-watching tower. A wide range of activities can be enjoyed in the area, including nature walks, wildlife observation, bird watching, nature education, botanical tours, scientific tours, and photo safaris (URL 15).

► Burdur Lake Ramsar Site

It is Turkey's seventh-largest lake and one of the most important protected wetlands of international significance. Located in the Lakes Region, it lies between the provinces of Burdur and Isparta. It holds the status of a first-degree natural protected area. Lake Burdur is one of Turkey's most important wetlands in terms of birdlife. Eighty-five bird species have been recorded at the lake. With 85 identifiable bird species, it is exceptionally well-suited for birdwatching within the scope of "ornithological tourism" and provides habitats for waterfowl for breeding, feeding, wintering, and stopovers. It is a wintering and stopover site for many waterbirds, most notably the endangered white-headed duck. The area features a bird-watching tower. Activities such as nature walking, picnicking, and bird watching can be enjoyed there (URL 16).

► Seyfe Lake Ramsar Site

Seyfe Lake Ramsar Site is a shallow, tectonic wetland of international importance located in the Mucur district of Kırşehir province. It is located on the Seyfe Plain, approximately 35 km from Kırşehir. It is home to hundreds of thousands of migratory waterbirds. Seyfe Lake contains numerous islets of various sizes where thousands of birds nest. It is one of the most important stopover and breeding grounds, particularly for the flamingo population. It provides opportunities for breeding, feeding, overwintering, and stopovers for waterbirds. The steppes surrounding the lake offer feeding and breeding grounds for endangered bird species (URL 17).

► Uluabat Lake Ramsar Site

Uluabat Lake is an important natural area that was designated as a "Wetland of International Importance" on April 15, 1998, and placed under protection within the scope of the Ramsar Convention. It is located within the borders of Bursa, at the intersection of the Karacabey, Nilüfer, and Mustafakemalpaşa districts. It is a shallow lake with an average depth ranging from 1 to 2 meters. It is situated on the main bird migration route in Anatolia. It is home to endangered bird species such as the pygmy cormorant and the pelican. It is one of Türkiye's most productive lakes, boasting rich underwater vegetation and fish populations. It has been included in the international Living Lakes Network. The lakeside village of Eskikaraağaç holds the title of "European Stork Village" and serves as a hub for nature tourism. It harbors diverse ecosystems. Turkey's most extensive water lily beds and reed beds are located around this lake (URL 18).

► Gediz Delta Ramsar Site

The Gediz Delta is a unique wetland ecosystem located east of the Gulf of İzmir, which was included under the international Ramsar Convention in 1998. It is located within the boundaries of the Çiğli, Menemen, and Foça districts of İzmir. It holds the designations of Ramsar Site, Important Bird Area, Important Nature Area, and Wildlife Development Area. It consists of salt marshes, freshwater wetlands, lagoons, and agricultural areas. It is also known as the İzmir Bird Paradise. Of the nearly 500 bird species recorded in Türkiye, 306 have been observed

in this delta. Thousands of flamingos and Dalmatian pelicans breed here every year. It is a critical habitat for fish, reptiles, and mammals, as well as for hundreds of plant species (URL 19).

► Meke Lake Ramsar Site

Lake Meke is a volcanic maar (crater) lake located in the Karapınar district of Konya; due to its shape, it is known as the "Eye of Anatolia" or the "evil eye bead." It is a maar structure formed millions of years ago as a result of volcanic eruptions. Fed by groundwater, the lake is drying up due to flawed agricultural and water policies implemented in the Konya Closed Basin. There is a saline lake within the caldera. Due to its existence, this lake is a unique, rare and valuable crater lake. In 2005, Meke Maari was registered as a Ramsar Site. It holds the status of a natural protected area, a natural monument, and a strictly protected sensitive area. Fed by groundwater, the lake faced a severe risk of drying up due to improper agricultural practices and drought, and subsequently gained public attention through "lifeline" water projects (URL 20). The salt marshes surrounding the lake turn into wetlands in winter and dry up in summer. Birds adapted to the volcanic nature of the area can be seen around the Meke Maar; the first among them is the 'Meke' bird, from which the site takes its name. Although it does not contain many ornithological species, bird species such as gray goose (*Anser anser*), shepherd shepherd (*Tadorna ferruginea*), shepherd (*Tadorna tadorna*), little vulture (*Neopron percnopterus*), red hawk (*Buteo rufinus*), golden eagle (*Golden eagle*), howler falcon (*Falco cherrug*) and stilt (*Himantopus himantopus*) have been identified (URL 21).

► Kızören Sinkhole Ramsar Site

Kızören Sinkhole, located in the Karatay district of Konya, is Türkiye's largest karst sinkhole lake. It is situated on the Konya-Aksaray highway, approximately 70–75 km from the Konya city center. It has a diameter of approximately 228–235 meters and a total depth of 171 meters. Of this depth, 145 meters is filled with fresh water. It is a karstic wetland. Its waters reflect various shades of turquoise and blue (URL 28). No living organisms have been detected in the lake. Although the surrounding vegetation is steppe-like, the lake is encircled by cultivated fields. The water surface in the sinkholes indicates the groundwater level. Excessive water extraction via pumps for irrigation has lowered the lake level. Water withdrawal from the lake for agricultural irrigation and domestic use has been halted. It has been determined that the water level dropped by as much as 10 meters between 1996 and 2006 (URL 29). There are nine plant species in the area that are endemic, endangered, and protected under the Bern Convention (URL 4).

► Kuyucuk Lake Ramsar Site

Kuyucuk Lake is an important bird sanctuary located within the boundaries of the Arpaçay district of Kars province and designated as Turkey's 13th Ramsar Site. It is situated at an elevation of 1,627 meters above sea level. It comprises a lake of approximately 245 hectares and a total protected area of 416 hectares. It has been designated as the country's 13th Ramsar site due to its location on the Asia-Europe bird migration routes and its role as a resting and breeding ground for numerous bird species, including seven endangered ones. It boasts a remarkably wide variety of bird species. Water has been supplied to the lake since 2019 to preserve its ecological balance, as it had previously reached the point of drying up completely (URL 22). The site features a bird-watching tower and a warden's hut. The bird-watching tower serves as a facility for tourism and recreation. As part of nature tourism activities, bird-watching events—alongside hiking and photo safaris—are organized regularly each year in collaboration with village schools located near the lake (URL 23).

► Nemrut Caldera Ramsar Site

The Nemrut Caldera, located within the boundaries of the Tatvan, Ahlat, and Güroymak districts of Bitlis, was designated as a Ramsar Site of international importance on April 14, 2013. It is a massive caldera covering an area of approximately 48 km². It contains a total of five lakes, including a large cold-water crater lake and the geothermally fed Ilık Göl (Warm Lake). Covering an area of approximately 10 kilometers, it is one of the world's largest craters, and the crater lake within it holds the distinction of being the second-largest caldera lake in the world. Endemic plant species are present in the area. The Nemrut Caldera was designated a natural monument on October 31, 2003, a Ramsar site on April 17, 2013, and a national park on August 19, 2026. Furthermore, together with Mount Nemrut—of which it is a part—it holds the status of an Important Bird Area (URL 4; 24).



Figure 5: Meke Lake (Source: URL 25)



Figure 6: Nemrut Caldera (Source: URL 26)

2. DISCUSSION AND CONCLUSION

Wetlands—which were once viewed as worthless, useless, or even sources of disease, and a significant portion of which were drained—are natural resources that possess the greatest functionality and value among the Earth's ecosystems. In addition to hosting rich wildlife—particularly waterfowl—and performing functions such as water storage, flood control, erosion prevention, climate moderation, and water purification and quality enhancement, it contributes to the local and national economies through fishing, hunting, reed harvesting, and tourism activities (Kardaş and Cebe, 2018).

This study, which examines the current status of Ramsar sites in Turkey, reveals that these areas are suitable not only for recreational and tourism activities—such as birdwatching, hiking, mountaineering, botanical tourism, wildlife viewing, village tours, recreational fishing, and boating—but also for cultural tourism, thanks to the assets found in their surrounding areas. Indeed, studies aimed at identifying potential ecotourism activities in certain Ramsar sites within our country (Akbana and Bulut, 2021; Çanga and Üzümcü, 2020; Sevindi, 2013; Yel and Selvi, 2019) also support these findings. In addition to being generally suitable for overlapping tourism and recreational activities, the wetlands in question possess unique characteristics and offer spaces where diverse activities can be carried out. For instance, the fact that Kuyucuk Lake is cited as one of the most ideal locations in Turkey for stargazing—due to the minimal light pollution in the area (URL 27)—constitutes a distinct element of attraction. On the other hand, the absence of an observation point on the shores of Lake Seyfe indicates that the existing potential is not being utilized at an optimal level—as is the case with every wetland—and that improvements are needed.

Studies conducted in recent years indicate that people's perceptions of tourism-related travel are changing, and that nature and naturalness are becoming increasingly important—not only in tourism but in all aspects of life (Sezen et al., 2012); in other words, a return to nature is taking place. At this point, it is evident that ecotourism—a form of tourism based on the natural environment and centered on preserving nature, local characteristics, and traditional authenticity—is coming to the forefront (Çanga and Üzümcü, 2020).

Ecotourism, which makes significant contributions to the preservation of cultural heritage in natural and rural areas (Altan, 2006), is considered a means of mitigating the adverse ecological and socioeconomic impacts of mass tourism and fosters sustainable development by integrating conservation, environmental education, and the well-being of local communities (Herath, 1997). The proper understanding and implementation of ecotourism can generate various environmental, economic, and sociocultural impacts—such as the protection and restoration of fragile ecosystems (Demir and Çevirgen, 2006), sustainable local economic development (Kuter and Ünal, 2009), and improvements in local employment, income, and living conditions (Gaul, 2003).

Wetlands, which are regarded as museums of natural wealth in the context of ecotourism, possess economic value in addition to functions such as controlling floods, regulating water regimes, and purifying water (Ateş and Uzer, 2007; Kardaş and Cebe, 2018: 32). The existing biodiversity makes these areas significant attractions for ecotourism as well (Çanga and Üzümcü, 2020).

Due to the climate crisis and improper agricultural irrigation, water levels in areas such as Lake Seyfe, Lake Burdur, and Meke Maar are dropping to critical levels. Domestic, industrial, and agricultural wastes threaten the ecosystem. Although the area is managed by the Ministry of Agriculture and Forestry—General Directorate of Nature Conservation and National Parks—and rehabilitation projects are being implemented, pressures persist.

Seasonal effects, alongside direct human-induced damage—such as the use of agricultural chemicals, improper irrigation techniques, unplanned urbanization, illegal fishing, and the dumping of waste—threaten the sustainability and biodiversity of these areas. The drying up of Lakes Kuyucuk and Meke, particularly in recent years, highlights the severity of the situation (Kasaroğlu and Güler, 2022).

Action plans must be prepared for the restoration and rehabilitation of wetlands that have suffered damage or whose ecological structures have been disrupted. These plans should be tailored to the specific ecological characteristics and climatic conditions of each site. To derive the desired level of benefit from the plans and ensure rapid progress without encountering obstacles, the process should be centralized under a single authority without abandoning the holistic approach (Kardaş and Cebe, 2018).

Environmental pollution and the threat of the depletion of natural resources—among the most significant issues of our time—are problems that concern all of humanity, and they will be resolved not only through administrative institutions but also through the involvement of local communities. The participation of the local population in this collaboration should be viewed as a duty, and it should be emphasized that it forms part of their own future plans. To foster sustainable development and protect nature, large-scale projects must be developed and implemented nationwide to raise public awareness, provide environmental education, and highlight the vital importance of wetlands in this educational process. The content of the "wise use" principle within the Ramsar Convention must be fully defined, and the importance of wetlands—not only for their conservation but also in terms of socio-economic, cultural, and tourism aspects—must be emphasized from the perspective of sustainability. The Ministry of National Education, the Ministry of Forestry and Water Affairs, and the Ministry of Environment and Urbanization must act in concert to beautify the environment and raise public awareness. In these activities, a governance model is being established—based on a participatory approach—in which local governments, central government institutions, civil society organizations, and citizens share roles and responsibilities (Ateş and Uzer, 2007).

In an era where freshwater resources are rapidly depleting due to global warming, and where water, aquatic products, and aquatic ecosystems have become matters of primary concern, the protection of wetlands and their preservation for future generations in the healthiest possible state is undoubtedly a matter of national security (Arı, 2006). However, despite all these gains achieved in political, legal, and institutional terms, wetlands in Turkey still face significant threats, and the loss of wetlands continues. The primary reason for this is that the importance of wetlands is still not sufficiently recognized or valued by the public, and the concept of wetland conservation has not been adequately embraced or accepted by those developing water and land use plans and programs (Ateş and Uzer, 2007). The primary cause of the pollution and destruction of wetlands is a lack of awareness. Raising public awareness will mark the beginning of resolving this issue (Kardaş and Cebe, 2018).

REFERENCES

Akbana, A., & Bulut, Y. (2021). Uluabat Gölü Ramsar Alanının (Bursa/Türkiye) ekoturizm açısından değerlendirilmesi. *Türk Tarım ve Doğa Bilimleri Dergisi, 8*(2), 286-294.

Altan, Ş. (2006). *Türkiye'de Ekoturizm Uygulamaları ve Ekonomiye Katkıları*. Niğde: Niğde Üniversitesi, Sosyal Bilimler Enstitüsü, Yayımlanmamış Yüksek Lisans Tezi.

Arı, Y. (2006). Ramsar Sözleşmesinin doğa koruma yaklaşımına eleştirel bir bakış. *Doğu Coğrafya Dergisi, 11*(15), 275-302.

Ateş, H., & Uzer, Y. (2007). Sulak Alan Projeleri İle Kalkınmanın Uyumlaştırılması: Akşehir Gölü Rehabilitasyon Projesi Örneği.

Çalkaya, M. (2023). Türkiye'de 105 sulak alan bulunuyor (2 Şubat 2023). https://www.aa.com.tr/tr/yasam/turkiyede-105-sulak-alan-bulunuyor/2804525

Çanga, A. Ç., & Üzümcü, T. P. (2020). Sürdürülebilir eko-turizm destinasyonları olarak sulak alanlar: Uluabat Gölü. *ÇOMÜ Ziraat Fakültesi Dergisi*, *8*(2), 335-346.

Demir, C., & Çevirgen, A. (2006). *Ekoturizm Yönetimi*. Ankara: Nobel Yayın Dağıtım.

Gaul, D. (2003). Environmental Impacts of Ecotourism a Review of Literature. https://foris.fao.org/static/pdf/foph/ecotour.pdf

Güzel, U. C. (2025). Türkiye'de Uluslararası Öneme Sahip Sulak Alanlar. 02 Şubat 2025. https://www.aa.com.tr/tr/info/infografik/44480

Herath, G. (1997). Ecotourism development in Australia. *Annals of Tourism Research*, *24*(2), 442-446.

Kardaş, F., & Cebe, M. (2018). Doğa koruma ve çevre eğitimi açısından sulak alanların işlevleri. *Menba Su Ürünleri Fakültesi Dergisi, 4*(1), 29-35.

Kasaroğlu, K., & Güler, M. E. (2022). T*ürkiye'de Bulunan Ramsar Alanlarının Mevcut Durumlarının ve Ekoturizm Potansiyellerinin Değerlendirilmesi.*(Geçmişten Geleceğe Küçük Asya Anadolu. Editör Mustafa Aça & Mehmet Ali Yolcu.Birinci Baskı, Çanakkale), 659-691.

Mengüllüoğlu, D. (2017). Göksu Deltası Özel Çevre Koruma Bölgesi Saz Horozu (Porphyrio porphyrio) Koruma ve Ġzleme Projesi Kesin Raporu. dogaarastirmalari.org.tr.

Okatan, A. (2021). Bilim Genç. Türkiye'nin Sulak Alanları: Sultan Sazlığı. 02.02.2021. https://bilimgenc.tubitak.gov.tr/yerbilim-gokbilim/turkiyenin-sulak-alanlari-sultan-sazligi

Sevindi, C. (2013). Ekoturizm ve kuş gözlemciliği açısından Kuyucuk Gölü Kuş Cenneti (Arpaçay-Kars). *Türk Coğrafya Dergisi, 61*(1), 63-76.

Sezen, I., Yılmaz, S., & Akpınar Külekçi, E. (2012). Ekoturizm için öneri alanlarıyla Bayburt. *KSÜ Doğa Bilimleri Dergisi, Özel Sayı*, 55-61.

Yel, S. G., & Selvi, H. Z. (2019). Göksu Deltası Özel Çevre Koruma Bölgesi'nde ekoturizme açılabilecek alanların belirlenmesi. *SETSCI Conference Proceedings, 4(*6), 220-227.

Elektronik Kaynaklar

URL 1. Çevreonline, Sulak Alan Nedir? https://cevreonline.com/sulak-alan-nedir/

URL 2. The Wetlands Initiative. http://www.wetlands-initiative.org/what-is-a-wetland

URL 3. T.C. Tarım ve Orman Bakanlığı Doğa Koruma ve Milli Parklae Genel Müdürlüğü. https://www.tarimorman.gov.tr/DKMP/Menu/31/Sulak-Alanlar

URL 4. Spring Water. Ramsar Sözleşmesi ve Türkiye'de Bulunan Ramsar Alanları. https://www.springwater.com.tr/blog/icerik/ramsar-sozlesmesi-ve-turkiye-de-bulunan-ramsar-alanlari

URL 5. Vikipedi Özgür Ansiklopedi. Türkiye'deki Ramsar alanları listesi https://tr.wikipedia.org/wiki/T%C3%BCrkiye%27deki_Ramsar_alanlar%C4%B1_listesi

URL 6. Türkiye'deki Ramsar alanları nelerdir? https://www.google.com/search?q=t%C3%BCrkiyede+%C3%B6nemli+sulak+alanlar+ve+durumu&oq=t%C3%BC&gs_lcrp=EgZjaHJvbWUqBggAECMYJzIGCAAQIxgnMhAIARAuGMcBGLEDGNEDGIAEMgYIAhBFGDkyBggDEEUYOzIPCAQQLhhDGLEDGIAEGIoFMgYIBRBFGD0yBggGEEUYPTIGCAcQRRg90gEINzUyN2owajeoAgiwAgHxBTIldVrLnXX6&sourceid=chrome&source=chrome.ob&ie=UTF-8

URL 7. Türkiye Cumhuriyeti Çevre, Şehircilik ve İklim Değişikliği Bakanlığı. https://tvk.csb.gov.tr/goksu-deltasi-393

URL 8. **Sultan Sazlığı.** https://www.facebook.com/trtavaz/posts/sultan-sazl%C4%B1%C4%9F%C4%B1-milli-park%C4%B1-ve-ramsar-alan%C4%B1-kayseriosmanl%C4%B1-imparatorlu%C4%9Fu **d%C3%B6nemind/717109958357208/**

URL 9. Manyas (Kuş) Gölü. https://ekotaban.tarimorman.gov.tr/alan/568

URL 10. Kayseri Sultan Sazlığı National Park. https://www.google.com/search?sca_esv=3d2f9fa888dd4596&sxsrf=APpeQnu2K8rQTNIqCiqcegQK9x_vXMEKcQ:1790935951747&udm=2&fbs=ABfTbFWfPazdQeYYSro3Hgtr2dRUpkYGOFLxtczpiPPMonK6b0atUYHgVRjjy_HDAjTEFQciuwTQKpVgnnQz3avXeGK_vWyFpX6c6qFFljJKXFX6nQAHXGDKLL83AE2nfVGegQ22OcbtxPavdDQWVRWVn_mjietqx5-K4g_OJxzfOVZ3YdQi8LlkVcurHyflSJvDpVW6sZpgfzfFsA--tbmyMTJM6KXxIh5RR_PAYEuD3uubR9lYWcsU_gKsCttuin2atPwemLq&q=Sultan+Sazl%C4%B1%C4%9F%C4%B1+Ramsar+Alan%C4%B1&sa=X&ved=2ahUKEwibl-CpjJuXAxVLgv0HHd4-CMAQtKgLegQIFxAB&biw=724&bih=339&dpr=2.63

URL 11. Manyas Kuş Cenneti. https://www.google.com/search?sca_esv=3d2f9fa888dd4596&sxsrf=APpeQnuJ1VkLKsfUp6SuJ5Au-MsUGLr5kg:1790935583088&udm=2&fbs=ABfTbFWfPazdQeYYSro3Hgtr2dRUpkYGOFLxtczpiPPMonK6b0atUYHgVRjjy_HDAjTEFQfjuG68nKYQULJEnKkNqMNlxAmECQzrhryS9AS1a1-ZHHQXw8dvfKGSc-EtgtB0Kn0YG6OV7GBFJksC5HJVdx7pEFQxqpkXckcO2URflLpbl2HSgjW1WSRGemrlkQegeTr-PHQFoprB_5hbmRWiApUtlHVv9RJ3RmSrtKOcagLww5SseJpQpMqrb3BAytZb1mGJiet&q=manyas+ku%C5%9F+cenneti&sa=X&ved=2ahUKEwjohPv5ipuXAxVNS_EDHbXHNOAQtKgLegQIFBAB&biw=724&bih=339&dpr=2.63#sv=CAMSXhoyKhBlLXNEaEM5aTVlWTJXLTlNMg5zRGhDOWk1ZVkyVy05TToOVWctZzdQbnE2YWpqb00gBCokCg5BUzJLN0hNdG9vdGJaTRIQZS1zRGhDOWk1ZVkyVy05TRgAMAEYByCBnsbSDkoIEAIYASACKAE

URL 12. T.C. Tarım ve Orman Bakanlığı 11. Bölge Müdürlüğü. https://bolge11.tarimorman.gov.tr/Menu/74/KizilirmakDeltasiURAMSARA

URL 13. Kızılırmak Deltası Ramsar Alanı. https://www.google.com/search?q=K%C4%B1z%C4%B1l%C4%B1rmak+Deltas%C4%B1+Ramsar+Alan%C4%B1&oq=K%C4%B1z%C4%B1l%C4%B1rmak+DeltaSI&gs_lcrp=EgZjaHJvbWUqCAgAEEUYJxg7MggIABBFGCcYOzIJCAEQRRg5GIAEMgcIAhAAGIAEMgcIAxAAGIAEMgcIBBAAGIAEMgcIBRAAGIAEMgYIBhBFGD0yBggHEEUYPNIBCDQxMzNqMGo3qAIAsAIA&sourceid=chrome&source=chrome.ob&ie=UTF-8

URL 14. **Kızılırmak Delta Ramsar Site.** https://www.google.com/search?sca_esv=eba56e73f2efc4d2&sxsrf=APpeQnufWX48tHZkalveWrSWc_kdhQMisw:1790942048709&udm=2&fbs=ABfTbFWfPazdQeYYSro3Hgtr2dRUpkYGOFLxtczpiPPMonK6b0atUYHgVRjjy_HDAjTEFQciuwTQKpVgnnQz3avXeGK_vWyFpX6c6qFFljJKXFX6nQAHXGDKLL83AE2nfVGegQ22OcbtxPavdDQWVRWVn_mjietqx5-K4g_OJxzfOVZ3YdQi8LlkVcurHyflSJvDpVW6sZpgfzfFsA--tbmyMTJM6KX-xIh5RR_PAYEuD3uubR9lYWcsU_gKsCttuin2atPwemLq&q=K%C4%B1z%C4%B1l%C4%B1rmak+Deltas%C4%B1+Ramsar+Alan%C4%B1&sa=X&ved=2ahUKEwiLhYGFo5uXAxWsSfEDHSliAHcQtKgLegQIFBAB&biw=726&bih=339&dpr=2.63#sv=CAMSXhoyKhBlLVk0RTFVVnVodEVpNE9NMg5ZNEUxVVZ1aHRFaTRPTToORFpNREVyVUZKOW1kWE0gBCokCg5tUGVDZTExcUZKOVNlTRIQZS1ZNEUxVVZ1aHRFaTRPTRgAMAEYByD7-In-CkoIEAIYASACKAE

URL 15. Yumurtalık Lagünü Ramsar Alanı. https://ekotaban.tarimorman.gov.tr/alan/5208

URL 16. Burdur Gölü Ramsar Alanı. https://www.google.com/search?q=burdur+g%C3%B6l%C3%BC+ramsar+alan%C4%B1&oq=Burdur+&gs_lcrp=EgZjaHJvbWUqCAgBEEUYJxg7MgYIABBFGDkyCAgBEEUYJxg7Mg8IAhAuGEMYsQMYgAQYigUyDAgDEAAYQxiABBiKBTIHCAQQLhiABDIMCAUQABhDGIAEGIoFMgYIBhBFGDwyBggHEEUYPNIBCDQ5MjVqMGo3qAIAsAIA&sourceid=chrome&source=chrome.ob&ie=UTF-8

URL 17. Seyfe Gölü Ramsar Alanı.
https://www.google.com/search?q=seyfe+g%C3%B6l%C3%BC+ramsar+alan%C4%B1&sca_esv=75f3bce9ede7bd4b&biw=731&bih=339&sxsrf=APpeQnt7qZau-4HF6zZxSwOY7y2LJTlUGg%3A1790241924662&ei=hOy0auyAKICF9u8P7d6a0Ao&oq=Seyfe+G%C3%B6l%C3%BC+ramsar+alan%C4%B1&gs_lp=Egxnd3Mtd2l6LXNlcnAiGlNleWZlIEfDtmzDvCByYW1zYXIgYWxhbsSxKgUIABiABDIFEAAYgAQyBRAAGIAEMgUQABjvBTIFEAAY7wUyBRAAGO8FMgUQABjvBUjUFlDLCFjLCHABeAGQAQCYAfQBoAH0AaoBAzItMbgBAcgBAPgBAvgBAZgCAqACiQLCAgoQABhHGNYEGLADmAMAiAYBkAYIkgcFMS4wLjGgB8cDsgcDMi0xuAf_AcIHBTItMS4xyAcPgAgB&sclient=gws-wiz-serp

URL 18. Uluabat Gölü.
https://www.google.com/search?q=uluabat+g%C3%B6l%C3%BC+ramsar+alan%C4%B1&biw=731&bih=339&sca_esv=75f3bce9ede7bd4b&sxsrf=APpeQntacckd6lk7f7G6NTUhR7C6COXjNg%3A1790243244279&ei=rPG0apzHEJLt7_UPp4HsAU&oq=uluabat++ramsar+alan%C4%B1&gs_lp=Egxnd3Mtd2l6LXNlcnAiFnVsdWFiYXQgIHJhbXNhciBhbGFuxLEqBggBGAcYHjIFEAAYgAQyBhAAGAcYHjIGEAAYBxgeMggQABgFGAcYHjIIEAAYiQUYogQyBRAAGO8FMggQABiABBiiBEjEOVCIC1iiI3ABeAGQAQCYAagBoAHQB6oBAzAuOLgBAcgBAPgBAZgCCKACmgfCAgoQABhHGNYEGLADwgIHEAAYgAQYDZgDAIgGAZAGCJIHAzEuN6AH-SuyBwMwLje4B5EHwgcFMi0xLjfIB1iACAE&sclient=gws-wiz-serp

URL 19. Gediz Deltası.
https://www.google.com/search?q=gediz+deltas%C4%B1+ramsar+alan%C4%B1&biw=731&bih=339&sca_esv=75f3bce9ede7bd4b&sxsrf=APpeQnuB1lGNgcKJQCTH3IDyCkFSBcFdNg%3A1790247049344&ei=iQC1aoTCFLiP-d8PhonryAg&oq=Gediz+Deltas%C4%B1+ramsar+alan%C4%B1&gs_lp=Egxnd3Mtd2l6LXNlcnAiHEdlZGl6IERlbHRhc8SxIHJhbXNhciBhbGFuxLEqBQgAGIAEMgUQABiABDIFEAAYgAQyBRAAGO8FMgUQABjvBTIFEAAY7wVIhRxQ8gVY8gVwAXgBkAEAmAHPAaABzwGqAQMyLTG4AQHIAQD4AQL4AQGYAgKgAuQBwgIKEAAYRxjWBBiwA5gDAIgGAZAGCJIHBTEuMC4xoAfRArIHAzItMbgH2wHCBwUyLTEuMcgHD4AIAQ&sclient=gws-wiz-serp

URL 20. Meke Gölü.
https://www.google.com/search?q=meke+g%C3%B6l%C3%BC+ramsar+alan%C4%B1&biw=731&bih=339&sca_esv=75f3bce9ede7bd4b&sxsrf=APpeQns21POkZkGg1d2wghFiQCaGEq5v_Q%3A1790247268597&ei=ZAG1avuEJL6gigP7rrE8Qo&oq=Meke+G%C3%B6l%C3%BC+ramsar+alan%C4%B1&gs_lp=Egxnd3Mtd2l6LXNlcnAiGU1la2UgR8O2bMO8IHJhbXNhciBhbGFuxLEqBAgAGB4yBBAAGB4yBRAAGO8FMgUQABjvBTIFEAAY7wUyCBAAGIAEGKIESOUuUJMGWKgccAF4AZABAJgBhwOgAZ0LqgEHMS42LjEuMbgBAcgBAPgBAZgCCKAC2AfCAgoQABhHGNYEGLADwgIGEAAYBxgewgIIEAAYCBgHGB6YAwCIBgGQBgiSBwUxLjYuMaAHhyKyBwUwLjYuMbgHzgfCBwUyLTUuM8gHSIAIAQ&sclient=gws-wiz-serp

URL 21. Meke Gölü Tabiat Anıtı. https://ekotaban.tarimorman.gov.tr/alan/127

URL 22. Kuyucuk Gölü.
https://www.google.com/search?q=kuyucuk+g%C3%B6l%C3%BC+ramsar+alan%C4%B1&biw=731&bih=339&sca_esv=75f3bce9ede7bd4b&sxsrf=APpeQnuALlV2LxORVqEgAEcXkiEzCfxHg%3A1790249012007&ei=NAi1aoQDiIH27wx5bP4AQ&oq=Kuyucuk+G%C3%B6l%C3%BC+ramsar+alan%C4%B1&gs_lp=Egxnd3Mtd2l6LXNlcnAiHEt1eXVjdWsgR8O2bMO8IHJhbXNhciBhbGFuxLEqBQgAGIAEMgUQABiABDIEEAAYHjIFEAAY7wUyBRAAGO8FMgUQABjvBTIFEAAY7wVIoiJQoAVYtQtwAXgBkAEAmAGwAaABlgKqAQMwLjK4AQHIAQD4AQL4AQGYAgOgAqkCwgIKEAAYRxjWBBiwA8ICBhAAGAcYHsICBxAAGIAEGA2YAwCIBgGQBgiSBwMxLjKgB84GsgcDMC4yuAekAsIHBTAuMS4yyAcNgAgB&sclient=gws-wiz-serp

URL 23. Kuyucuk Gölü Ramsar Alanı.
https://www.google.com/search?q=Kuyucuk+G%C3%B6l%C3%BC+Ramsar+Alan%C4%B1&oq=KUYUCUK&gs_lcrp=EgZjaHJvbWUqCAgAEEUYJxg7MggIABBFGCcYOzIGCAEQRRg5MggIAhBFGCcYOzIHCAMQLhiABDIHCAQQLhiABDIHCAUQABiABDIGCAYQRRg8MgYIBxBFGDzSAQgzOTQwajBqN6gCALACAA&sourceid=chrome&source=chrome.ob&ie=UTF-8

URL 24. Nemrut Kalderası.
https://www.google.com/search?q=nemrut+kalderas%C4%B1+ramsar+alan%C4%B1&biw=731&bih=339&sca_esv=75f3bce9ede7bd4b&sxsrf=APpeQnuwC_Vv85Rmu4LEXrC9c6FUy72ag%3A1790249701685&ei=5Qq1avy3KaK29u8PodWSmA8&oq=Nemrut+Kalderas%C4%B1+ramsar+alan%C4%B1&gs_lp=Egxnd3Mtd2l6LXNlcnAiH05lbXJ1dCBLYWxkZXJhc8SxIHJhbXNhciBhbGFuxLEqBQgBGIAEMgUQABiABDIFEAAYgAQyBRAAGO8FMgUQABjvBTIFEAAY7wUyBRAAGO8FSNkfUIkFWIkFcAF4AJABAJgBggGgAe8BqgEDMC4yuAEByAEA-AEC-AEBmAICoAKRAcICChAAGEcY1gQYsAOYAwCIBgGQBgiSBwMxLjGgB6QUsgcDMC4xuAeMAcIHAzItMsgHC4AIAQ&sclient=gws-wiz-serp

URL 25. Meke Lake https://www.google.com/search?sca_esv=eba56e73f2efc4d2&sxsrf=APpeQns47ZqCwzg-eLEYVSQDHlbZjYu_gQ:1790942809690&udm=2&fbs=ABfTbFWfPazdQeYYSro3Hgtr2dRUpkYGOFLxtczpiPPMonK6b0atUYHgVRjjy_HDAjTEFQciuwTQKpVgnnQz3avXeGK_vWyFpX6c6qFFljJKXFX6nQAHXGDKLL83AE2nfVGegQ22OcbtxPavdDQWVRWVn_mjietqx5K4g_OJxzfOVZ3YdQi8LlkVcurHyflSJvDpVW6sZpgfzfFsA--tbmyMTJM6KX-xIh5RR_PAYEuD3uubR9lYWcsU_gKsCttuin2atPwemLq&q=%E2%96%BA+Meke+G%C3%B6l%C3%BC&sa=X&ved=2ahUKEwi_te_vpZuXAxWkgv0HHRvlAEIQtKgLegQIFhAB&biw=726&bih=339&dpr=2.63#sv=CAMSURoyKhBlLUZzOE5KcUxmV0piZ29NMg5GczhOSnFMZldKYmdvTToOWDVjV3kwbG9kVkIwWk0gBCoXCgFzEhBlLUZzOE5KcUxmV0piZ29NGAEwARgHIN-it-QHSggQAhgBIAIoAQ

URL 26. Nenrut **Caldera.**
https://www.google.com/search?sca_esv=eba56e73f2efc4d2&sxsrf=APpeQntKarFBHcRnM5eOEB6v_X7sVSJJVQ:1790942850754&udm=2&fbs=ABfTbFWfPazdQeYYSro3Hgtr2dRUpkYGOFLxtczpiPPMonK6bxzDiCFsgARVFi5PA_rffFfwcZLLvlJTFOrvkDBMVLbr20XNYNEplahkbJqwYyNKQ7WbEW6JynQTUPUeKSEtciNlrL2hZcqKcmUaT_BO24zfDz7eJdTsqfKFdQEo_erdmZDcJUDNy7QZhspR94miCZZq1kLMfKo4KreVnExz5aIRW8L_iRFmz8hjOsgC59dQtXb9DUTiHU_BA4Acfpx8betYnxC0&q=Nemrut+Kalderas%C4%B1+Ramsar+Alan%C4%B1&sa=X&ved=2ahUKEwijg7qDppuXAxVH_rsIHWgYHLQQtKgLegQIGxAB&biw=726&bih=339&dpr=2.63#sv=CAMSUROyKhBlLXV3NFd3UEpoTEk1eUlNMg51dzRXd1BKaExJNXlJTToOTHA2TGQxMjNLRnJSQk0gBCoXCgFzEhBlLXV3NFd3UEpoTEk1eUlNGAEwARgHIM-r6IsFSggQAhgBIAIoAQ

URL-27: Kars Kuyucuk Gölü/Yaban Hayatı Geliştirme Sahası. https://eden.ktb. gov.tr/ TR-127829/kars--kuyucuk-golu-yaban-hayati-gelistirme-sahasi. html

Investigating Third-Grade EFL Students' Motivation for Storytelling-Based Vocabulary Instruction: A Mixed-Methods Study

Beyzanur Turgut[1] **Assoc. Prof. Dr. Selma Deneme Gençoğlu**[2]

[1] Trakya University, Institute of Social Sciences, Department of English Language Teaching, Edirne, turgutbeyza0@gmail.com, ORCID: 0009-0002-3489-7525

[2] Trakya University, Faculty of Education, Department of English Language Teaching, Edirne, selmadeneme@trakya.edu.tr, ORCID: 0000-0001-7408-1163

Abstract: Motivation is vital when learning a new language. In this context, intrinsic motivation is a key component of language learning. Storytelling is an important teaching strategy for increasing intrinsic motivation. Motivation is particularly important for students learning English as a foreign language at a young age. The purpose of this study is to investigate third-grade students' motivation toward vocabulary learning based on storytelling and to support these findings with a teacher-researcher reflective journal and student participation records. The study employed a single-group mixed-methods descriptive design and included an 18-hour storytelling intervention. Data collection tools included a motivation scale (nine items) administered to students, a teacher reflective journal, and student participation records. The sample size was eleven, and the participants were third-grade students from a public school attending a special language course at a summer camp. The data reveal that students generally enjoyed the storytelling activities; however, their engagement with cognitive techniques remained relatively limited. Overall, the study's findings indicate that the use of storytelling in vocabulary instruction positively influenced motivation and engagement among third-grade EFL (English as a Foreign Language) students.

Keywords: Motivation, storytelling, young learners, English as a Foreign Language (EFL)

Özet: Yeni bir dil öğrenirken motivasyon hayati öneme sahiptir. Bu bağlamda, içsel motivasyon dil öğreniminin temel bileşenlerinden biridir. Hikâye anlatımı, içsel motivasyonu artırmak için önemli bir öğretim stratejisidir. Motivasyon, özellikle küçük yaşta İngilizceyi yabancı dil olarak öğrenen öğrenciler için büyük önem taşımaktadır. Bu çalışmanın amacı, hikâye anlatımına dayalı kelime öğrenimine yönelik üçüncü sınıf öğrencilerinin motivasyonunu araştırmak ve bu bulguları bir öğretmen-araştırmacı yansıtıcı günlüğü ile öğrenci katılım kayıtlarıyla desteklemektir. Çalışmada tek grup karışık yöntemli betimsel bir tasarım kullanılmıştır ve 18 saatlik bir hikâye anlatımı müdahalesi yer almıştır. Veri toplama araçları arasında öğrencilere uygulanan bir motivasyon ölçeği (dokuz madde), bir öğretmen yansıtıcı günlüğü ve öğrenci katılım kayıtları bulunmaktadır. Örneklem büyüklüğü on birdir ve katılımcılar, bir yaz kampında özel dil kursuna katılan bir devlet okulunun üçüncü sınıf öğrencileridir. Veriler, öğrencilerin genel olarak hikâye anlatımı etkinliklerinden keyif aldıklarını ortaya koymaktadır; ancak bilişsel tekniklere katılımları nispeten sınırlı kalmıştır. Genel olarak, çalışmanın bulguları, kelime öğretiminde hikaye anlatımının kullanılmasının, üçüncü sınıf EFL (Yabancı Dil Olarak İngilizce) öğrencilerinin motivasyonunu ve katılımını olumlu yönde etkilediğini göstermektedir.

Anahtar Kelimeler: Motivasyon, hikâye anlatımı, genç öğrenciler, Yabancı Dil Olarak İngilizce (EFL)

1. INTRODUCTION

This section examines the importance of motivation in foreign language acquisition within the framework of self-determination theory. In this context, it also identifies a gap in the use of storytelling as a pedagogical tool among third-grade EFL students and outlines the research questions.

1.1 Background of the Study

Storytelling has always been seen as a crucial element of human interaction and the safeguarding of culture (Harashchuk, 2025). Through storytelling, people have found ways to pass down their cultures, communication styles, languages, and many nuances of their lives from one generation to the next. In this context, stories play a very important role in language education. Stories not only expose students to authentic language but also give them the opportunity to immerse themselves in those stories.

For children, stories are especially vital. Storytelling procedures serve as a profound method for imparting a foreign language or life lessons to students, particularly the youth (Onu, 2013). Young children give their experiences shape and meaning by narrating them to themselves and others, as numerous studies have highlighted (Pennington, 2009).

In the 21st century, language acquisition has become increasingly important, and motivation is one of the key milestones in language acquisition. Self-determination theory (SDT) offers a comprehensive framework for

comprehending the factors that either enhance or detract from motivation and psychological wellness in educational settings (Ryan & Deci, 2020).

The educational significance of stories and their influence on children's linguistic, cognitive, and affective development have piqued the curiosity of foreign language instructors in their potential as a teaching tool in L2 classrooms (Nikolov et al., 2007). Similarly, using literature in courses can help foreign language teachers excite their students, which is crucial for effective learning (Vural, 2013).

Hayamizu's (1997) research conducted in Japan indicates that students with higher levels of autonomous motivation exhibited greater attention, more profound learning strategies, and more favorable attitudes towards school than their less autonomous counterparts.

1.2 Statement of the Problem

The literature demonstrates that storytelling is an effective method for EFL instruction. Similarly, studies in the literature have shown that motivation is strongly linked to language learning success (Cameron, 2011; Ellis & Brewster, 1991). Nevertheless, most studies have focused on students' success with storytelling or their vocabulary scores. Research on students' perceptions of their own motivation regarding storytelling remains limited in the literature (Çubukçu, 2014; Losi et al., 2022). In particular, within the Turkish context, the number of studies examining the motivational effects of storytelling among third-grade students is still limited. Existing studies have focused either solely on students' quantitative test results or solely on qualitative aspects. Most teachers use storytelling in their classrooms in an adaptive manner. However, classroom-based evidence regarding the actual impact of this practice on student motivation is limited. This knowledge gap in the literature makes it difficult for teachers to make evidence-based decisions regarding the extent to which they should integrate storytelling into their classroom practices. Given this gap, the purpose of this study is to explore third grade students' motivation towards storytelling-based vocabulary instruction, as corroborated by the teacher-researcher's reflective observations.

1.3 Purpose of Study

The primary objective of this study is to explore motivation among third-grade EFL students through storytelling, in conjunction with the reflective observations of the teacher-researcher. Student participation records were also analyzed in the study. To this end, a single-group descriptive mixed methods design was employed over an 18-hour instructional period, using a motivation scale appropriate to the students' developmental level, along with a teacher's journal and student participation records, to provide a triangulated account of students' motivational responses. By focusing on students' self-reported motivation rather than their learning achievements, this study aims to assist EFL teachers in making decisions regarding the integration of storytelling into the classroom based on in-class evidence.

1.4 Research Questions

This study will seek to answer the following questions:

- What is the degree of motivation among third-grade EFL students about storytelling-based vocabulary teaching, as shown by their answers to a motivation scale given at the conclusion of the instructional phase?
- How do the teacher-researcher's reflective journal observations corroborate or elaborate on students' self-reported motivation towards storytelling-based instruction?
- What was the level of active engagement among third-grade children throughout storytelling sessions over the 18-hour instructional timeframe, according to teacher reflective journal?

1.5 Significance of the Study

Since this study examines third-grade students' participation and motivation in the context of storytelling activities, it serves as an important source of data for teachers working in both private and public schools. Furthermore, one of the contributions of this study is to help teachers prepare for the decision-making process regarding the incorporation of storytelling activities into their lessons. In summary, the findings of this study are

expected to contribute to curriculum designers, teachers, educators, school administrators, and all stakeholders in education.

2. LITERATURE REVIEW

This section provides a detailed examination of the concept of intrinsic motivation. It then discusses the effects of storytelling on classroom participation and addresses the shortcomings in this area within the Turkish context.

2.1 Motivation in EFL Learners

There are definitions in the literature regarding intrinsic motivation. Self-determination theory provides a wide framework for analyzing the factors that promote or inhibit motivation and psychological well-being in educational contexts (Ryan & Deci, 2020). Moreover, as stated by Gardner (1985) motivation in the context refers to the combination of effort, desire to attain the objective of learning the language, and favorable attitudes about learning the language. The literature indicates that motivation has many positive effects on language learning and encourages students to engage in the course.

Motivation plays a special role in language learning for young learners. It is vital in the language acquisition process, especially for young learners who are in a crucial phase of cognitive and social development. Intrinsic motivation refers to the desire to engage in an activity or acquire knowledge for personal satisfaction and delight (Bakhromovich, 2022). With intrinsic motivation, students are more eager to attend classes, more open to learning, and more willing to participate in the learning process. Intrinsic motivation emphasizes urges to complete a specific job. Individuals engage in certain activities for personal enjoyment, skill development, or moral reasons (Reena & Bonjour, 2010).

Cameron and Pierce (1994) contend that external incentives enhance children's eagerness to learn, firmly opposing the view that such incentives detrimentally affect students' intrinsic desire. Activities designed to encourage motivation have many positive effects on students. Enhanced motivation to acquire knowledge often propels persons toward elevated accomplishments and educational results (Wardani et al., 2020).

Many studies have been conducted on how motivation influences young learners in their English learning journey. Oga-Baldwin et al. (2017) found that teachers who provide adequate assistance and structure in foreign language sessions increase student engagement and motivation at the end of the year. When considering its role in supporting student motivation and fostering a structured learning environment, storytelling emerges as a pedagogical tool that promises to create a supportive and engaging learning environment.

2.2 Storytelling as a Motivational Pedagogical Tool

Building on this foundation, storytelling has been shown to offer numerous motivational benefits for young learners. The most notable finding of Elkılıç and Akça (2008) study, which involved fourth-grade students enrolled at a private school, was that the participants showed a high degree of motivation to learn English. Similarly, the digital storytelling approach enhanced students' language proficiency, particularly in oral reading fluency and extrinsic motivation, according to Liu et al. (2018), who examined the impact of digital storytelling on students' learning motivation and performance in a formal educational setting.

Beyond its motivational effects, storytelling also incorporates written and spoken language through a great deal of meaningful input (Haznedar & Uysal, 2020) In this regard, Berberyan et al. (2024) claim that engaging in storytelling exercises fosters students' creativity and communication abilities while enabling them to express themselves and share thoughts and feelings with their peers and teachers. In a similar vein, digital storytelling can also boost students' self-esteem and help them develop their social and psychological abilities (Smeda et al., 2014).

Taken together, these findings suggest that storytelling not only supports vocabulary and language development but also occupies an essential feature in shaping young learners' motivation and engagement.

2.3 Related Studies

There are numerous studies in the literature on the effects of storytelling on students. In the Turkish context, a recent study conducted in a preschool setting found that despite their lack of knowledge, the children actively

participated in class (Tekin et al., 2026). Similarly, Canlı's (2019) study on young learners found that they were engaged and interested in the EFL vocabulary acquisition class, enjoying the activities provided during the implementation time.

Recent research indicates that using interactive digital storytelling in an exercise allows students to intervene and build problem-solving abilities connected to the subject matter (Çetinkaya & Demir, 2025). Furthermore, Krashen (2011) believes that storytelling is an effective way to introduce children to books and foster strong reading habits.

Taking all of this into account, previous studies in the literature have observed that storytelling has a positive impact on vocabulary acquisition and language development, as well as on motivation, willingness to participate in class, and a positive classroom environment. However, most studies in the literature have examined only the development of young students in terms of their vocabulary acquisition levels or language performance. Relatively few studies have examined students' motivation in primary school classrooms—particularly in Türkiye—using a mixed-methods research approach. This gap provides the rationale for the present study.

3. METHOD

This section highlights the reasons for selecting a single-group descriptive mixed-methods design for the study. An 18-hour storytelling-based vocabulary instruction process was conducted with a sample consisting of third-grade participants from a public school who participated in a private language course at a summer camp. It is explained in detail that the quantitative part of the study was based on a participant motivation checklist, while the qualitative part was based on the teacher-researcher journal and student participation lists.

3.1 Research Design

This study used a single group descriptive mixed method design to investigate third-grade EFL students' motivations for storytelling-based vocabulary education. This approach was chosen because it permits quantitative data (motivation scale scores) to be interpreted alongside qualitative data (teacher reflective journal and student engagement checklist) acquired from the same set of students, resulting in a triangulated data.

3.2 Participants

The current study was conducted with students. They were third-grade students from a public school who participated in a private language course at a summer camp.

This study was conducted at a private language school in Tekirdağ, in accordance with a written institutional authorization dated July 6, 2026, obtained from the school administration. Consent forms were obtained from participants during the research process, in accordance with the principle of voluntary participation.

3.3 Instructional Procedure

The guided procedure was carried out systematically. First, the teacher reviews the words that students will encounter while searching for the story in class. Then, the teacher plays the story for the students using YouTube. As the story unfolds, the teacher asks the students questions. The teacher-researcher then takes notes while listening to the story. After the story ends, the teacher supports the students with follow-up activities related to the story.

3.4 Data Collection Instruments

The motivation scale used in this study has been adapted from Lena and Nikolov's (2025) study to the theme of storytelling. This survey, consisting of nine items—intrinsic motivation (four items), emotional engagement (one item), cognitive engagement (one item), behavioral engagement (two items), and social engagement (one item)—was administered to students at the conclusion of the storytelling activities. The teacher's reflective journal was maintained by the teacher-researcher after each session. In this context, the teacher observed students' attention, participation, and interest in responding to the story and questions throughout the 18-hour period. The teacher also used open-ended questions to assess students' participation in the lesson, while the frequency of their participation was examined through roll calls by the teacher-researcher.

3.3.1 Motivation Scale

The motivation scale consists of nine items, which have been simplified using emojis and plain language and explained in a way that students can understand and know which option to select. While the students were completing the survey, the teacher read each item aloud and moved on to the next item only after the students had made their selection. To ensure the students felt comfortable, the survey was administered in their native language (Turkish).

3.3.2 Teacher Reflective Journal

A total of five stories were used over the course of the 18-hour class period. Throughout the 18-hour class period during which these stories have been covered, the teacher has kept an open-ended journal about the lessons. This journal systematically documented the students' interest in the activities, their attention to the stories, and their participation in the activities during class.

3.3.3 Student Participation

Throughout this study, attendance records were also taken into account during the 18 hours of storytelling classes. In this context, qualitative data was collected regarding students' willingness to participate in future classes and their motivation toward the classes.

3.4 Data Analysis

3.4.1 Quantitative Component

At the end of the 18-hour educational session, students were given a developmentally appropriate motivation questionnaire, which provided numerical data on their self-reported motivation for storytelling-based vocabulary acquisition.

3.4.2 Qualitative component

Throughout the instructional period, the teacher-researcher kept a reflective notebook to collect observations of classroom behavior, engagement patterns, and contextual factors that could elaborate on or verify the scale result.

3.4.3 Supplemental Component

Student participation records were retained throughout all sessions to give a behavioral, session-by-session measure of active engagement over the whole 18-hour period.

4. RESULTS

In this section, the quantitative and qualitative data collected through the storytelling techniques used in this study are presented by combining the results. The percentages from the nine-item motivation scale administered to participants, the three main themes identified in the teacher's journal, and the analysis results from the student participation list have been consolidated and presented in a concise format under this heading.

4.1 Item –Level Frequency and Percentage Results

As shown in Table 1, the responses to the first item revealed a highly positive attitude toward students (88.9%). However, one student "agreed" with the statement "I really love learning English with stories" (11.1%). None of the nine participants held a negative opinion. In conclusion, all nine participants stated that they enjoy learning through stories. This indicates that stories help boost the motivation of young language learners and, as a result, contribute to more effective language learning.

Table 1 *Frequencies and Percentages of Item 1*

I really love learning English from stories.	Frequency	Percent	Valid Percent	Cumulative Percent
3	1	11.1	11.1	11.1
4	8	88.9	88.9	100.0
Total	9	100.0		

Table 2, on the other hand, includes a question regarding whether students want to use the new vocabulary words outside of school as well. The results show that the majority of the class (66.7%) “strongly agreed.” However, 2 students (22.2%) simply “agreed,” and only one (11.1%) “disagreed.” In summary, cumulatively, the majority of participants (88.9%) indicated that, thanks to storytelling, they were willing to use the vocabulary words outside of school. This result also demonstrates that story-based instruction is authentic and does not remain limited to the target language, but rather sustains students’ interest over time.

Table 2 *Frequencies and Percentages of Item 2*

I want to use the words I learn from stories in my free time, too.	Frequency	Percent	Valid Percent	Cumulative Percent
2	1	11.1	11.1	11.1
3	2	22.2	22.2	33.3
4	6	66.7	66.7	100.0
Total	9	100.0		

Table 3 shows students’ perceptions of the activities as fun and interesting following the storytelling session. The data generally indicates positive responses, with most students (77.8%) “strongly agreed,” and the remaining students (22.2%) “agreed.” The absence of any negative responses indicates that all participants were actively engaged in the lesson during the post-story section. This finding underscores that incorporating storytelling into lessons is a crucial pedagogical tool. When storytelling is combined with game-based methods, teachers can ensure young students’ behavioral engagement and motivation throughout the entire lesson.

Table 3 *Frequencies and Percentages of Item 3*

I am interested in the games and activities that follow the story.	Frequency	Percent	Valid Percent	Cumulative Percent
3	2	22.2	22.2	22.2
4	7	77.8	77.8	100.0
Missing	0	0.0		
Total	9	100.0		

Table 4 sheds light on the participants’ enjoyment of the activities. All results are determined as “strongly participated” (100%). No other responses were recorded. This clear response indicates that storytelling activities were very enjoyable and appealing to the students. From a language acquisition perspective, such a high level of participation is an indicator of intrinsic motivation. This finding reaffirms that storytelling is an effective recreational and pedagogical tool for young language learners.

Table 4 *Frequencies and Percentages of Item 4*

I find story activities fun.	Frequency	Percent	Valid Percent	Cumulative Percent
4	9	100.0	100.0	100.0
Missing	0	0.0		

I find story activities fun.	Frequency	Percent	Valid Percent	Cumulative Percent
Total	9	100.0		

Table 5 presents students' cognitive engagement and word acquisition process during storytelling activities. The data shows that most students (77.7%) "participated actively." In contrast, one student (11.1%) "definitely did not participate," and another student (11.1%) "did not participate." These results reveal that most participants inferred the meanings of unfamiliar words using contextual clues, demonstrating that this is a key cognitive component in language learning. However, despite the presence of negative responses (22.2%), a small majority of young learners may experience difficulty in deriving meaning from context, and emphasis could be placed on vocabulary instruction through additional teacher scaffolding or explicit instruction.

Table 5 *Frequencies and Percentages of Item 5*

While listening to the story, I try to guess the meanings of words I don't know.	Frequency	Percent	Valid Percent	Cumulative Percent
1	1	11.1	11.1	11.1
2	1	11.1	11.1	22.2
4	7	77.8	77.8	100.0
Missing	0	0.0		
Total	9	100.0		

Table 6 shows the participants' self-reported attention levels throughout the storytelling activities. The results indicate that the vast majority of students (88.8%) "participated actively," and one student (11.1%) "participated." No negative responses were recorded. This indicates that all students (100%) maintained their full attention throughout the stories. It is important to capture and sustain the attention of young learners in an EFL setting, and these results confirm that the storytelling approach helped students maintain their attention levels throughout the instructional process.

Table 6 *Frequencies and Percentages of Item 6*

I pay close attention while listening to the story.	Frequency	Percent	Valid Percent	Cumulative Percent
3	1	11.1	11.1	11.1
4	8	88.9	88.9	100.0
Missing	0	0.0		
Total	9	100.0		

Table 7 focuses on participants' social engagement and their willingness to discuss the story with their peers. According to the results, the majority of students (77.7%) "participated strongly," while a portion of the students (22.2%) "participated." No negative responses were found. It is known that this 100% positive approach to storytelling not only affects students' individual attention spans but also plays an effective role in creating and maintaining a respectful and collaborative classroom environment. Students who actively listened to their peers developed strong communication skills and social engagement, which is one of the key characteristics of effective communicative language teaching.

Table 7 *Frequencies and Percentages of Item 7*

I listen carefully when my friends talk about something related to the story.	Frequency	Percent	Valid	Cumulative Percent

I pay close attention while listening to the story.	Frequency	Percent	Valid Percent	Cumulative Percent
3	2	22.2	22.2	22.2
4	7	77.8	77.8	100.0
Missing	0	0.0		
Total	9	100.0		

Table 8 sheds light on students' behavioral engagement and their willingness to participate in post-story speaking tasks. The findings show that the vast majority of students (88.8%) "strongly agreed," and only one student ''agreed.'' No negative responses were recorded. This demonstrates the students' interest in post-storytelling speaking activities. It also indicates that storytelling activities serve as an effective springboard for young learners, successfully motivating them in terms of verbal output and enabling them to engage in classroom discussions by showcasing their productive language skills.

Table 8 *Frequencies and Percentages of Item 8*

I do my best in the conversation activities after the story.	Frequency	Percent	Valid Percent	Cumulative Percent
3	1	11.1	11.1	11.1
4	8	88.9	88.9	100.0

I pay close attention while listening to the story.	Frequency	Percent	Valid Percent	Cumulative Percent
Missing	0	0.0		
Total	9	100.0		

It was observed that 88.9% of students “strongly agreed” and 11.1% “agreed” with the statement “I love storytelling activities” as indicated in Table 9. This serves as a solid indication that young English learners find storytelling activities for vocabulary instruction highly enjoyable and experience this process positively.

Table 9 *Frequencies and Percentages of Item 9*

I love storytelling activities.	Frequency	Percent	Valid Percent	Cumulative Percent
3	1	11.1	11.1	11.1
4	8	88.9	88.9	100.0
Missing	0	0.0		
Total	9	100.0		

4.2 Themes from the Teacher Reflective Journal

Upon reviewing the teacher’s reflective journal, which adopted Braun and Clarke’s (2006) approach, three recurring themes emerged across the six stories: high initial enthusiasm, sustained participation, and active comprehension through question-answering.

High Initial Enthusiasm: According to the teacher’s journal, the participants experienced a high level of emotional engagement during the first story. After the story ‘The Very Hungry Caterpillar,’ the students were highly motivated, and the teacher’s note reads, ‘The students were very excited about the story. Even though some students were familiar with the Turkish version of this story, they were quite eager to participate in the lesson.’’ Additionally, this enjoyment was not limited to ''The Very Hungry Caterpillar'' story: throughout The Emperor's New Clothes storytelling, students expressed obvious enthusiasm regardless of whether they were already familiar with the story from its Turkish version, implying that the storytelling format itself, rather than novelty, contributed to their positive emotional response.

Sustained Participation: Although attention levels sometimes fluctuated during complex and longer stories, overall participation remained consistently high. During the Rapunzel story, the teacher noted, “Even though the

students' attention sometimes wandered or their minds got distracted, their participation remained significantly high." emphasizing that these momentary lapses did not affect their overall willingness to engage.

Active Comprehension through Question-Answering: Throughout various storytelling activities—including "Country Mouse, City Mouse," "The Bear and the Bee," and "The Wind and the Sun"—students answered general comprehension questions correctly. This demonstrates not only their participation in the lesson but also their engagement with the stories and their ability to understand them at a deeper level.

Taken together, these findings indicate that these themes yielded positive and consistent results regarding student engagement in storytelling activities throughout the study. The motivational scale calculated in the quantitative section supports this finding.

4.3 Student Participation Checklist

An analysis of student participation revealed variations in attendance for the 18-hour storytelling activities. While four students (S001–S004) participated in all 18 hours of activities (100%), three students (S005–S007) participated in 15 hours (83.3%) of the activities. Two students (S008–S009) participated for twelve hours (66.7%). Two students (S010–S011) participated for six hours (33.3%).

Because the study was conducted in July, differences in student participation could be attributed to variables such as family vacations. This variability should be considered when analyzing the findings on motivation and involvement, as students who participated in storytelling lessons had less chances to participate in storytelling activities.

Table 10 *Student participation checklist*

Student Code	Attendance (Hours)	Percentage of Total Duration
S001	18	100%
S002	18	100%
S003	18	100%
S004	18	100%
S005	15	83.3%
S006	15	83.3%
S007	15	83.3%
S008	12	66.7%
S009	12	66.7%
S010	6	33.3%
S011	6	33.3%

5. DISCUSSION

The findings of the study are discussed in this section in light of the existing literature. The study also highlights that while participants' motivation toward story-based vocabulary teaching techniques was consistently high, their engagement with cognitive strategies was relatively low. Furthermore, this section summarizes the consistency between self-reports and teacher-researcher journals, as well as the impact of class attendance on the study's results.

5.1 High Overall Motivation Towards Storytelling Activities

In particular, the statement "I find storytelling activities fun," included in the student motivation section, was rated 100% "strongly agreed." This result sheds light on just how much students actually enjoy activities in a storytelling context and indicates that their intrinsic motivation has increased in this regard. Just as in a similar study conducted by Elkılıç and Akça (2008) with fourth-grade students, the findings of this study are consistent with those of the previous research. The results also align with those reported in Canlı's (2019) study, which indicated that young students' interest in and enjoyment of storytelling have increased.

5.2 Comparatively Lower Engagment with Cognitive Strategies

In the student motivation questionnaire, the item involving word prediction from the story was rated “strongly disagreed” by one student and “disagreed” by another. The strategy of inferring meaning from context—that is, contextual inference—may not yet be fully developed among third-grade students. Alternatively, students may have responded this way because this skill is more complex and challenging than cognitive skills such as enjoyment and attention. Teachers can use scaffolding to design activities appropriate for students’ zones of proximal development, or provide explicit instructions in this context.

5.3 Convergence Between Self-Reported Motivation and Observed Behavior

The alignment among the three themes observed in the reflective journal of the teacher appeared to provide an additional level of consistency between the thematic content analysis and the results at the item level in terms of the motivation scale, adding further validity to the conclusions reached in the research. Thus, the first theme – High Initial Enthusiasm – appeared to be highly congruent with the almost unanimous response given to Item 4 ("I find story activities fun" – 100% strong agreement) and Item 9 ("I love storytelling activities" – 88.9% strong agreement), both referring to students' own perception of intrinsic interest in storytelling activities. In turn, the second theme – Sustained Participation – matched the high ratings for Item 6 (attentiveness while listening – 88.9% strong agreement) and Item 7 (careful listening to what the peers say – 77.8% strong agreement). Finally, the third theme – Active Comprehension through Question-Answering – had much weaker links with Item 5 (inferring word meaning in context) with quite diverse responses.

An especially pertinent case in point was observed during the “Emperor’s New Clothes” class, where even though the students were already well aware of the tale in its Turkish version, they still seemed to enjoy themselves. This evidence indicates that the motivation of the students was not prompted by novelty of the story but by the storytelling method used – an aspect that can be related to the idea of intrinsic motivation of self-determination theory proposed by Ryan and Deci (2020).

The consistency between students' self-perceived motivation and teacher-researcher's behavioral observations on an independent basis holds much methodological value. First of all, self-report methods tend to suffer from social desirability bias which means that the way in which students answer questions could be biased since they would answer the way in which they believe they are supposed to rather than based on their true motivations. The consistency between the two types of data makes one more confident about the true nature of motivation.

5.4 The Role of Attendance Variability in Intrepreting Engagment

As is shown in Table 10, there were significant differences in attendance among the students during the 18-hour course, with attendance being either full (18 hours; S001-S004) or low (6 hours; S010-S011). This variation should definitely be taken into account when trying to analyze the motivation findings presented in the study. Students with limited attendance (S008-S011) had less opportunities for participation in the storytelling exercises compared to other participants, which makes one wonder about how reliable and well-informed their end-of-course answers on motivation were compared to the answers given by fully exposed to the intervention participants.

It does not mean that the answers of these students should be ignored; instead, it means that they need to be read as the answers of a sample with different levels of exposure to the intervention, rather than a homogenous sample of participants who underwent the same conditions during the course. The fact that attendance variability seems to be connected with the summer schedule of the course rather than disinterest in the storytelling activities itself should be considered as a context-specific issue.

6. CONCLUSION

The main findings of the study are summarized in this section. Supported by the findings of previous studies and the literature, it has been observed that the storytelling approach provides significant benefits for third-grade EFL students. In addition, this section discusses pedagogical implications, the study’s limitations, and recommendations for future research.

6.1 Conclusion of the Study

This study is based on vocabulary instruction using storytelling on third-graders who typically attend a public school and participated in a private language course during a summer camp. Triangulated data was collected using a student motivation scale, the teacher-researcher's reflective journal, and student participation lists to determine the students' motivational states.

When data from the motivation scale was collected, a consistently high level of motivation was observed among students over time. It was found that students' engagement—categorized as "agreed" and "strongly agreed"—was facilitated through storytelling activities that fostered affective, cognitive, behavioral, and social interaction. Importantly, all participants in the study found the storytelling activities enjoyable, and most participants indicated that they would incorporate the vocabulary they learned in these activities into their real lives. These qualitative findings, along with the teacher-researcher's reflective journal, high levels of enthusiasm, sustained participation, occasional fluctuations in attention, and active learning through question-and-answer sessions, revealed positive results in both data sources.

Taking all of this into account, the study's findings indicate that the storytelling-based approach offers third-grade students numerous benefits in terms of motivation and engagement. These benefits not only encourage students' participation in classroom activities but also help them engage with the target language from a broader perspective.

6.2 Pedagogical Implications

The results of this study have several implications for EFL teachers working with young learners. First, consistently high motivation scores across the intrinsic, emotional, and behavioral dimensions indicate that storytelling can be meaningfully integrated into the EFL curriculum. As a result, students learn vocabulary in a way that is easy to remember and experience less stress. Second, sustained participation allowed the lesson to continue with student engagement, even in the face of occasional momentary distractions. This suggests that while students' attention may be distracted during certain activities, overall attention does not decrease and teachers can adapt to many classroom situations. Finally, the positive responses to post-story follow-up activities highlight that storytelling is a valuable resource for reinforcing vocabulary acquisition through interactive, game-based tasks and for developing productive skills such as speaking and writing.

6.3 Limitations of the Study and Suggestions for Future Research

Several limitations should be kept in mind when interpreting the findings of this study. First, this study was conducted with a single group using a post-only descriptive design and did not include a pretest or a comparison group. These findings describe students' motivation rather than explain it. Second, the small sample size (n=11) limits the generalizability of the findings, and statistical reliability could not be calculated because there was an insufficient sample size. Instead, item-level frequency and percentage analysis were used. Third, variations in student participation (ranging from 6 to 18 hours) may affect the reliability of the self-reported motivation scores. Since the study was conducted during the summer months, these variations may stem from seasonal factors such as vacation. Thus, there is no threat to internal consistency. Fourth, the study may be biased because the teacher served as the researcher. Future studies could be conducted with an independent researcher to ensure the reliability of the study. Finally, since this study was conducted in a single school and classroom, generalizing the findings to other educational settings may be limited.

Future studies could more effectively assess students' motivation toward storytelling through pretest-posttest designs. Larger and more diverse samples, as well as different schools and school environments, could enhance the generalizability of the findings. Additionally, future studies could directly examine the relationship between attendance/exposure levels and motivational outcomes. Furthermore, incorporating different independent evaluators or internal rater reliability measures could strengthen the mixed-methods design.

REFERENCES

Bakhromovich, L. B. (2022). The Importance of Intrinsic Motivation for Young Learners to Enhance Reading Ability at Secondary Schools. *Entral Asian Journal of Literature, Philosophy and Culture*, *03*(05).

Berberyan, A. S., Kukushkina, M. D., & Berberyan, H. S. (2024). Storytelling as a Tool for Promoting Educational Motivation and Psychological Well-Being. In D. Bylieva & A. Nordmann (Eds), *Scenarios, Fictions, and Imagined Possibilities in Science,*

Engineering, and Education (Vol. 1204, pp. 285–307). Springer Nature Switzerland. https://doi.org/10.1007/978-3-031-76800-2_20

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, *3*(2), 77–101. https://doi.org/10.1191/1478088706qp063oa

Cameron, J., & Pierce, W. D. (1994). Reinforcement, Reward, and Intrinsic Motivation: A Meta-Analysis. *Review of Educational Research*, *64*(3), 363–423. https://www.jstor.org/stable/1170677

Canlı, N. (2019). *Exploring the Effects of Digital Storytelling on Young Learners' Motivation, Vocabulary Learning and Retention in Foreign Language Teaching* [Master Dissertion, Cukurova University the Instutute of Social Science Department of English Language Teaching]. https://tez.yok.gov.tr/UlusalTezMerkezi/tezDetay.jsp?id=YUSxkuzbrWHUmxbriDgfTQ&no=aWqUGD4cpUUQYv7WiDDpYQ

Çetinkaya, M., & Demir, İ. C. (2025). The Effect of Interactive Digital Storytelling on the Academic Achievement and Attitudes of 6th Grade Students in Learning the Circulatory System. *International E-Journal of Educational Studies*, *9*(19), 88–101. https://doi.org/10.31458/iejes.1602184

Çubukçu, F. (2014). *A Synergy Between Storytelling and Vocabulary Teaching Through TPRS*. *3*(2), 84–90. https://dergipark.org.tr/en/download/article-file/63639

Elkılıç, G., & Akça, C. (2008). Attitudes of the Students Studying at Kafkas University Private Primary EFL Classroom Towards Storytelling and Motivation. *Journal of Language and Linguistic Studies*, *4*(1). https://dergipark.org.tr/en/download/article-file/104681

Ellis, G., & Brewster, J. (1991). *The Storytelling Handbook: A Guide for Primary Teachers of English*. (Original work published Penguin Books)

Gardner, R. C. (1985). *Social Psychology and Second Language Learning: The Role of Attitudes and Motivation*. London: Edward Arnold. https://doi.org/10.1037/h0083787

Harashchuk, K. (2025). Integrating Storytelling in English Language Teaching: Enhancing Young Learners' Engagement and Comprehension. *Zhytomyr Ivan Franko State University Journal. Pedagogical Sciences*, (1(120)), 229–239. https://doi.org/10.35433/pedagogy.1(120).2025.18

Hayamizu, T. (1997). Between Intrinsic and Extrinsic Motivation: Examination of Reasons for Academic Study based on the Theory of Internalization. *Japanese Psychological Research*, *39*(2), 98–108. https://doi.org/10.1111/1468-5884.00043

Haznedar, B., & Uysal, H. H. (2020). *Handbook for Teaching Foreign Languages to Young Learners in Prşmary Schools* (4th Ed.). (Original work published Anı Yayıncılık)

Krashen, S. D. (2011). Defying Convention, Inventing the Future in Literacy Research and Practice: Essays in Tribute to Ken and Yetta Goodman. In P. Anders (Ed.), *The Goodman-Smith Hypothesis, the Input Hypothesis, the Comprehension Hypothesis and the (even Stronger) Case for Free Voluntary Reading.* (pp. 56–99). New York: Routledge.

Lena, M. S., & Nikolov, M. (2025). Motivation and Task Engagement of Young EFL Learners in Indonesian Primary Schools: Development and Validation of a Questionnaire. *Cogent Education*, *12*(1), 2598731. https://doi.org/10.1080/2331186X.2025.2598731

Liu, K.-P., Tai, S.-J. D., & Liu, C.-C. (2018). Enhancing Language Learning Through Creation: The Effect of Digital Storytelling on Student Learning Motivation and Performance in a School English Course. *Educational Technology Research and Development*, *66*(4), 913–935. https://doi.org/10.1007/s11423-018-9592-z

Losi, R. V., Tasril, V., Widya, R., & Akbar, M. (2022). Using Storytelling to Develop English Vocabulary on Early Age Children Measured by Mean Length Of Utterance (MLU). *International Journal of English and Applied Linguistics (IJEAL)*, *2*(1), 179–187. https://doi.org/10.47709/ijeal.v2i1.1470

Nikolov, M., Djigunović, J. M., Mattheoudakis, M., Lundberg, G., & Flanagan, T. (2007). *Teaching Modern Languages to Young Learners*. Council of Europe Publishing.

Oga-Baldwin, W. L. Q., Nakata, Y., Parker, P., & Ryan, R. M. (2017). Motivating Young Language Learners: A Longitudinal Model of Self-Determined Motivation in Elementary School Foreign Language Classes. *Contemporary Educational Psychology*, *49*, 140–150. https://doi.org/10.1016/j.cedpsych.2017.01.010

Onu, N. (2013). Teaching English to Young Leaners Through Storytelling. *Linguaculture*, *4*(2), 133–143. https://www.researchgate.net/publication/359783807_Teaching_English_to_Young_Learners_Through_Storytelling

Pennington, G. (2009). Storytelling in the Second Language Classroom. *TESOL in Context*, *19*(1), 5–22.

Reena, B., & Bonjour, R. H. (2010). *Motivation: Extrinsic and Intrinsic*. https://scispace.com/pdf/motivation-extrinsic-and-intrinsic-27qq3hgunt.pdf

Ryan, R. M., & Deci, E. L. (2020). Intrinsic and Extrinsic Motivation from a Self-Determination Theory Perspective: Definitions, Theory, Practices, and Future Directions. *Contemporary Educational Psychology*, *61*, 101860. https://doi.org/10.1016/j.cedpsych.2020.101860

Smeda, N., Dakich, E., & Sharda, N. (2014). The Effectiveness of Digital Storytelling in the Classrooms: A Comprehensive Study. *Smart Learning Environments*, *1*(1), 6. https://doi.org/10.1186/s40561-014-0006-3

Tekin, S., Baykara, T., & Garton, S. (2026). Exploring Storytelling Practices of Pre-Service Teachers with Young EFL Learners in the Turkish Primary Context. *European Early Childhood Education Research Journal*, 1–23. https://doi.org/10.1080/1350293X.2026.2650364

Temel, T., & Yılmaz, C. (2025). Investigating the Impact of Digital Storytelling on EFL Learners' Language Motivation Levels. *Journal of Educational Technology and Online Learning*, *8*(2), 164–189. https://doi.org/10.31681/jetol.1600975

Urba, T. K. (2025). *Young Learners Motivation for Learning English: A Thematic Review*.

USING STORYTELLING AS EDUCATIONAL TOOL. (n.d.).

Vural, H. (2013). Use of Literature to Enhance Motivation in ELT Classes. *Mevlana International Journal of Education*, *3*(4), 15–23. https://doi.org/10.13054/mije.13.44.3.4

Wardani, A. D., Gunawan, I., Kusumaningrum, D. E., Benty, D. D. N., Sumarsono, R. B., Nurabadi, A., & Handayani, L. (2020). Student Learning Motivation: A Conceptual Paper. *Proceedings of the 2nd Early Childhood and Primary Childhood Education (ECPE 2020)*. 2nd Early Childhood and Primary Childhood Education (ECPE 2020). https://doi.org/10.2991/assehr.k.201112.049

Excise Taxes, Inflation, and Illicit Tobacco Consumption: Evidence from Nonlinear Panel Models

Prof.Dr. Utku ALTUNÖZ[1]

[1] Department of Banking and Finance, Sinop University, 57000 Sinop, Türkiye, *Corresponding author(s). E-mail(s): utkual@hotmail.com

Abstract: Many governments use tobacco excise taxes to reduce smoking and raise revenue, yet their effectiveness varies widely across countries and over time. Evidence increasingly indicates that inflation reshapes consumer reactions to tax-driven price increases by strengthening incentives to substitute toward illicit tobacco. This study investigates the combined effects of excise taxes and inflation on illicit tobacco consumption across countries facing different inflation regimes. Allowing for nonlinear behavioral responses, the analysis finds that modest excise tax increases have limited impact while tax levels remain below critical thresholds. Once these thresholds are crossed, behavior shifts sharply, producing a strong move toward illicit tobacco. Inflation moderates this relationship by eroding real purchasing power and lowering the effective tax threshold at which substitution becomes attractive. Thresholds differ substantially across countries. In developing economies—where inflation is typically higher—thresholds are markedly lower, so similar tax hikes trigger disproportionately larger shifts to illicit consumption. These results underscore the role of macroeconomic conditions in shaping excise tax effectiveness and suggest that raising tobacco taxes during high inflation can be counterproductive unless paired with strong enforcement and careful policy timing.

Introduction

Tobacco excise taxation is widely used to address public health concerns while also generating government revenue. A large empirical literature documents a negative relationship between cigarette prices and smoking prevalence, especially in the long run and among price-sensitive groups (Chaloupka, Yurekli, & Fong, 2012; World Health Organization, 2015). These findings position tobacco taxation as a core health policy tool. Yet its effectiveness cannot be evaluated independently of the macroeconomic environment in which it is implemented.

High inflation complicates excise tax design and outcomes by eroding real purchasing power, disproportionately affecting low- and middle-income households. Instead of producing gradual reductions in consumption, inflation may encourage smokers to change purchasing channels. Research shows that sharp increases in legal cigarette prices often lead consumers to substitute toward cheaper options, including illicit tobacco (Merriman, 2010; Joossens & Raw, 2012). Such substitution weakens health gains, reduces the tax base, and raises monitoring and enforcement costs.

These patterns imply that the link between excise taxation and illicit consumption is unlikely to be linear. Moderate tax increases may curb legal cigarette consumption without substantially expanding illicit markets, whereas very high taxes may generate a tipping point at which consumers shift more rapidly toward illegal products (Becker, Grossman, & Murphy, 1994; Chaloupka & Warner, 2000). Cross-country evidence also points to substantial heterogeneity, with illicit-market outcomes shaped by enforcement capacity, income, and cross-jurisdiction price differentials (Merriman, Yurekli, & Chaloupka, 2000; Yurekli & Sayginsoy, 2010).

Inflation is a critical but underexplored element in this framework. Beyond raising nominal prices, inflation changes the real value of incomes, taxes, and relative prices, and its real effects depend on institutional arrangements and on whether inflation is anticipated (Fischer & Modigliani, 1978). Distributional evidence further shows that inflation is especially burdensome for lower-income households (Easterly & Fischer, 2001). These mechanisms can increase the salience of affordability and strengthen incentives to search for cheaper tobacco products. Whether this adjustment occurs within the legal market or through illicit purchasing is therefore an empirical question rather than an assumption imposed by the model.

These dynamics are particularly salient in developing and emerging economies, where inflation is often more volatile and enforcement capacity may be more constrained. Tobacco tax increases can still generate substantial public-health and revenue gains (Goodchild, Perucic, & Nargis, 2016), but illicit-trade outcomes depend importantly on enforcement, market structure, and the incentives created by price differentials (Yurekli & Sayginsoy, 2010). Understanding how inflation conditions this relationship is therefore essential to balancing revenue, public-health goals, and compliance.

Accordingly, this study examines the joint effects of tobacco excise taxation and inflation on illicit tobacco use within a nonlinear empirical framework. It identifies threshold effects and tests whether inflation lowers the tax level at which illicit substitution becomes more likely, recognizing that consumers may absorb gradual price increases up to a point before adjusting behavior abruptly. The study contributes by (i) providing systematic evidence on the inflation–tax interaction in shaping illicit consumption, (ii) applying nonlinear econometric techniques to detect threshold behavior, and (iii) offering policy insights on when tax increases may become ineffective or counterproductive, especially in inflation-prone economies.

1. LITERATURE REVIEW

1.1 Tobacco Excise Taxes and Consumption

The economic case for tobacco taxation is well established in public health and public finance. Empirical evidence consistently shows that cigarette demand is price-inelastic but responsive: excise tax increases raise retail prices, reduce consumption, and generate significant revenue (Chaloupka & Warner, 2000; Chaloupka et al., 2012). These effects are often stronger over longer horizons as consumers adjust smoking intensity, initiation, and cessation decisions. Responsiveness also varies across groups; younger and lower-income individuals tend to react more strongly to price increases due to tighter budget constraints and higher affordability sensitivity (Grossman & Chaloupka, 1997; Tauras, 2006). Importantly, these outcomes depend on how consumers adjust within legal markets: moderate price increases may shift demand across legal brands or products, whereas larger increases can push adjustment beyond the formal market.

1.2 Tobacco Taxation and Illicit Trade

A growing literature highlights the possibility that higher excise taxes may increase incentives for smuggling, counterfeit production, or domestic tax evasion, thereby weakening revenue and regulatory control when enforcement is insufficient (Joossens & Raw, 2012). Early cross-country work shows that illicit trade differs markedly across institutional and market settings (Merriman et al., 2000). Subsequent evidence emphasizes enforcement capacity and price differentials as central determinants of illicit-market activity (Merriman, 2010; Yurekli & Sayginsoy, 2010). Illicit trade is therefore not an automatic consequence of higher taxes, and estimates based on tobacco-industry-sponsored data require particular caution because of transparency and measurement concerns (Gilmore et al., 2014). Independent global and multi-country estimates likewise show wide variation in illicit cigarette market shares across countries (Joossens et al., 2010; Goodchild et al., 2022). This heterogeneity supports a nonlinear framework in which substitution toward illicit products may intensify only after legal prices and affordability pressures cross country-specific thresholds.

1.3 Inflation, Real Income, and Consumer Behaviour

While tobacco taxation has been studied extensively, inflation is often treated as a secondary background variable despite its direct influence on purchasing power and affordability. Persistent inflation can make household budget constraints more binding and alter the real effects of tax-induced price increases relative to periods of price stability (Fischer & Modigliani, 1978). Distributional effects can amplify this mechanism because lower-income households are especially exposed to inflation-related welfare losses (Easterly & Fischer, 2001). Under such conditions, excise tax increases may make cheaper alternatives more attractive. The key empirical issue is whether this affordability channel strengthens illicit substitution, particularly in developing and emerging economies characterized by greater inflation volatility and less uniform enforcement capacity.

1.4 Nonlinearities and Threshold Effects in Tobacco Markets

Several theoretical perspectives suggest that responses to tobacco taxation may be nonlinear rather than smooth. Addiction, habit persistence, and binding income constraints can generate limited responses to small price changes but more pronounced adjustments when price shocks become large (Becker & Murphy, 1988; Deaton, 1997). In this setting, illicit substitution may intensify once legal prices cross affordability thresholds. From a public-finance perspective, high tax differentials can also increase incentives for evasion or smuggling when expected enforcement costs are insufficient (Slemrod & Yitzhaki, 2002; Cnossen, 2006). However, studies

that jointly model excise taxes, inflation, and illicit consumption within a unified nonlinear framework remain limited, leaving an important gap in understanding how inflation conditions tax effectiveness.

1.5 Contribution to the Literature

This study addresses this gap by integrating inflation dynamics into the analysis of tobacco excise taxation and illicit tobacco use within a nonlinear framework. It explicitly tests whether inflation lowers the excise-tax level at which illicit substitution intensifies and whether post-threshold responses are amplified under higher inflation. By linking public finance, macroeconomics, and informal market behavior, the study provides new evidence on when tobacco taxes remain effective and when they may become less effective or counterproductive.

2. CONCEPTUAL FRAMEWORK AND HYPOTHESES

Tobacco excise taxation affects consumption through both price and income channels. Standard consumer theory predicts that higher excise taxes raise retail prices and reduce legal cigarette demand, which is typically price-inelastic (Chaloupka & Warner, 2000). In addictive markets, however, adjustment is neither immediate nor linear: the rational addiction framework emphasizes stronger behavioral responses to large and persistent price changes than to small or temporary ones (Becker & Murphy, 1988). Inflation modifies this mechanism by altering the real burden of taxation and the affordability of legal cigarettes. Under low and stable inflation, tax-driven price changes are more predictable, allowing gradual adjustment within the legal market. Under high inflation, real disposable income declines and price uncertainty rises, making legal purchases relatively more burdensome and changing the conditions under which consumers respond to excise increases.

From a public-finance perspective, excise taxes are levied as specific (per-unit) or ad valorem (percentage) taxes, and governments may adjust rates to maintain their real value. When nominal cigarette prices rise faster than household income, affordability constraints become more binding and increase incentives to substitute toward cheaper products (Blecher & van Walbeek, 2009). Illicit consumption can therefore be interpreted as a substitution choice shaped by relative prices and enforcement frictions. When the legal–illegal price gap becomes sufficiently large, consumers may accept legal risks and quality uncertainty, particularly where expected enforcement costs are low (Slemrod & Yitzhaki, 2002; Yurekli & Sayginsoy, 2010). Inflation can strengthen this affordability channel by reducing real purchasing power, but the direction and magnitude of its effect on illicit purchasing must be established empirically.

These mechanisms imply potentially nonlinear responses. Consumers may initially cope with higher prices by reducing quantities or reallocating spending, but once affordability thresholds are crossed, switching to illicit products may accelerate and produce regime-like changes rather than smooth adjustments. This logic is consistent with public-finance arguments that very large tax differentials can strengthen evasion and smuggling incentives when enforcement does not rise proportionately (Cnossen, 2006; Yurekli & Sayginsoy, 2010). Inflation is expected to shift the relevant threshold inward by magnifying affordability pressure, so a tax increase that is modest under low inflation may induce a stronger illicit-market response under high inflation. Modelling tax–inflation interactions and threshold effects is therefore necessary to capture behavioral shifts that linear specifications may obscure.

Building on this framework, the study tests four hypotheses. Excise taxes are expected to reduce legal tobacco consumption but increase illicit tobacco consumption once tax-induced price increases surpass a critical threshold (H1). Inflation is expected to amplify the positive effect of excise taxes on illicit consumption by eroding purchasing power and increasing price uncertainty (H2). The excise-tax threshold at which illicit consumption accelerates is expected to be lower in high-inflation regimes than in low-inflation regimes (H3). Finally, the tax–illicit link is expected to be stronger in emerging economies than in advanced economies due to differences in enforcement capacity and inflation volatility (H4).

3. DATA AND VARIABLES

This study uses an unbalanced country-year panel assembled from the sources listed in Table 1. The estimation sample is restricted to observations for which the illicit-cigarette market-share measure, tobacco excise burden, CPI inflation, and baseline controls are simultaneously available. Because coverage of illicit-market estimates is uneven across countries and years, the panel is unbalanced. The analysis focuses on the interaction between

tobacco excise taxation, inflation, and illicit tobacco consumption. The choice of variables follows the theoretical framework and the empirical literature on tobacco taxation, illicit trade, and macroeconomic instability.

To ensure comparability across countries, all monetary variables are expressed in real terms where appropriate, and logarithmic transformations are applied to reduce skewness and interpret coefficients as elasticities. Illicit tobacco consumption, which cannot be observed directly, is proxied using established indirect measures widely adopted in the literature. Control variables are included to account for income effects, enforcement capacity, and demographic factors that may influence tobacco consumption behavior.

Table 1: Variable Definitions, Symbols, and Data Sources

Variable	Symbol	Definition	Source
Illicit tobacco consumption	ITC_{it}	Share of illicit cigarette consumption in total cigarette market (%)	Independent country estimates from published/official sources; methodological benchmarks: Joossens et al. (2010) and Goodchild et al. (2022)
Tobacco excise tax	TAX_{it}	Total excise tax burden on cigarettes (% of retail price)	WHO Report on the Global Tobacco Epidemic / WHO country profiles
Inflation rate	INF_{it}	Annual consumer price inflation (CPI, %)	World Bank – WDI
Legal cigarette price	P_{it}	Retail price of a standard cigarette pack (real terms)	WHO country profiles; Euromonitor Passport (licensed, where used)
Real GDP per capita	Y_{it}	GDP per capita (constant prices, USD)	World Bank – WDI
Unemployment rate	$UNEMP_{it}$	Total unemployment rate (%)	World Bank – WDI
Trade openness	$OPEN_{it}$	(Exports + Imports) / GDP	World Bank – WDI
Institutional quality	$INST_{it}$	Rule of Law index	Worldwide Governance Indicators
Border price differential	BPD_{it}	Domestic cigarette price relative to neighbouring countries	WHO country profiles; Euromonitor Passport (licensed, where used)

In Table 1, the dependent variable, illicit tobacco consumption, is measured as the estimated share of illicit cigarettes in total cigarette consumption. Because illicit trade cannot be observed directly and measurement approaches differ across countries, the study relies on independent published or official estimates and uses the global and multi-country evidence in Joossens et al. (2010) and Goodchild et al. (2022) as methodological benchmarks. The variable should therefore be interpreted as an estimated market share rather than a directly observed consumption measure.

Tobacco excise taxation is defined as the total excise burden, including specific and ad valorem components, expressed as a percentage of the retail price. Inflation is measured using the CPI to capture overall price instability faced by consumers. Real GDP per capita and unemployment rate are included to control for income and labor market conditions, while trade openness and border price differentials capture incentives for cross-border smuggling. Institutional quality accounts for enforcement capacity and regulatory effectiveness.

4. ECONOMETRIC METHODOLOGY

4.0. Notation, transformations, and baseline setup

Countries are indexed by i = 1, …, N and years by t = 1, …, T. The dependent variable is the share of illicit/illegal tobacco consumption, denoted by ITC_{it} (in percent). For interpretability and to reduce skewness, Equation (1) defines the transformed outcome variable used in the baseline estimations:

$$y_{it} = \ln(ITC_{it} + 1) \quad (1)$$

Baseline covariates include the total excise tax burden on tobacco, TAX_{it} (as a percentage of the retail price), and inflation, INF_{it} (CPI growth, %). Equation (2) defines the vector of controls used across specifications:

$X_{it} = (\ln GDPpc_{it}, UNEMP_{it}, OPEN_{it}, INST_{it}, BPD_{it}, \ln PRICE_{it})'$ (2)

Variable definitions are provided in Table 1.

4.1. Two-way fixed effects with inflation–tax interaction

To test whether inflation amplifies the effect of excise taxation on illicit consumption, we estimate a two-way fixed effects (TWFE) model with an interaction term. Equation (3) presents the baseline TWFE specification with country and year fixed effects:

$y_{it} = \alpha_i + \lambda_t + \beta_1 TAX_{it} + \beta_2 INF_{it} + \beta_3 (TAX_{it} \times INF_{it}) + \gamma' X_{it} + u_{it}$ (3)

In Equation (3), α_i captures time-invariant country heterogeneity and λ_t captures common time shocks. The interaction coefficient β_3 indicates whether the tax effect becomes stronger when inflation is higher. The inflation-conditional marginal effect of taxation implied by Equation (3) is reported in Equation (4):

$\partial y_{it} / \partial TAX_{it} = \beta_1 + \beta_3 INF_{it}$ (4)

Thus, $\beta_3 > 0$ implies that higher inflation strengthens the tax–illicit consumption linkage. Robust inference is based on heteroskedasticity- and autocorrelation-robust standard errors clustered at the country level.

4.1.1. Dynamic persistence extension (habit formation / market persistence)

Illicit market shares may be persistent due to habit formation, enforcement frictions, or network effects. To account for persistence, we consider a dynamic panel extension. Equation (5) augments the baseline model with a lagged dependent variable:

$y_{it} = \alpha_i + \lambda_t + \rho y_{i,t-1} + \beta_1 TAX_{it} + \beta_2 INF_{it} + \beta_3 (TAX_{it} \times INF_{it}) + \gamma' X_{it} + \varepsilon_{it}$ (5)

Because fixed-effects estimation of Equation (5) may be biased in panels with a relatively short time dimension, System-GMM is used as a robustness check, following the moment-condition framework developed by Arellano and Bover (1995) and Blundell and Bond (1998). Equation (6) summarizes the key orthogonality condition.

$E[z_{i,t-s} \Delta \varepsilon_{it}] = 0, \; s \geq 2$ (6)

In Equation (6), z denotes appropriately lagged instruments. Over-identifying restrictions are evaluated using Hansen/Sargan tests, while second-order serial correlation in differenced residuals is assessed using the AR(2) test.

4.2. Panel threshold model (Hansen-type regime switching)

To examine whether taxation effects change discontinuously beyond a critical excise level, the analysis applies the fixed-effects panel threshold framework of Hansen (1999). Equation (7) allows the slope on TAX_{it} to differ below and above an unknown threshold γ.

$y_{it} = \alpha_i + \lambda_t + \theta' X_{it} + \beta\_L \, TAX_{it} \, I(TAX_{it} \leq \gamma) + \beta\_H \, TAX_{it} \, I(TAX_{it} > \gamma) + e_{it}$ (7)

In Equation (7), $I(\cdot)$ is the indicator function. The threshold γ is obtained by grid search, and Equation (8) defines the estimator as the value that minimizes the sum of squared residuals, following Hansen (1999).

$\hat{\gamma} = \arg\min_{\{\gamma \in \Gamma\}} \Sigma_i \Sigma_t \, e_{it}(\gamma)^2$ (8)

Because the asymptotic distribution of the threshold test is non-standard, statistical significance is assessed using bootstrap procedures. Confidence regions are constructed from the likelihood-ratio statistic in Equation (9), consistent with Hansen (1999).

$LR(\gamma) = [SSR(\gamma) - SSR(\hat{\gamma})] / \hat{\sigma}^2$ (9)

4.2.1. Regime-specific inflation moderation (threshold + interaction within regimes)

To allow inflation to moderate tax effects differently across regimes, we estimate the regime-specific interaction model. Equation (10) introduces inflation-moderated slopes for TAX_{it} below and above the threshold:

$y_{it} = \alpha_i + \lambda_t + \theta' X_{it} + [\beta\_L + \phi\_L \, INF_{it}] TAX_{it} \, I(TAX_{it} \leq \gamma) + [\beta\_H + \phi\_H \, INF_{it}] TAX_{it} \, I(TAX_{it} > \gamma) + v_{it}$ (10)

The inflation-conditional marginal tax effect implied by Equation (10) is summarized in Equation (11):

$\partial y_{it}/\partial TAX_{it} = \{\beta\_L + \phi\_L\, INF_{it},\ TAX_{it} \le \gamma;\ \beta\_H + \phi\_H\, INF_{it},\ TAX_{it} > \gamma\}$ (11)

4.3. Inflation-conditional thresholds (two-stage regime structure)

To directly reflect the idea that the tax threshold itself shifts under high inflation, we first define an inflation regime indicator. Equation (12) defines the high-inflation regime:

$D_{it} = I(INF_{it} > \pi)$ (12)

The tax threshold is then allowed to differ by inflation regime. Equation (13) defines the regime-dependent threshold:

$\gamma(D_{it}) = \gamma\_L(1 - D_{it}) + \gamma\_H\, D_{it}$ (13)

Finally, Equation (14) presents the inflation-conditional threshold model in which both the relevant threshold and the tax slope differ across inflation regimes:

$y_{it} = \alpha_i + \lambda_t + \theta' X_{it} + \beta\_L0 TAX_{it} I(TAX_{it} \le \gamma\_L)(1-D_{it}) + \beta\_L1 TAX_{it} I(TAX_{it} > \gamma\_L)(1-D_{it}) + \beta\_H0 TAX_{it} I(TAX_{it} \le \gamma\_H) D_{it} + \beta\_H1 TAX_{it} I(TAX_{it} > \gamma\_H) D_{it} + \eta_{it}$ (14)

This specification provides a direct test of whether the critical excise threshold is lower under high inflation, i.e., $\gamma\_H < \gamma\_L$.

4.4. Estimation and robustness

All specifications include country fixed effects (α_i) and year fixed effects (λ_t). Inference is based on heteroskedasticity- and autocorrelation-robust standard errors clustered at the country level. Threshold significance and confidence sets rely on bootstrap p-values and LR-based intervals following Hansen (1999). Robustness checks include: (i) using ITC_{it} in levels instead of the log transformation in Equation (1), (ii) alternative illicit-measure proxies where available, (iii) trimming outliers, (iv) subgroup estimation for advanced and emerging economies, and (v) the dynamic System-GMM specification described in Section 4.1.1.

5. EMPIRICAL RESULTS

This section presents the empirical findings on the relationship between tobacco excise taxes, inflation, and illicit tobacco consumption. The results are reported in a stepwise manner. First, descriptive statistics are discussed to provide an overview of the data. Second, baseline fixed-effects estimates are presented. Finally, nonlinear threshold results are reported to assess whether inflation alters the tax–illicit consumption relationship.

5.1 Descriptive Statistics

Before proceeding to the econometric analysis, Table 2 reports summary statistics for the main variables used in the study. This preliminary analysis provides insights into cross-country variation in tobacco taxation, inflation, and illicit tobacco consumption.

Table 2: Descriptive Statistics

Variable	Mean	Std. Dev.	Min	Max
ITC_{it}	11.8	7.4	1.2	38.5
TAX_{it}	62.3	9.6	28.0	85.0
INF_{it}	6.9	8.1	-1.4	65.2
Y_{it}	18,450	14,210	1,120	72,300
$UNEMP_{it}$	7.6	3.9	2.1	26.4
$INST_{it}$	0.21	0.83	-1.65	1.95

Illicit tobacco use displays substantial cross-country dispersion, ranging from very low shares in some observations to nearly 40% of the cigarette market in others. Excise burdens are also heterogeneous, although their sample mean is relatively high. Inflation varies even more sharply, including episodes of deflation and very high inflation. This dispersion supports examining whether the tax–illicit-consumption relationship changes across inflation regimes rather than imposing a single linear response.

5.2 Baseline Fixed-Effects Results

Table 3 reports the baseline fixed-effects estimates examining the linear relationship between tobacco excise taxes, inflation, and illicit tobacco consumption. Country and time fixed effects are included in all specifications.

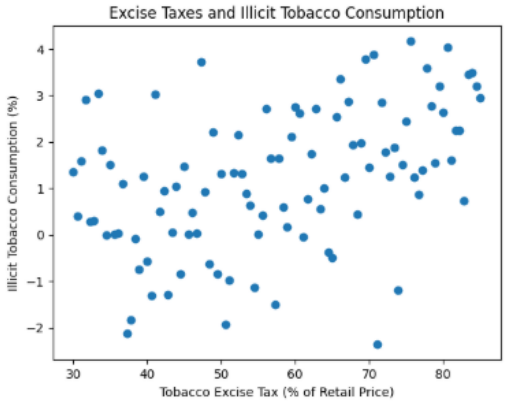
Table 3: Baseline Fixed-Effects Estimates

Variable	(1)	(2)	(3)
TAX_{it}	0.082***	0.067***	0.041**
	(0.021)	(0.019)	(0.018)
INF_{it}		0.036**	0.021
		(0.015)	(0.014)
$TAX_{it} \times INF_{it}$			0.004***
			(0.001)
Controls	Yes	Yes	Yes
Country FE	Yes	Yes	Yes
Time FE	Yes	Yes	Yes
R^2	0.41	0.45	0.52

Robust standard errors clustered at the country level are reported in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

The baseline results indicate a positive and statistically significant relationship between excise taxes and illicit tobacco consumption. Inflation also exerts an independent positive effect, although its magnitude diminishes once the interaction term is included. Importantly, the interaction between excise taxes and inflation is positive and highly significant, suggesting that inflation amplifies the impact of taxation on illicit consumption. This finding provides initial empirical support for Hypothesis H2. Figure 1 illustrates the unconditional relationship between tobacco excise taxes and illicit tobacco consumption.

Figure 1: Excise Taxes and Illicit Tobacco Consumption



The visual evidence suggests that the relationship between taxation and illicit consumption is not constant across the distribution of excise tax levels, motivating the use of nonlinear estimation techniques.

5.3 Threshold Effects of Tobacco Excise Taxes

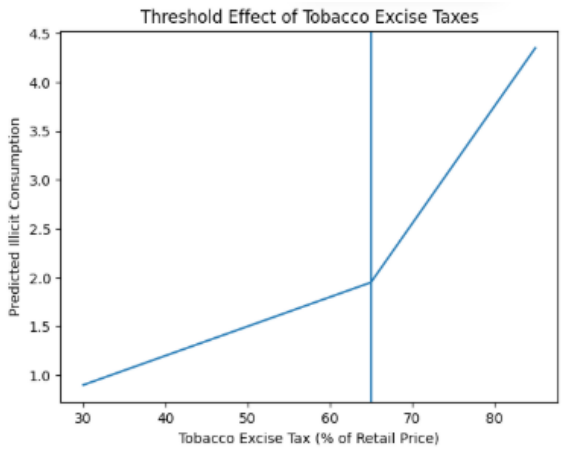
While the baseline estimates assume linearity, the theoretical framework predicts nonlinear responses once taxation exceeds critical levels. To test this prediction, a panel threshold model is estimated.

Table 4: Threshold Estimates for Tobacco Excise Taxes

Regime	Tax Coefficient
$TAX_{it} \leq \tau$	0.029 (0.018)
$TAX_{it} > \tau$	0.121*** (0.031)
Estimated threshold (τ)	64.7
Bootstrap p-value	0.01

The threshold results reveal a pronounced nonlinear pattern. Below the estimated threshold of approximately 65 percent of the retail price, excise taxes have a modest and statistically insignificant effect on illicit consumption. Once this threshold is exceeded, the tax coefficient more than quadruples and becomes highly significant. This finding supports Hypothesis H1, indicating that illicit substitution accelerates beyond a critical tax burden. To visualize the estimated tax threshold, Figure 2 plots predicted illicit consumption across different tax regimes.

Figure 2. Threshold Response Function



The sharp change in slope beyond the threshold supports the hypothesis of discrete behavioral shifts rather than gradual adjustments.

5.4 Inflation-Conditional Threshold Results

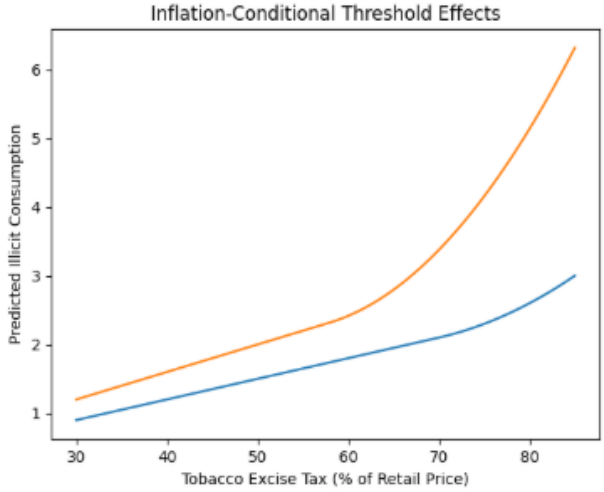
To examine whether inflation shifts the tax threshold, the sample is divided into low- and high-inflation regimes.

Table 5: Inflation-Conditional Threshold Estimates

Inflation Regime	Tax Threshold	Tax Coefficient Above Threshold
Low inflation	68.9	0.097**
High inflation	58.3	0.154***

The results demonstrate that inflation significantly alters the tax–illicit consumption relationship. In high-inflation environments, the threshold level of excise taxation is substantially lower, and the marginal effect of taxes on illicit consumption is considerably stronger. These findings provide strong empirical support for Hypothesis H3, confirming that inflation magnifies nonlinear responses to excise taxation. Figure 3 compares tax thresholds across inflation regimes.

Figure 3 – Inflation-Conditional Thresholds



This figure provides visual confirmation that inflation amplifies the nonlinear impact of excise taxation on illicit tobacco consumption.

5.5 Advanced vs. Emerging Economies

Finally, the analysis compares results across advanced and emerging economies.

Table 6: Heterogeneity Across Country Groups

Country Group	Tax Coefficient
Advanced economies	0.041*
Emerging economies	0.132***

The effect of excise taxation on illicit tobacco consumption is markedly stronger in emerging economies, consistent with weaker enforcement capacity and higher inflation volatility. This result supports Hypothesis H4 and underscores the importance of tailoring tobacco tax policies to macroeconomic and institutional conditions.

6. POLICY IMPLICATIONS AND CONCLUSION

This study examines the joint effects of tobacco excise taxation and inflation on illicit tobacco consumption using a nonlinear panel framework. The results show that the tax–illicit consumption relationship is not linear: illicit substitution remains limited at lower tax levels but accelerates once excise burdens exceed critical thresholds. Inflation materially strengthens this mechanism by eroding real incomes and intensifying price pressures,

effectively lowering the tax threshold at which illicit consumption responds sharply. These effects are especially pronounced in emerging economies, where inflation volatility and enforcement constraints are typically greater.

These findings imply that tobacco excise policy cannot be designed in isolation from macroeconomic conditions. In high-inflation regimes, aggressive tax hikes risk becoming counterproductive, undermining revenues and weakening regulatory control by triggering abrupt shifts toward illicit markets—whereas moderate increases may still reduce legal consumption without substantially expanding informality. Policymakers should therefore incorporate inflation dynamics into rate adjustments, avoid uniform escalation strategies, and complement taxation with stronger enforcement capacity (e.g., border controls, tax administration, and monitoring), particularly in emerging economies. The evidence also supports more gradual or countercyclical approaches during inflationary episodes, such as smoothing increases over time or indexing excises to reduce sudden real price shocks, thereby preserving deterrence while limiting incentives for illicit substitution.

Future research may extend the analysis by using alternative measures of illicit trade, exploring subnational variation, or examining interactions between tobacco taxation and other sin taxes under inflationary conditions.

Appendix A. Supplementary Descriptive Evidence

Before proceeding to the nonlinear estimations, Table A1 reports the pairwise correlations among the main variables. This analysis provides a preliminary assessment of potential multicollinearity and the direction of simple associations.

Table A1. Correlation Matrix

Variable	ITC	TAX	INF	Y	INST
ITC	1.00				
TAX	0.42	1.00			
INF	0.38	0.21	1.00		
Y	-0.46	0.19	-0.33	1.00	
INST	-0.51	0.24	-0.29	0.62	1.00

The correlation matrix indicates a positive association between excise taxation and illicit tobacco consumption, while higher income levels and stronger institutional quality are negatively correlated with illicit market shares. Importantly, the correlations remain below conventional multicollinearity thresholds, suggesting that the regression estimates are unlikely to be distorted by strong linear dependence among regressors.

To distinguish between low- and high-inflation environments, countries are classified based on the distribution of CPI inflation rates.

Table A2. Inflation Regimes

Inflation Regime	CPI Inflation (%)	Share of Observations
Low inflation	≤ 5%	46%
Moderate inflation	5–10%	31%
High inflation	> 10%	23%

This classification confirms substantial heterogeneity in inflation experiences across countries, reinforcing the relevance of inflation-conditional threshold analysis.

Author contribution: Utku Altunöz is the sole author and is responsible for the conception, methodology, analysis, and writing of the manuscript.

Declarations

- Competing interests: The author declares no competing interests.
- Funding: No external funding was received for this research.
- Ethics approval: Not applicable; the study uses secondary data and involves no human participants or identifiable personal data.
- Consent to participate / publish: Not applicable.

- Data availability: Secondary data are drawn from WHO tobacco-control sources, the World Bank's World Development Indicators and Worldwide Governance Indicators, and licensed Euromonitor data where used. Replication files can be shared subject to third-party licensing restrictions.

REFERENCES

Arellano, M., & Bover, O. (1995). Another look at the instrumental variable estimation of error-components models. Journal of Econometrics, 68(1), 29–51. https://doi.org/10.1016/0304-4076(94)01642-D

Becker, G. S., & Murphy, K. M. (1988). A theory of rational addiction. Journal of Political Economy, 96(4), 675–700.

Becker, G. S., Grossman, M., & Murphy, K. M. (1994). An empirical analysis of cigarette addiction. American Economic Review, 84(3), 396–418.

Blecher, E. H., & van Walbeek, C. P. (2009). Cigarette affordability trends: An update and some methodological comments. Tobacco Control, 18(3), 167–175. https://doi.org/10.1136/tc.2008.026682

Blundell, R., & Bond, S. (1998). Initial conditions and moment restrictions in dynamic panel data models. Journal of Econometrics, 87(1), 115–143. https://doi.org/10.1016/S0304-4076(98)00009-8

Chaloupka, F. J., & Warner, K. E. (2000). The economics of smoking. In A. J. Culyer & J. P. Newhouse (Eds.), Handbook of Health Economics (Vol. 1, pp. 1539–1627). Elsevier.

Chaloupka, F. J., Yurekli, A., & Fong, G. T. (2012). Tobacco taxes as a tobacco control strategy. Tobacco Control, 21(2), 172–180. https://doi.org/10.1136/tobaccocontrol-2011-050417

Cnossen, S. (2006). Tobacco taxation in the European Union. FinanzArchiv: Public Finance Analysis, 62(2), 305–322. https://doi.org/10.1628/001522106X120686

Deaton, A. (1997). The analysis of household surveys: A microeconometric approach to development policy. World Bank.

Easterly, W., & Fischer, S. (2001). Inflation and the poor. Journal of Money, Credit and Banking, 33(2), 160–178.

Fischer, S., & Modigliani, F. (1978). Towards an understanding of the real effects and costs of inflation. Review of World Economics (Weltwirtschaftliches Archiv), 114(4), 810–833. https://doi.org/10.1007/BF02696381

Gilmore, A. B., Rowell, A., Gallus, S., Lugo, A., Joossens, L., & Sims, M. (2014). Towards a greater understanding of the illicit tobacco trade in Europe: A review of the PMI funded "Project Star" report. Tobacco Control, 23(e1), e51–e61. https://doi.org/10.1136/tobaccocontrol-2013-051240

Goodchild, M., Paul, J., Iglesias, R., Bouw, A., & Perucic, A. M. (2022). Potential impact of eliminating illicit trade in cigarettes: A demand-side perspective. Tobacco Control, 31(1), 57–64. https://doi.org/10.1136/tobaccocontrol-2020-055980

Goodchild, M., Perucic, A. M., & Nargis, N. (2016). Modelling the impact of raising tobacco taxes on public health and finance. Bulletin of the World Health Organization, 94(4), 250–257. https://doi.org/10.2471/BLT.15.164707

Grossman, M., & Chaloupka, F. J. (1997). Cigarette taxes: The straw to break the camel's back. Public Health Reports, 112(4), 290–297.

Hansen, B. E. (1999). Threshold effects in non-dynamic panels: Estimation, testing, and inference. Journal of Econometrics, 93(2), 345–368. https://doi.org/10.1016/S0304-4076(99)00025-1

Joossens, L., Merriman, D., Ross, H., & Raw, M. (2010). The impact of eliminating the global illicit cigarette trade on health and revenue. Addiction, 105(9), 1640–1649. https://doi.org/10.1111/j.1360-0443.2010.03018.x

Joossens, L., & Raw, M. (2012). From cigarette smuggling to illicit tobacco trade. Tobacco Control, 21(2), 230–234.

Merriman, D. (2010). The micro-geography of tax avoidance: Evidence from littered cigarette packs in Chicago. American Economic Journal: Economic Policy, 2(2), 61–84.

Merriman, D., Yurekli, A., & Chaloupka, F. J. (2000). How big is the worldwide cigarette smuggling problem? In P. Jha & F. J. Chaloupka (Eds.), Tobacco control in developing countries (pp. 365–392). Oxford University Press.

Slemrod, J., & Yitzhaki, S. (2002). Tax avoidance, evasion, and administration. In A. J. Auerbach & M. Feldstein (Eds.), Handbook of Public Economics (Vol. 3, pp. 1423–1470). Elsevier.

Tauras, J. A. (2006). Smoke-free air laws, cigarette prices, and adult cigarette demand. Economic Inquiry, 44(2), 333–342. https://doi.org/10.1093/ei/cbj028

World Health Organization. (2015). WHO report on the global tobacco epidemic, 2015: Raising taxes on tobacco. World Health Organization.

Yurekli, A., & Sayginsoy, O. (2010). Worldwide organized cigarette smuggling: An empirical analysis. Applied Economics, 42(5), 545–561. https://doi.org/10.1080/00036840701720721

Yapay Zekânın Almanca Dil Bilgisi Hatalarına Yönelik Geri Bildirimlerinin İncelenmesi

Dr. Rahim Şentürk[1]

[1] Trakya Üniversitesi, Eğitim Fakültesi, Yabancı Diller Eğitimi Bölümü, Alman Dili Eğitimi Anabilim Dalı, Edirne, Türkiye, E-posta: rahimsenturk@trakya.edu.tr, ORCID: 0000-0002-3053-6784

Özet: Yapay zekâ araçlarının yabancı dil öğrenme süreçlerinde kullanımı giderek yaygınlaşmakta ve özellikle öğrencilere sundukları anlık geri bildirim olanakları dikkat çekmektedir. Bu çalışmanın amacı, üretken yapay zekânın Almanca öğretmen adaylarının yazılı metinlerinde yer alan dil bilgisi hatalarına yönelik ürettiği geri bildirimlerin niteliğini incelemektir. Araştırma, nitel araştırma yaklaşımı çerçevesinde doküman incelemesine dayalı olarak tasarlanmıştır. Araştırmanın veri kaynağını, Almanca yazma becerileri dersi kapsamında öğretmen adayları tarafından üretilen yazılı metinler ve bu metinlere yönelik yapay zekâ geri bildirimleri oluşturmaktadır. Öğretmen adaylarının metinleri üretken yapay zekâ aracına aktarılacak ve araçtan yalnızca dil bilgisi hatalarına odaklanan geri bildirimler üretmesi istenecektir. Elde edilen geri bildirimler, önceden belirlenen kategoriler doğrultusunda nitel içerik analiziyle incelenecektir. Analiz kapsamında hataların doğru tespit edilmesi, önerilen düzeltmelerin dil bilgisel doğruluğu, açıklamaların doğruluğu ve anlaşılırlığı ile sunulan örneklerin uygunluğu değerlendirilecektir. Ayrıca yapay zekânın farklı dil bilgisi hata türlerine yönelik geri bildirimlerinde ortaya çıkan eksiklikler ve yanlışlıklar belirlenecektir. Araştırmadan elde edilecek bulguların, üretken yapay zekânın Almanca dil bilgisi hatalarına yönelik geri bildirim üretme potansiyelinin ve sınırlılıklarının ortaya konmasına katkı sağlaması beklenmektedir.

Anahtar Kelimeler: Yapay zekâ, Almanca öğretimi, dil bilgisi hataları, geri bildirim, nitel içerik analizi

Giriş

Yapay zekâ teknolojileri, yabancı dil öğretiminde öğrenme süreçlerinin bireyselleştirilmesi, dil becerilerinin geliştirilmesi ve öğrenci performansının değerlendirilmesi bakımından giderek daha fazla kullanılmaktadır. Bu uygulamalar arasında özellikle yazılı metinlerin analiz edilmesi ve dilsel hatalara yönelik geri bildirim üretilmesi öne çıkmaktadır (Nindya & Taufiqulloh, 2024). Strasser (2020), yapay zekâ destekli geri bildirim mekanizmalarının yabancı dil öğretimindeki kullanılabilirliğini öğretmenin rolüyle birlikte ele alırken Rüdian vd. (2023), bu teknolojilerin öğrenme süreçlerinin bireyselleştirilmesi ve değerlendirme görevlerinin yürütülmesindeki olanaklarına dikkat çekmektedir. Almancanın yabancı dil olarak öğretimi bağlamında Şentürk (2023), ChatGPT'nin dil becerilerinin geliştirilmesinde kullanılabilecek uygulamalarını somut örneklerle incelemiş; Hartmann (2021) ise yapay zekâ destekli metin üretiminin yazma öğretimindeki didaktik ve yöntemsel boyutlarını tartışmıştır. Bu çalışmalar, yapay zekânın yabancı dil öğretimindeki işlevlerinin çeşitlendiğini göstermekle birlikte, üretilen dilsel çıktıların doğruluğunun değerlendirilmesi gerekliliğini de gündeme getirmektedir.

Yabancı dilde yazma, dil bilgisi, sözcük bilgisi ve söz dizimi gibi farklı dilsel bileşenlerin birlikte kullanılmasını gerektiren karmaşık bir beceridir. Bu süreçte ortaya çıkan hataların belirlenmesi ve uygun geri bildirimlerle ele alınması, yazma becerisinin geliştirilmesi açısından önem taşımaktadır (Baz & Aksoy, 2025). Çebi (2022), 23 Almanca öğretmen adayının yazılı metinlerini yanlış çözümlemesi yöntemiyle incelemiş ve en sık karşılaşılan hataların dil bilgisi ile söz dizimi alanlarında yoğunlaştığını belirlemiştir. Bu bulgu, Almanca öğretmen adaylarının yazılı ürünlerinde dil bilgisel doğruluğun geliştirilmesine yönelik geri bildirim ihtiyacını ortaya koymaktadır. Bununla birlikte, yazılı metinlerin değerlendirilmesi öğretmenler açısından zaman ve iş yükü gerektiren bir süreçtir (Şentürk, 2024). Otomatik yazma değerlendirme sistemleri bu süreci destekleyebilecek araçlar arasında yer almaktadır. Ding ve Zou (2024), 39 araştırmayı kapsayan sistematik derlemelerinde söz konusu sistemlerin yazma becerisine olumlu katkılar sağlayabildiğini, ancak araştırmaların ağırlıklı olarak öğrenme çıktıları ve kullanıcı görüşlerine odaklandığını belirlemiştir.

Yapay zekâ destekli geri bildirimin dil bilgisi öğrenimine etkisini inceleyen deneysel araştırmalar da bu teknolojilerin potansiyelini desteklemektedir. Lalira vd. (2024), farklı akademik programlardaki öğrencilerle yürüttükleri araştırmada yapay zekâ araçlarının dil bilgisi başarısını artırabildiğini ortaya koymuştur. İngilizcenin yabancı dil olarak öğretimi bağlamında Yener ve Selcuk (2024), yapay zekâ destekli geri bildirimin Present Perfect yapısının öğrenilmesinde dil bilgisel doğruluğa katkısını belirlerken Sari ve Lestari (2025), benzer uygulamaların yazılı metinlerdeki dil bilgisel doğruluğu geliştirebildiğini göstermiştir. Bununla birlikte, öğrenme performansındaki gelişme ile yapay zekâ tarafından üretilen geri bildirimin doğruluğu farklı değerlendirme boyutlarıdır. Nitekim Küçük ve Solak (2025), yabancı dil olarak Türkçe öğrenen öğrencilerin yapay zekâyı dil bilgisi kurallarını öğrenmek amacıyla kullandıklarını, ancak sunulan bilgilerin doğruluğuna ilişkin sorunlarla

karşılaştıklarını belirlemiştir. Bu durum, yapay zekâ geri bildirimlerinin yalnızca öğrenme çıktıları üzerinden değil, içerdiği dil bilgisel düzeltmelerin ve açıklamaların doğruluğu açısından da incelenmesini gerekli kılmaktadır.

Almanca öğretimine odaklanan güncel araştırmalar, bu gerekliliği daha belirgin hâle getirmektedir. Koca (2026), Almanca hazırlık sınıfında öğrenim gören 83 öğrenciyle gerçekleştirdiği çalışmada yapay zekânın ağırlıklı olarak dil bilgisi, yazma ve sözcük bilgisi alanlarında kullanıldığını belirlemiştir. Öğrenciler hız, zaman tasarrufu ve bireyselleştirilmiş öğrenmeyi olumlu değerlendirirken yapay zekânın güvenilirliğine ilişkin çekinceler de dile getirmiştir. Doğrudan geri bildirim süreçlerini ele alan Şentürk (2024), LanguageTool uygulamasının Almanca dil bilgisi ve yazım hatalarına yönelik düzeltme olanaklarını incelemiştir. Şentürk (2026) ise Almanca öğretmen adaylarının hazırladığı geri bildirimlerle ChatGPT tarafından üretilen geri bildirimleri karşılaştırarak iki yaklaşımın güçlü ve sınırlı yönlerini ortaya koymuştur. Yapay zekâ destekli geri bildirim sistemlerinin geliştirilmesine odaklanan Li vd. (2025) ise mevcut sistemlerde açıklamaların yetersizliği, doğruluk sorunları ve öğrenicilerin dilsel düzeylerine göre farklılaştırılmış geri bildirim sunulmasındaki güçlükleri vurgulamıştır. Bu çalışmalar birlikte değerlendirildiğinde, yapay zekânın Almanca öğretiminde geri bildirim aracı olarak kullanımının yalnızca işlevsellik açısından değil, üretilen düzeltmelerin dil bilgisel geçerliliği bakımından da ele alınması gerektiği anlaşılmaktadır.

Araştırmanın Amacı

Bu araştırmanın amacı, ChatGPT'nin Almanca öğretmen adaylarının yazılı metinlerindeki dil bilgisi hatalarına yönelik sunduğu geri bildirimleri doğruluk ve dil bilgisel açıklamaların niteliği açısından incelemektir. Bu kapsamda önerilen düzeltmelerin dil bilgisi kurallarına uygunluğu, gerekliliği ve açıklamaların doğruluğu değerlendirilmektedir.

Araştırma Soruları

Araştırmanın amacı doğrultusunda aşağıdaki sorulara yanıt aranmıştır:

1. ChatGPT, Almanca öğretmen adaylarının yazılı metinlerinde yer alan dil bilgisi hatalarını ne ölçüde doğru tespit etmekte ve düzeltmektedir?
2. ChatGPT'nin dil bilgisi hatalarına yönelik sunduğu açıklamalar doğruluk ve anlaşılırlık açısından hangi özellikleri taşımaktadır?

Araştırma Yöntemi

Bu araştırma, nitel araştırma yaklaşımı çerçevesinde doküman incelemesine dayalı betimsel bir çalışma olarak tasarlanmıştır. Doküman incelemesi, araştırma kapsamında ele alınan yazılı materyallerin sistematik biçimde incelenmesine ve değerlendirilmesine olanak tanıyan bir yöntemdir (Bowen, 2009). Araştırmada, ChatGPT'nin Almanca öğretmen adaylarının yazılı metinlerindeki dil bilgisi hatalarına yönelik ürettiği geri bildirimler incelenmiştir. Verilerin analizinde, metinlerin önceden belirlenen kategoriler doğrultusunda sistematik olarak değerlendirilmesine olanak sağlayan nitel içerik analizi yaklaşımı benimsenmiştir (Mayring, 2019).

Veri Toplama Süreci

Veri toplama sürecinde öncelikle öğretmen adaylarının Almanca yazılı metinleri[1] bir araya getirilmiştir. Ardından her metin ChatGPT'ye aktarılmış ve standart bir komut kullanılarak yalnızca dil bilgisi hatalarına yönelik geri bildirim üretmesi istenmiştir. Komutta ChatGPT'den hataları belirlemesi, dil bilgisi kategorilerine göre sınıflandırması, uygun düzeltmeler sunması ve her düzeltmeyi kısa dil bilgisel açıklamalarla gerekçelendirmesi talep edilmiştir. Yazım, üslup ve içerik özelliklerinin değerlendirme dışında tutulması istenmiştir. Elde edilen geri bildirimler metin kodlarıyla ilişkilendirilerek analiz için düzenlenmiştir.

[1] Araştırmada incelenen Almanca yazılı metinler, 2025–2026 eğitim-öğretim yılı bahar döneminde, Alman Dili Eğitimi Anabilim Dalı birinci sınıf öğrencileri tarafından Yazma Becerileri dersi kapsamında, ders ortamında bağımsız olarak oluşturulmuş metinlerdir.

Veri Analizi

Araştırma verileri, Mayring'in (2019) tümdengelimsel nitel içerik analizi yaklaşımı doğrultusunda incelenmiştir. Analiz kategorilerinin belirlenmesinde Ellis'in (2009) yazılı düzeltici geri bildirim sınıflandırmasından yararlanılmıştır. Bu kapsamda ChatGPT tarafından üretilen geri bildirimler; hata tespiti, düzeltme doğruluğu ve dil bilgisel açıklamaların niteliği olmak üzere üç kategoride değerlendirilmiştir. Belirlenen hataların metinlere göre dağılımı frekanslarla sunulmuş, geri bildirimlerin doğruluğu ve sınırlılıkları seçilmiş örnekler üzerinden incelenmiştir.

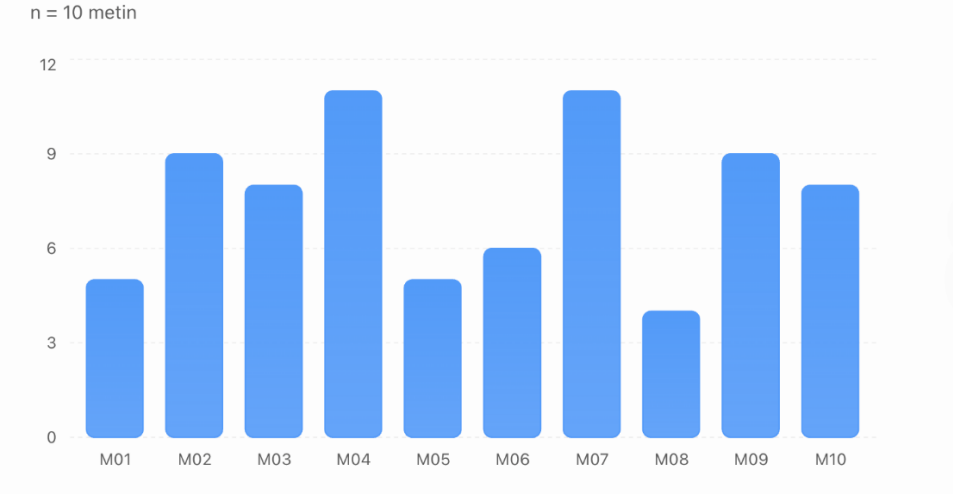
3. BULGULAR

Bu bölümde, Almanca öğretmen adaylarının yazılı metinlerine yönelik ChatGPT[2] tarafından üretilen geri bildirimlerin analizinden elde edilen bulgular sunulmaktadır. Bulgular, dil bilgisi hatalarının metinlere göre dağılımı, hata türlerine yönelik düzeltmelerin doğruluğu ve dil bilgisel açıklamaların niteliği çerçevesinde ele alınmıştır. Elde edilen sonuçlar, frekans dağılımları ve seçilmiş geri bildirim örnekleriyle desteklenmiştir.

3.1. ChatGPT tarafından belirlenen dil bilgisi hatalarının dağılımı

Araştırma kapsamında Almanca öğretmen adaylarının yazdığı 10 metne yönelik ChatGPT geri bildirimleri incelenmiştir. ChatGPT tarafından yapılan analizlerde farklı dil bilgisi kategorilerine ilişkin hatalar belirlenmiş ve bu hatalara yönelik düzeltmeler ile açıklamalar sunulmuştur.

Şekil 1. Metinlere göre ChatGPT tarafından belirlenen dil bilgisi hatalarının dağılımı



Şekil 1 incelendiğinde, ChatGPT tarafından 10 öğrenci metninde toplam 76 dil bilgisi hatası belirlendiği görülmektedir. Metin başına ortalama hata sayısı 7,6'dır. En fazla hata M04 ve M07 (f=11) metinlerinde, en az hata ise M08 (f=4) metninde tespit edilmiştir. Diğer metinlerde belirlenen hata sayıları 5 ile 9 arasında değişmektedir. Bu bulgular, ChatGPT tarafından belirlenen dil bilgisi hatalarının metinler arasında farklılık gösterdiğini ortaya koymaktadır.

3.2. Hata Tespiti ve Düzeltmelerin Doğruluğuna İlişkin Bulgular

ChatGPT tarafından üretilen geri bildirimler incelendiğinde, özellikle durum kullanımı (Kasus), fiil çekimi (Verbkonjugation) ve sözcük dizilişi (Wortstellung) gibi dil bilgisi kategorilerinde doğru düzeltmeler yapıldığı görülmüştür. Bununla birlikte, bazı geri bildirimlerde dil bilgisel açıdan kabul edilebilir yapıların değiştirilmesi önerilmiş veya düzeltmenin gerekliliği bağlama bağlı kalmıştır. Bu doğrultuda seçilen örnekler Tablo 2'de sunulmuştur.

[2] Araştırmada OpenAI tarafından geliştirilen ChatGPT (GPT-6) kullanılmıştır. Verilerin analizi Ekim 2026'da gerçekleştirilmiştir.

Tablo 1. Bağlaç Kullanımı ve Sözcük Dizilişine İlişkin Hataların Değerlendirilmesi

Metin	Özgün ifade	ChatGPT düzeltmesi	Araştırmacı değerlendirmesi
M01	weil die Stadt sehr interessant ist und es gibt viele schöne Plätze	weil die Stadt sehr interessant ist und es viele schöne Plätze gibt	Doğru düzeltme
M02	denn das Wetter sehr warm und sonnig war	denn das Wetter war sehr warm und sonnig	Doğru düzeltme
M04	Absolut kann diese Situation sich ändern	Diese Situation kann sich ändern	Gereksiz müdahale
M05	deshalb es ist sehr praktisch	deshalb ist es sehr praktisch	Doğru düzeltme
M07	Obwohl verwendet sie es	Obwohl sie es verwendet	Doğru düzeltme
M09	weil Smartphones unser Leben einfacher machen und haben viele verschiedene Funktionen	weil Smartphones unser Leben einfacher machen und viele verschiedene Funktionen haben	Doğru düzeltme

Tablo 1'deki bulgular, ChatGPT'nin bağlaç kullanımı ve sözcük dizilişine ilişkin hataları büyük ölçüde doğru düzelttiğini göstermektedir. Özellikle yan cümlelerde ve bağlaçlarla kurulan ana cümlelerde fiilin konumu doğru belirlenmiştir. Ancak M04'te dil bilgisel açıdan kabul edilebilir bir yapıya müdahale edilmesi, ChatGPT'nin bazı durumlarda zorunlu düzeltmelerin ötesine geçtiğini ortaya koymaktadır.

Tablo 2. Ad Durumları, Artikel ve Sıfat Çekimine İlişkin Hataların Değerlendirilmesi

Metin	Özgün ifade	ChatGPT düzeltmesi	Araştırmacı değerlendirmesi
M01	mit meine Familie	mit meiner Familie	Doğru düzeltme
M03	viele Städten	viele Städte	Doğru düzeltme
M04	in gleichem Position	in der gleichen Position	Doğru düzeltme
M05	bei viele Menschen	bei vielen Menschen	Doğru düzeltme
M06	keine gemeinsame Aktivitäten	keine gemeinsamen Aktivitäten	Doğru düzeltme
M08	ein größer und schneller Motorrad	ein größeres und schnelleres Motorrad	Doğru düzeltme
M10	eine große Effekt	einen großen Effekt	Doğru düzeltme

Tablo 2'de görüldüğü üzere, ad durumları, artikel kullanımı ve sıfat çekimine ilişkin incelenen yedi örneğin tamamında ChatGPT doğru düzeltmeler sunmuştur. Özellikle Dativ ve Akkusativ kullanımı ile cinsiyet ve sayıya bağlı çekim kurallarının doğru uygulandığı anlaşılmaktadır. Bu bulgu, ChatGPT'nin söz konusu dil bilgisi yapılarına yönelik hataları seçilen örneklerde doğru biçimde düzelttiğini göstermektedir.

Tablo 3. Fiil Çekimi, Fiil Biçimleri ve Fiil Kullanımına İlişkin Hataların Değerlendirilmesi

Metin	Özgün ifade	ChatGPT düzeltmesi	Araştırmacı değerlendirmesi
M01	Souvenirs kaufen	Souvenirs gekauft	Doğru düzeltme
M02	Mein Vater gefällt es sehr	Meinem Vater gefällt es sehr	Doğru düzeltme
M03	Ich mag, dass ich neues Essen probieren	Ich mag, dass ich neues Essen probiere	Doğru düzeltme
M04	Das ist hängt von Person	Das hängt von der Person ab	Doğru düzeltme
M07	der Mann einschlafen	der Mann schläft ein	Doğru düzeltme
M08	haben ihn geholfen	haben ihm geholfen	Doğru düzeltme
M09	dass der Autor nur Vorteile sehen	dass der Autor nur Vorteile sieht	Doğru düzeltme

M10	KI korrigiere meine Fehler	KI korrigiert meine Fehler	Doğru düzeltme

Tablo 3 incelendiğinde, ChatGPT'nin fiil çekimi, fiil biçimleri ve fiil kullanımına ilişkin seçilen sekiz örneğin tamamında doğru düzeltmeler yaptığı anlaşılmaktadır. Özellikle özne-yüklem uyumu, Perfekt yapısı, ayrılabilen fiiller ve fiillerin gerektirdiği ad durumlarında dil bilgisi kurallarına uygun düzeltmeler sunulmuştur. Bu sonuç, ChatGPT'nin farklı fiil yapılarına ilişkin hataların düzeltilmesinde başarılı örnekler sergilediğini ortaya koymaktadır.

Tablo 4. Diğer Dil Bilgisi Yapılarına İlişkin Hataların Değerlendirilmesi

Metin	Özgün ifade	ChatGPT düzeltmesi	Araştırmacı değerlendirmesi
M02	**Es ist war** sehr interessant.	**Es war** sehr interessant.	Doğru düzeltme – gereksiz fiil kullanımı
M03	Wenn ich durch Stadt spazierte, kaufte ich viele **Souvenir** für meine Freundinnen.	Wenn ich durch die Stadt spazierte, kaufte ich viele **Souvenirs** für meine Freundinnen.	Doğru düzeltme – artikel kullanımı ve çoğul oluşturma
M04	**Die manche Arbeitgeber** sehen diese Situation als Chance.	**Manche Arbeitgeber** sehen diese Situation als Chance.	Doğru düzeltme – belirleyici kullanımı
M07	aber die Frau noch mit dem Handy	aber die Frau **beschäftigt sich** noch mit dem Handy	Uygun tamamlama – eksik yüklem
M09	Aber der Text berücksichtigt nicht, **dass** wie die Nachteile uns beeinflussen.	Aber der Text berücksichtigt nicht, **wie** die Nachteile uns beeinflussen.	Doğru düzeltme – dolaylı soru cümlesi
M10	Ich stimme zu, weil ich schnell **Antworte** bekomme und Zeit spare.	Ich stimme zu, weil ich schnell **Antworten** bekomme und Zeit spare.	Uygun düzeltme – isim biçimi; tekil kullanım da mümkündür

Tablo 4'te, ChatGPT'nin çoğul oluşturma, belirleyici kullanımı, eksik yüklem ve cümle kuruluşu gibi farklı dil bilgisi yapılarına yönelik düzeltmeleri yer almaktadır. İncelenen örneklerde düzeltmelerin genel olarak dil bilgisi kurallarıyla uyumlu olduğu anlaşılmaktadır. Bununla birlikte, özellikle eksik cümle ögelerinin tamamlanmasında ve isim biçimlerinin seçiminde birden fazla doğru kullanımın mümkün olması, bağlamın önemini ortaya koymaktadır.

3.3. Dil Bilgisel Açıklamaların Doğruluğuna ve Sınırlılıklarına İlişkin Bulgular

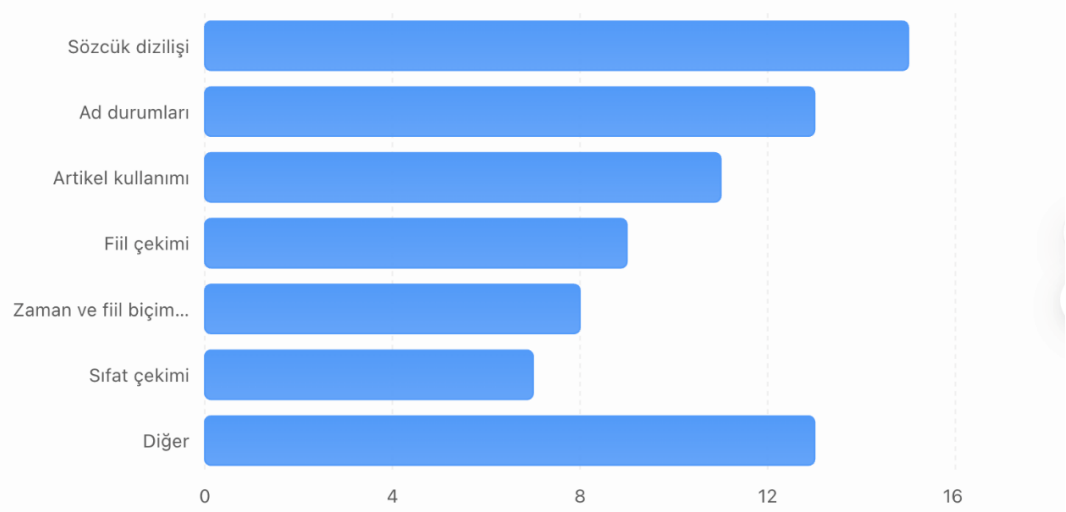
ChatGPT'nin dil bilgisi hatalarına yönelik sunduğu açıklamalar, ilgili dil bilgisi kurallarıyla tutarlılık ve açıklamaların sınırlılıkları açısından incelenmiştir. Geri bildirimlerde özellikle Perfekt (yakın geçmiş zaman), Kasus (ad durumları), Adjektivdeklination (sıfat çekimi) ve Satzbau (cümle yapısı) gibi dil bilgisi yapılarına ilişkin açıklamalara yer verildiği görülmüştür. Bununla birlikte bazı açıklamalarda alternatif kullanımların dikkate alınmadığı veya dil bilgisel açıdan kabul edilebilir yapıların hatalı olarak değerlendirildiği belirlenmiştir. Seçilen örnekler Tablo 3'te sunulmuştur.

Tablo 5. ChatGPT'nin dil bilgisel açıklamalarının doğruluğu ve sınırlılıkları

Metin	Dil bilgisi kategorisi	Açıklamanın niteliği	Araştırmacı değerlendirmesi
M02	Perfekt (Geçmiş zaman)	Partizip II kullanımına ilişkin kural doğru açıklanmıştır.	Doğru açıklama
M03	Kasus (Ad durumları)	Besuchen fiilinin Akkusativ gerektirdiği açıklanmıştır.	Doğru açıklama
M04	Wortstellung (Sözcük dizilişi)	Refleksif zamirin kabul edilebilir konumu hatalı değerlendirilmiştir.	Hatalı gerekçelendirme
M06	Possessivartikel (İyelik belirteci)	Mit edatının Dativ gerektirdiği ve iyelik belirtecinin çekimi açıklanmıştır.	Doğru açıklama
M07	Verbgebrauch (Fiil kullanımı)	Dafür unsurunun eklenmesi zorunlu bir düzeltme olarak sunulmuştur.	Bağlama bağlı açıklama
M10	Adjektivdeklination (Sıfat çekimi)	Effekt sözcüğünün cinsiyeti ile Akkusativ ve sıfat çekimi ilişkisi doğru açıklanmıştır.	Doğru açıklama

Tablo 5 incelendiğinde, ChatGPT'nin özellikle geçmiş zaman yapıları, ad durumları ve sıfat çekimine ilişkin dil bilgisi kurallarıyla tutarlı açıklamalar sunduğu görülmektedir. Bununla birlikte, bazı açıklamalarda dil bilgisel açıdan kabul edilebilir yapıların hatalı değerlendirildiği ve bağlama bağlı kullanımların yeterince dikkate alınmadığı belirlenmiştir. Bu bulgular, ChatGPT'nin dil bilgisel açıklamalarının doğruluğunun özgün metnin bağlamı ve alternatif kullanımlar dikkate alınarak değerlendirilmesi gerektiğini göstermektedir.

Şekil 2. Dil bilgisi hatalarının kategorilere göre dağılımı



Şekil 2'deki örnek dağılıma göre, en fazla hata sözcük dizilişi (f=15), ad durumları (f=13) ve artikel kullanımı (f=11) kategorilerinde görülmektedir. Fiil çekimi (f=9), zaman ve fiil biçimleri (f=8) ile sıfat çekimi (f=7) kategorilerinde ise daha az hata bulunmaktadır.

4. SONUÇ

Bu araştırmada, ChatGPT'nin Almanca öğretmen adaylarının yazılı metinlerindeki dil bilgisi hatalarına yönelik ürettiği geri bildirimler, hata tespiti, düzeltme doğruluğu ve dil bilgisel açıklamaların niteliği açısından incelenmiştir.

Birinci araştırma sorusuna ilişkin bulgular, ChatGPT'nin özellikle bağlaç kullanımı, sözcük dizilişi, ad durumları, artikel ve sıfat çekimi ile fiil yapılarına yönelik doğru düzeltmeler sunabildiğini göstermiştir. İncelenen örneklerde özellikle fiil çekimi ve ad durumlarına ilişkin düzeltmelerin dil bilgisi kurallarıyla tutarlı olduğu belirlenmiştir. Bununla birlikte, dil bilgisel açıdan kabul edilebilir bazı yapılara gereksiz müdahalelerde bulunulması, ChatGPT'nin dil bilgisel hata ile ifade tercihi arasındaki ayrımı her zaman gözetemediğini ortaya koymuştur.

İkinci araştırma sorusu kapsamında, ChatGPT'nin dil bilgisi hatalarına yönelik açıklamalarında ilgili kurallara yer verdiği ve çoğunlukla anlaşılır gerekçeler sunduğu görülmüştür. Ancak bazı açıklamalarda alternatif kullanımların göz ardı edildiği ve bağlama bağlı yapıların zorunlu dil bilgisi hataları olarak değerlendirildiği belirlenmiştir. Bu durum, düzeltmelerin doğruluğu ile açıklamaların doğruluğunun ayrı değerlendirilmesi gerektiğini göstermektedir.

Sonuç olarak araştırma, ChatGPT'nin Almanca dil bilgisi hatalarının belirlenmesi, düzeltilmesi ve açıklanmasında destekleyici bir araç olarak kullanılabileceğine işaret etmektedir. Bununla birlikte, geri bildirimlerin doğruluğunun bağlama ve dil bilgisel alternatiflere duyarlı biçimde değerlendirilmesi, yapay zekâ kullanımında öğretmen ve alan uzmanı kontrolünün önemini ortaya koymaktadır.

Araştırmanın Sınırlılıkları

Bu araştırma, Almanca öğretmen adayları tarafından yazılan 10 metin ve bu metinlere yönelik ChatGPT tarafından üretilen geri bildirimlerle sınırlıdır. Çalışmada yalnızca dil bilgisi hatalarına odaklanılmış; yazım, sözcük seçimi ve metin bütünlüğü gibi diğer dilsel boyutlar değerlendirme dışında tutulmuştur. Ayrıca araştırmada tek bir yapay zekâ aracı kullanılmış ve geri bildirimlerin farklı modellerde veya tekrarlanan uygulamalarda nasıl değiştiği incelenmemiştir. Bulgular, incelenen metinler ve elde edilen geri bildirimler çerçevesinde değerlendirilmelidir.

Öneriler

Gelecek araştırmalarda farklı yapay zekâ modellerinin geri bildirimleri karşılaştırılabilir ve daha geniş veri setleri üzerinden hata türlerine göre ayrıntılı analizler gerçekleştirilebilir. Ayrıca yapay zekâ geri bildirimlerinin öğrencilerin dil bilgisel farkındalıkları ve yazma becerileri üzerindeki etkileri deneysel çalışmalarla incelenebilir.

KAYNAKÇA

Baz, M. A., & Aksoy, S. H. (2025). The effect of feedback on informative text writing: AI or teacher?. Open Praxis, 17(3), 611-631.

Bowen, G. A. (2009). Document analysis as a qualitative research method. Qualitative Research Journal, 9(2), 27–40.

Çebi, R. H. (2022). Almanca öğretmenliği öğrencilerinin yazılı anlatım hataları. Abant İzzet Baysal Üniversitesi Eğitim Fakültesi Dergisi, 22(3), 1244–1254. https://doi.org/10.17240/aibuefd.2022..-1128415.

Ding, L., & Zou, D. (2024). Automated writing evaluation systems: A systematic review of Grammarly, Pigai, and Criterion with a perspective on future directions in the age of generative artificial intelligence. Education and Information Technologies, 29(11), 14151–14203. https://doi.org/10.1007/s10639-023-12402-3

Ellis, R. (2009). A typology of written corrective feedback types. ELT Journal, 63(2), 97–107. https://doi.org/10.1093/elt/ccn023

Hartmann, D. (2021). Künstliche Intelligenz im DaF-Unterricht? Disruptive Technologien als Herausforderung und Chance. Informationen Deutsch als Fremdsprache, 48(6), 683–696. https://doi.org/10.1515/infodaf-2021-0078

Koca, N. (2026). Fallstudie zum Einsatz künstlicher Intelligenz beim Lernen von Deutsch als Fremdsprache in einer Vorbereitungsklasse. HUMANITAS – Uluslararası Sosyal Bilimler Dergisi, 14(Ek Sayı), 240–256.

Küçük, E., & Solak, Ö. (2025). Yabancı dil olarak Türkçe öğretiminde yapay zekâ kullanımına dair öğrenici görüşleri. Avrasya Dil Eğitimi ve Araştırmaları Dergisi, 9(1), 1–22. https://izlik.org/JA77KL22KA

Lalira, J. E., Pangemanan, Y. A. T., Scipio, J. E., Lumi, S., Merentek, T. C., & Tumuju, V. N. (2024). Evaluating the impact of AI tools on grammar mastery: A comparative study of learning outcomes. Voices of English Language Education Society, 8(3). https://doi.org/10.29408/veles.v8i3.27856

Li, Y., Zheng, Y., Gu, Y., & Liu, Z. (2025). Entwicklung eines KI-gestützten Feedbacksystems für Schreibaufgaben chinesischer Deutschlernender auf der Basis des CDLK. Jahrbuch für Internationale Germanistik, 57(2), 223–244. https://www.peterlang.com/document/1695810.

Mayring, P. (2019). Qualitative content analysis. Forum Qualitative Sozialforschung / Forum: Qualitative Social Research, 1(2), Article 20.

Nindya, M. A., & Taufiqulloh, T. (2024). EFL Learners Views on AI Feedback Tools: Assessing Grammar Accuracy and Learning Impact. English Review: Journal of English Education, 12(3), 993-1002.

Rüdian, L. S., Dittmeyer, M., & Pinkwart, N. (2023). Sprachenlernen per KI. Möglichkeiten und Grenzen in der Praxis. In C. de Witt, C. Gloerfeld, & S. E. Wrede (Eds.), Künstliche Intelligenz in der Bildung (pp. 357–376). Springer Fachmedien Wiesbaden.

Sari, N., & Lestari, Y. (2025). The effect of artificial intelligence-based feedback on improving the grammatical accuracy of EFL students. NeuroLingua: Journal of Cognitive, Technological, and Cultural Language Learning, 1(1), 40–48. https://journal.ekantara.com/neurolingua/article/view/13

Strasser, T. (2020). Künstliche Intelligenz im Sprachunterricht. Ein Überblick. Revista Lengua y Cultura, 1(2), 1–6.

Şentürk, R. (2023). Die Rolle Künstlicher Intelligenz beim Deutsch als Fremdsprachenlernen: Eine Untersuchung am Beispiel von ChatGPT. Diyalog Interkulturelle Zeitschrift für Germanistik, 11(2), 405–430. https://doi.org/10.37583/diyalog.1404207.

Şentürk, R. (2024). AI-assisted German grammar and writing check: LanguageTool's assessment and feedback capabilities. In 12th International Congress on Social, Humanities, Administrative, and Educational Sciences in a Changing World: Proceedings book (pp. 428–436).

Şentürk, R. (2026). Almanca öğretmen adaylarının yazılı geri bildirim süreçlerinde insan ve yapay zekâ karşılaştırması. XXV. IBANESS İktisat, İşletme ve Yönetim Bilimleri Kongreler Serisi Bildiri Kitabı (s. 546).

Yener, B., & Selcuk, H. (2024). AI-assisted grammar learning: Improving present perfect tense proficiency in EFL students. The Literacy Trek, 10(3), 339–361. https://doi.org/10.47216/literacytrek.1556837.

Küreselden Yerele İklim Yönetişimi: COP31'in Türkiye'de Yerel Yönetimler Açısından Sunduğu Fırsatlar Üzerine Bir Değerlendirme

Doç. Dr. Miray Özden[1] **Doç. Dr. Seray Özden Keleş[2]**

[1] Tekirdağ Namık Kemal Üniversitesi, Sosyal Bilimler MYO, Yerel Yönetimler, mirayozden@nku.edu.tr, ORCID: 0000-0001-7998-9699

[2] Kastamonu Üniversitesi, Orman Fakültesi, Orman Mühendisliği, sozden@kastamonu.edu.tr, ORCID: 0000-0002-2379-5331

Özet: İklim değişikliğinin sınır aşan ve çok aktörlü niteliği, geleneksel merkezi yönetim odaklı politika anlayışının ötesinde farklı yönetim düzeyleri arasında iş birliğini gerekli kılmaktadır. Bu süreçte yerel yönetimler, iklim değişikliğinin etkilerinin doğrudan hissedildiği kentleri yönetmeleri ve azaltım ile uyum politikalarının önemli bir bölümünü uygulamaları nedeniyle küresel iklim yönetişiminin giderek daha görünür aktörleri haline gelmektedir. Bu çalışmanın amacı, 9–20 Kasım 2026 tarihlerinde Antalya'da gerçekleştirilecek Birleşmiş Milletler İklim Değişikliği Çerçeve Sözleşmesi 31. Taraflar Konferansı'nın (COP31) Türkiye'de yerel yönetimler açısından ortaya çıkarabileceği fırsatları iklim yönetişimi perspektifinden değerlendirmektir. Çalışma nitel doküman incelemesine dayanmaktadır. UNFCCC (Birleşmiş Milletler İklim Değişikliği Çerçeve Sözleşmesi)'nin COP31 belgeleri, Türkiye'nin iklim politikalarına ilişkin güncel düzenleme ve politika belgeleri ile yerel iklim yönetişimine ilişkin literatür birlikte değerlendirilmiştir. İnceleme sonucunda COP31'in Türkiye'de yerel yönetimler açısından çok düzeyli yönetişimin güçlendirilmesi, iklim finansmanına erişim, yerel iklim eylem planlarının geliştirilmesi, kurumsal ve teknik kapasitenin artırılması, uluslararası kent ağlarına katılım, yerel paydaş iş birlikleri ve iklim dirençli kent politikalarının yaygınlaştırılması bakımından önemli bir politika penceresi oluşturabileceği değerlendirilmektedir. Bununla birlikte söz konusu fırsatların kalıcı kazanımlara dönüşmesinin merkezi ve yerel yönetimler arasındaki koordinasyonun, finansman kapasitesinin ve uygulama-izleme mekanizmalarının güçlendirilmesine bağlı olduğu sonucuna ulaşılmıştır.

Anahtar Kelimeler: İklim Yönetişimi, COP31, Yerel Yönetimler, Türkiye

From Global to Local Climate Governance: Assessing the Opportunities of COP31 for Local Governments in Türkiye

Abstract: Climate change has become a multi-level and multi-actor governance issue due to its transboundary impacts and the need for coordinated action across different levels of government. In this context, local governments have increasingly emerged as important actors in global climate governance, as cities are both highly exposed to the impacts of climate change and central to the implementation of mitigation and adaptation policies. This study aims to evaluate the potential opportunities that the 31st Conference of the Parties to the United Nations Framework Convention on Climate Change (COP31), to be held in Antalya on 9–20 November 2026, may offer for local governments in Türkiye from a climate governance perspective. The study is based on qualitative document analysis and draws on COP31-related documents of the UNFCCC(United Nations Framework Convention on Climate Change), current climate policy and regulatory documents in Türkiye, and relevant literature on local and multilevel climate governance. The findings indicate that COP31 may provide a significant policy window for local governments in Türkiye in terms of strengthening multilevel climate governance, improving access to climate finance, enhancing local climate action planning, developing institutional and technical capacity, expanding participation in international city networks, strengthening local stakeholder partnerships, and promoting climate-resilient urban policies. However, transforming these opportunities into lasting local policy outcomes will depend on stronger central-local coordination, financial and institutional capacity, and effective implementation and monitoring mechanisms.

Keywords: Climate Govarnance, COP31, Local Governments, Türkiye

1. GİRİŞ

İklim değişikliği, çevresel etkilerinin yanı sıra ekonomik, sosyal, mekânsal ve yönetsel sonuçları bulunan çok boyutlu bir politika sorunudur. İklim değişikliğinin nedenlerinin ve sonuçlarının idari ve coğrafi sınırları aşması, bu sorunla mücadeleyi yalnızca ulusal hükümetlerin sorumluluğunda olan bir politika alanı olmaktan çıkarmaktadır. Uluslararası kuruluşlar, merkezi yönetimler, bölgesel ve yerel yönetimler, özel sektör, sivil toplum kuruluşları ve vatandaşlar iklim politikalarının farklı aşamalarında rol üstlenmektedir. Bu yapı iklim değişikliğinin yönetiminden çok iklim yönetişimi kavramını ön plana çıkarmaktadır.

İklim yönetişiminin temel özelliklerinden biri farklı yönetim düzeyleri ve devlet dışı aktörler arasındaki ilişkilerin önem kazanmasıdır. Bulkeley ve Betsill (2005: 42-63), kentlerde iklim politikalarının yalnızca yerel düzeyde gerçekleşen faaliyetler olarak değerlendirilemeyeceğini; yerel, ulusal ve küresel düzeyler arasındaki ilişkilerin

iklim politikalarının biçimlenmesinde belirleyici olduğunu ortaya koymaktadır. Bu nedenle iklim değişikliği, çok düzeyli yönetişim yaklaşımının belirgin biçimde gözlenebildiği politika alanlarından biri haline gelmiştir.

Kentler bu yönetişim yapısında özel bir konuma sahiptir. Yerel yönetimler ulaşım, arazi kullanımı, atık yönetimi, enerji verimliliği, yeşil alanlar, su yönetimi ve kentsel altyapı gibi iklim değişikliğinin azaltılması ve etkilerine uyum açısından kritik alanlarda yetki ve sorumluluklara sahiptir. Fuhr ve arkadaşları (2018: 1-6), yerel yönetimlerin çok düzeyli iklim yönetişiminin temel aktörlerinden biri olduğunu, ancak yerel iklim eylemlerinin etkili olabilmesi için bunların üst yönetim düzeylerindeki politikalarla bütünleştirilmesi gerektiğini vurgulamaktadır.

Yerel yönetimlerin küresel iklim politikasındaki görünürlüğü "*Birleşmiş Milletler İklim Değişikliği Çerçeve Sözleşmesi (UNFCCC)"* kapsamındaki "*Taraflar Konferansları"* sürecinde de giderek artmaktadır. Özellikle son yıllarda kentler, yerel ve bölgesel yönetimler ile bunların oluşturduğu uluslararası ağlar COP süreçlerinin önemli devlet dışı aktörleri arasında yer almaya başlamıştır. COP28'de gerçekleştirilen *"Yerel İklim Eylemi Zirvesi"* ve *"Çok Düzeyli Ortaklıklar Koalisyonu"* gibi gelişmeler, yerel yönetimlerin küresel iklim diplomasisinde artan görünürlüğünün örnekleri olarak değerlendirilmektedir (Lamontagne, 2026).

Bu gelişmeler Türkiye açısından COP31 ile yeni bir boyut kazanmıştır. COP31, 9–20 Kasım 2026 tarihlerinde Antalya'da gerçekleştirilecektir (UNFCCC, 2026a). Konferansın Türkiye'de düzenlenmesi yalnızca uluslararası iklim diplomasisi bakımından değil, küresel iklim gündeminin ulusal ve yerel politikalarla ilişkilendirilmesi açısından da önem taşımaktadır. COP31 hazırlık sürecinde uygulama, ölçülebilir sonuçlar ve dirençli şehirler öne çıkan konular arasında yer almaktadır.

Türkiye açısından bu süreç aynı zamanda önemli bir ulusal politika dönüşümüyle örtüşmektedir. 2025 yılında kabul edilen İklim Kanunu ile yerel iklim değişikliği eylem planlarının hazırlanması ve İl İklim Değişikliği Koordinasyon Kurullarının oluşturulması öngörülmüş; yerel iklim eyleminin hukuki ve kurumsal çerçevesi güçlendirilmiştir. Yerel iklim değişikliği eylem planlarının en geç 31 Aralık 2027 tarihine kadar hazırlanması öngörülmektedir (İklim Değişikliği Başkanlığı, 2025). Bu nedenle COP31'in Türkiye'de gerçekleştirilecek olması, küresel iklim yönetişimi ile Türkiye'de gelişmekte olan yerel iklim politikaları arasında bağlantı kurulması açısından önemli bir politika penceresi olarak değerlendirilebilir.

Bu çalışmanın amacı, COP31'in Türkiye'deki yerel yönetimler açısından ortaya çıkarabileceği fırsatları iklim yönetişimi ve çok düzeyli yönetişim perspektifinden değerlendirmektir. Bu doğrultuda çalışmada öncelikle küresel iklim yönetişiminde yerel yönetimlerin değişen rolü ele alınmakta, ardından COP sürecinde kentlerin konumu değerlendirilmekte ve son olarak COP31'in Türkiye'de yerel yönetimler açısından oluşturabileceği fırsat alanları tartışılmaktadır.

2. KÜRESEL İKLİM YÖNETİŞİMİNDE YEREL YÖNETİMLERİN DEĞİŞEN ROLÜ

2.1. Küreselden Yerele Çok Düzeyli İklim Yönetişimi

İklim değişikliği politikalarının gelişimi, çevre yönetiminde devlet merkezli yaklaşımdan çok aktörlü ve çok düzeyli yönetişim anlayışına geçişin önemli örneklerinden biridir. İklim değişikliğinin küresel niteliği uluslararası anlaşmaları ve ulusal politikaları gerekli kılarken, etkilerinin belirli coğrafi ve toplumsal koşullarda ortaya çıkması yerel düzeyde müdahaleyi zorunlu hale getirmektedir.

Çok düzeyli iklim yönetişimi, farklı yönetim düzeylerinin birbirinden bağımsız hareket ettiği bir yapıdan ziyade, yetki, kaynak, bilgi ve sorumlulukların çeşitli aktörler arasında paylaşıldığı bir politika sürecini ifade etmektedir. Betsill ve Bulkeley (2006: 141-159), küresel iklim yönetişiminin farklı coğrafi ölçeklerde faaliyet gösteren devlet ve devlet dışı aktörler arasındaki ilişkiler üzerinden anlaşılması gerektiğini belirtmektedir. Bu yaklaşımda kentler yalnızca ulusal politikaları uygulayan idari birimler değil, aynı zamanda iklim politikalarının oluşturulmasına katkı sağlayabilen aktörlerdir.

Yerel yönetimlerin iklim politikalarındaki konumu iki yönlüdür. Dikey boyutta yerel yönetimler ulusal ve bölgesel yönetimlerle; yatay boyutta ise diğer belediyeler, özel sektör, üniversiteler, sivil toplum kuruluşları ve uluslararası kent ağlarıyla ilişki kurmaktadır. Lee ve Koski (2015), yerel iklim eylemlerinin hem merkezi yönetimden yerele doğru gelişen dikey etkilerden hem de kentler arasındaki yatay politika etkileşimlerinden etkilendiğini göstermektedir.

Bununla birlikte yerel yönetimlerin iklim politikasındaki öneminin artması, tek başına etkili yerel iklim eylemini garanti etmemektedir. Yetki sınırlılıkları, mali kaynak yetersizlikleri, teknik personel eksikliği, veri ve izleme

kapasitesinin zayıflığı ile merkezi-yerel koordinasyon sorunları yerel iklim politikalarının uygulanmasını sınırlandırabilmektedir. Türkiye'deki yerel yönetimlerin iklim uyum kapasitesini inceleyen Küçük Horasan ve Özerol (2026), belediyeler arasında önemli farklılıkların bulunduğunu; teknik uzmanlık, risk değerlendirmesi, altyapı ve eğitimli personel alanlarındaki eksikliklerin yerel uyum politikalarının önündeki başlıca engeller arasında olduğunu ortaya koymaktadır.

Dolayısıyla çok düzeyli iklim yönetişiminin başarısı, yalnızca yerel yönetimlere sorumluluk verilmesine değil; bu sorumlulukların finansman, kurumsal kapasite, bilgi paylaşımı ve koordinasyon mekanizmalarıyla desteklenmesine bağlıdır.

2.2. COP Sürecinde Kentlerin ve Yerel Yönetimlerin Konumu

COP toplantıları temel olarak UNFCCC'ye taraf devletlerin iklim politikalarını müzakere ettikleri uluslararası platformlardır. Bununla birlikte iklim değişikliğinin uygulanmasına ilişkin gündemin genişlemesiyle birlikte yerel ve bölgesel yönetimler, özel sektör, sivil toplum ve diğer devlet dışı aktörler COP süreçlerinde daha görünür hale gelmiştir.

Kentlerin uluslararası iklim yönetişimindeki rolü yalnızca COP toplantılarına katılımla sınırlı değildir. Uluslararası belediye ağları aracılığıyla kentler arasında bilgi ve deneyim paylaşımı yapılmakta, ortak hedefler belirlenmekte ve yerel iklim politikaları uluslararası düzeyde görünür hale getirilmektedir. Kern ve Bulkeley (2009: 309-332), ulusötesi belediye ağlarının yerel iklim politikalarının geliştirilmesinde bilgi aktarımı ve politika öğrenmesi bakımından önemli işlevler üstlenebildiğini göstermektedir.

COP28 sürecinde yerel yönetimlerin uluslararası iklim diplomasisindeki konumu daha belirgin hale gelmiştir. Lamontagne (2026), COP28'deki *"Yerel İklim Eylemi Zirvesi"* ve *"Coalition for High Ambition Multilevel Partnerships (CHAMP)"* girişimini yerel yönetimlerin küresel iklim yönetişiminde tanınma arayışının önemli örnekleri arasında değerlendirmektedir.

Bu eğilim COP30'da da devam etmiştir. COP30 Eylem Gündeminde "*şehirler, altyapı ve su için dirençlilik*" ayrı bir eksen olarak ele alınmış; çok düzeyli iklim yönetişimi bu eksenin temel hedeflerinden biri olarak belirlenmiştir. COP30 sonuçlarında ulusal ve alt-ulusal yönetimler arasında iş birliğinin artırılması, iklim finansmanına erişimin kolaylaştırılması ve yerel yönetimlerin ulusal iklim taahhütlerinin uygulanmasına daha güçlü biçimde dahil edilmesi üzerinde durulmuştur (UNFCCC, 2026c).

Bu gelişmeler, COP31'e devredilen gündemin yalnızca yeni iklim hedeflerinin belirlenmesiyle sınırlı olmadığını göstermektedir. COP30 sonrasında başlatılan "*Belém Mission to 1.5"* süreci, ulusal katkı beyanları ve ulusal uyum planlarının uygulanmasının hızlandırılması, uluslararası iş birliğinin geliştirilmesi ve iklim yatırımlarının artırılmasını 2026 gündeminin temel unsurları arasına yerleştirmiştir (UNFCCC, 2026b).

3. COP31 VE TÜRKİYE'DE YEREL İKLİM YÖNETİŞİMİ

3.1. COP31'in Türkiye Açısından Önemi

COP31'in 9–20 Kasım 2026 tarihlerinde Antalya'da gerçekleştirilmesi planlanmaktadır. Konferans COP31'in yanı sıra Kyoto Protokolü Taraflar Toplantısı'nın 21. oturumu (CMP21) ve Paris Anlaşması Taraflar Toplantısı'nın sekizinci oturumunu (CMA8) da kapsayacaktır (UNFCCC, 2026a).

COP31 hazırlık sürecinin ayırt edici özelliklerinden biri uygulama odaklılık olarak görünmektedir. Türkiye'nin COP31 Başkanlığının ilk resmi mesajında taahhütlerin ölçülebilir ve uygulanabilir sonuçlara dönüştürülmesine vurgu yapılmıştır. UNFCCC de COP31 hazırlıklarını, COP30 sonrasında iklim taahhütlerinin uygulamasının hızlandırılması perspektifiyle ele almaktadır (UNFCCC, 2026b).

Bu yaklaşım Türkiye'nin mevcut iklim politikalarındaki dönüşümle birlikte değerlendirildiğinde daha anlamlı hale gelmektedir. Türkiye 2025 yılında ikinci Ulusal Katkı Beyanını sunmuş ve 2035'i hedef yıl olarak belirlemiştir. Beyan enerji, endüstriyel süreçler, tarım, atık ve arazi kullanımı-arazi kullanım değişikliği ve ormancılık dahil olmak üzere ekonomi genelini kapsamaktadır (iklim.gov.tr., 2025).

Bunun yanında 2025 yılında kabul edilen İklim Kanunu, yerel yönetimler açısından yeni bir kurumsal çerçeve ortaya koymuştur. Kanun doğrultusunda yerel iklim değişikliği eylem planlarının her ilin bütüncül planı olacak şekilde hazırlanması ve büyükşehirlerde büyükşehir belediyelerinin bu sürece katılması öngörülmektedir. Ayrıca

yerel yönetim temsilcilerinin de dahil olduğu İl İklim Değişikliği Koordinasyon Kurullarının kurulması düzenlenmiştir (T.C. İklim Değişikliği Başkanlığı, 2025).

Dolayısıyla COP31'in Türkiye açısından önemi yalnızca uluslararası bir konferansa ev sahipliği yapılmasından kaynaklanmamaktadır. Konferans, ulusal iklim hedeflerinin uygulamaya geçirilmesi ile yerel iklim eyleminin kurumsallaşmasının aynı dönemde gerçekleşmesi nedeniyle küresel, ulusal ve yerel iklim politikaları arasında yeni bağlantılar kurulmasına imkân sağlayabilecek bir süreç niteliğindedir.

3.2. Türkiye'de Yerel Yönetimler Açısından Ortaya Çıkan Fırsatlar

COP31'in Türkiye'de gerçekleştirilmesi, yerel yönetimler açısından doğrudan ve otomatik bir kazanım anlamına gelmemektedir. Bununla birlikte konferansın yarattığı uluslararası görünürlük, politika gündemi ve iş birliği ortamı çeşitli fırsat alanlarının ortaya çıkmasını sağlayabilir.

İlk fırsat alanı çok düzeyli iklim yönetişiminin güçlendirilmesidir. Türkiye'nin İklim Kanunu ile oluşturduğu İl İklim Değişikliği Koordinasyon Kurulları ve yerel iklim değişikliği eylem planı sistemi, merkezi ve yerel yönetimler arasında yeni koordinasyon mekanizmaları öngörmektedir. COP31'in çok düzeyli yönetişim konusundaki uluslararası deneyimlerin Türkiye'ye aktarılması açısından katalizör işlevi görmesi mümkündür.

İkinci alan iklim finansmanıdır. Yerel yönetimlerin iklim eylemlerini uygulamasındaki temel sorunlardan biri, planlanan projelerin yatırım aşamasına taşınabilmesidir. COP31 Başkanlığının Ağustos 2026'da gerçekleştirdiği İklim Dirençli Şehirler Zirvesi'nde belediyelerin su, atık, enerji ve afet risklerine ilişkin verilerini ölçmesi ve bunları "finansmana hazır projelere" dönüştürmesi yönünde çağrı yapılmış; yerel yönetimlere yönelik finansman paketleri üzerinde çalışıldığı belirtilmiştir (T.C. Çevre, Şehircilik ve İklim Değişikliği Bakanlığı, 2026). Bu yaklaşım devam ettirildiği takdirde COP31, belediyelerin ulusal ve uluslararası iklim finansman mekanizmalarıyla ilişkisini güçlendirebilir.

Üçüncü fırsat alanı yerel iklim eylem planlarının yaygınlaştırılması ve niteliğinin geliştirilmesidir. İklim Kanunu kapsamında yerel iklim değişikliği eylem planlarının hazırlanmasına yönelik hukuki yükümlülüğün ortaya çıkması, COP31 süreciyle birleştiğinde belediyelerde iklim planlama kapasitesinin geliştirilmesini hızlandırabilir.

Dördüncü alan kurumsal ve teknik kapasitenin geliştirilmesidir. İklim eylem planlarının hazırlanması tek başına yeterli değildir. Belediyelerin iklim risklerini belirleyebilmesi, sera gazı envanterleri oluşturabilmesi, proje geliştirebilmesi, finansman kaynaklarına başvurabilmesi ve uygulama sonuçlarını izleyebilmesi için uzman personel ve kurumsal yapılara ihtiyaç bulunmaktadır. Türkiye'deki belediyelere ilişkin güncel araştırmalar da teknik uzmanlık ve eğitimli personel eksikliklerinin yerel iklim uyumunun temel sınırlılıkları arasında bulunduğunu göstermektedir (Küçük Horasan ve Özerol, 2026).

Beşinci alan uluslararası kent ağları ve kent diplomasisidir. COP31'in Türkiye'de gerçekleştirilmesi, Türk belediyelerinin uluslararası yerel yönetim ağları, diğer kentler ve uluslararası kuruluşlarla doğrudan temas kurmasını kolaylaştırabilir. Bu süreç yalnızca belediyelerin uluslararası görünürlüğünün artması açısından değil, iyi uygulamaların aktarılması, ortak proje geliştirilmesi ve politika öğrenmesi açısından da önemlidir.

Altıncı fırsat alanı ise yerel katılım ve ortaklıkların geliştirilmesidir. İklim değişikliğinin çok sektörlü niteliği belediyelerin üniversiteler, meslek kuruluşları, sivil toplum, özel sektör ve vatandaşlarla birlikte hareket etmesini gerekli kılmaktadır. Yerel iklim yönetişimi üzerine Türkiye'de gerçekleştirilen güncel çalışmalar da yerel iklim politikalarının belediyelerin tek taraflı faaliyetleri yerine farklı yerel paydaşların katılımını içeren bir yönetişim modeli içerisinde değerlendirilmesi gerektiğine işaret etmektedir (Kırboz ve Atar, 2026).

Tablo.1 COP31'in Türkiye'de Yerel Yönetimler Açısından Sunduğu Potansiyel Fırsatlar

Fırsat Alanı	Yerel Yönetimler Açısından Potansiyel Karşılığı
Çok düzeyli iklim yönetişimi	Merkezi ve yerel yönetimler arasında koordinasyon ve ortak politika geliştirme kapasitesinin güçlendirilmesi
İklim finansmanı	Belediyelerin ulusal ve uluslararası finansman kaynaklarına erişiminin ve finansmana hazır proje geliştirme kapasitesinin artırılması
Yerel iklim eylem planları	Yerel iklim değişikliği eylem planlarının yaygınlaştırılması, niteliklerinin geliştirilmesi ve uygulamayla ilişkilendirilmesi

Fırsat Alanı	Yerel Yönetimler Açısından Potansiyel Karşılığı
Kurumsal ve teknik kapasite	İklim birimleri, uzman personel, veri üretimi, risk analizi ve izleme kapasitesinin geliştirilmesi
Uluslararası kent ağları	Belediyelerin uluslararası ağlara katılımı, iyi uygulama paylaşımı ve ortak proje geliştirme imkânlarının artırılması
Yerel katılım ve ortaklık	Üniversite, STK, özel sektör ve vatandaşların yerel iklim politikalarına katılımının güçlendirilmesi
İklim dirençli kentleşme	Ulaşım, su, atık, enerji, yeşil alan ve afet yönetiminin iklim dirençliliği perspektifiyle bütünleştirilmesi

Kaynak: *Yazarlar tarafından UNFCCC belgeleri, Türkiye'nin güncel iklim politikaları ve ilgili literatürden yararlanılarak hazırlanmıştır.*

Tablodaki fırsatlar birlikte değerlendirildiğinde COP31'in potansiyel etkisinin yalnızca konferans süresiyle sınırlı olmadığı görülmektedir. Esas önem taşıyan konu, konferansın oluşturduğu uluslararası ve ulusal politika hareketliliğinin kalıcı yerel kapasiteye dönüştürülüp dönüştürülemeyeceğidir. Bu açıdan COP31'in başarısı, belediyelerin konferansa görünürlük veya temsil amacıyla katılımından çok, konferans sonrasında ortaya çıkan finansman, bilgi, ortaklık ve politika araçlarının yerel düzeyde ne ölçüde kullanılabildiği üzerinden değerlendirilmelidir.

4. SONUÇ

İklim değişikliğinin çok boyutlu niteliği, iklim politikalarının yalnızca ulusal yönetimler veya uluslararası kuruluşlar tarafından yürütülebilecek bir alan olmadığını ortaya koymuştur. Kentler, iklim değişikliğinin etkilerinin yoğun biçimde hissedildiği mekânlar olmalarının yanı sıra azaltım ve uyum politikalarının önemli bölümünün uygulandığı alanlardır. Bu nedenle yerel yönetimler küresel iklim yönetişiminin giderek daha önemli aktörleri haline gelmektedir.

COP31'in Türkiye'de düzenlenmesi, bu küresel eğilimin Türkiye'deki yerel iklim politikalarıyla buluşması açısından önemli bir fırsat oluşturmaktadır. Çalışmada yapılan değerlendirme sonucunda COP31'in özellikle çok düzeyli iklim yönetişiminin güçlendirilmesi, iklim finansmanına erişim, yerel iklim eylem planlarının geliştirilmesi, kurumsal kapasitenin artırılması, uluslararası kent ağlarına katılım, yerel paydaş iş birlikleri ve iklim dirençli kentleşme alanlarında yerel yönetimler açısından fırsatlar yaratabileceği sonucuna ulaşılmıştır.

Bununla birlikte bu fırsatların varlığı, bunların kendiliğinden yerel politika kazanımlarına dönüşeceği anlamına gelmemektedir. Yerel yönetimlerin mali ve teknik kapasitesi, merkezi ve yerel yönetimler arasındaki görev ve yetki paylaşımı, kurumsal koordinasyon, nitelikli personel, güvenilir yerel iklim verileri ve izleme-değerlendirme sistemleri sürecin başarısını belirleyecektir. Türkiye'deki belediyelere ilişkin güncel bulguların teknik uzmanlık, altyapı ve insan kaynağı eksikliklerine işaret etmesi de bu gerekliliği desteklemektedir (Küçük Horasan ve Özerol, 2026).

2025 tarihli İklim Kanunu'nun yerel iklim değişikliği eylem planlarını ve İl İklim Değişikliği Koordinasyon Kurullarını kurumsallaştırması bu açıdan önemli bir başlangıçtır (T.C. İklim Değişikliği Başkanlığı, 2025). COP31 ise söz konusu hukuki ve kurumsal dönüşümün uluslararası deneyim, finansman ve iş birlikleriyle desteklenmesi açısından bir politika penceresi oluşturabilir.

Sonuç olarak COP31'in Türkiye'deki yerel yönetimler açısından kalıcı değeri, konferansın Antalya'da gerçekleştirilmesinden çok, küresel iklim gündeminin yerel kurumsal kapasiteye, uygulanabilir projelere ve ölçülebilir iklim eylemlerine ne ölçüde dönüştürülebildiğiyle belirlenecektir. Bu nedenle COP31 sonrasında yerel yönetimlerin iklim politikalarındaki değişimin izlenmesi; yerel eylem planları, finansman kullanımı, uluslararası iş birlikleri ve uygulama sonuçları üzerinden yapılacak araştırmalar açısından da önemli bir çalışma alanı oluşturacaktır.

KAYNAKÇA

Betsill, M. M. ve Bulkeley, H. (2006). Cities and The Multilevel Governance Of Global Climate Change. Global Governance, 12(2), 141–159.

Bulkeley, H. ve Betsill, M. M. (2005). Rethinking Sustainable Cities: Multilevel Governance And The "Urban" Politics Of Climate Change. Environmental Politics, 14(1), 42–63. doi:10.1080/0964401042000310178.

Fuhr, H., Hickmann, T. ve Kern, K. (2018). The Role Of Cities İn Multi-Level Climate Governance: Local Climate Policies And The 1.5°C Target. Current Opinion in Environmental Sustainability, 30, 1–6. doi:10.1016/j.cosust.2017.10.006.

Güler, E. (2026). İklim değişikliği kanunları ve Türkiye'de İklim Değişikliği Kanunu'na göre yerel yönetimler. Çankırı Karatekin Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi, 16(1).

Kern, K. ve Bulkeley, H. (2009). Cities, Europeanization and multi-level governance: Governing climate change through transnational municipal networks. Journal of Common Market Studies, 47(2), 309–332. doi:10.1111/j.1468-5965.2009.00806.x.

Kırboz, Ş. ve Atar, E. (2026). Yerel iklim yönetişimi ve iklim değişikliği politikaları: Rize ili örneği. Karadeniz Araştırmaları Enstitüsü Dergisi, 12(25).

Küçük Horasan, E. ve Özerol, G. (2026). Climate change adaptation status of Turkish local governments: A comparative analysis. Urban Climate, 65, 102815. doi:10.1016/j.uclim.2026.102815.

Lamontagne, M. (2026). "We Are The State": Cities' Quest For Recognition İn Climate Diplomacy. Urban Studies. doi:10.1177/00420980261417127.

Lee, T. ve Koski, C. (2015). Multilevel Governance And Urban Climate Change Mitigation. Environment And Planning C: Government And Policy, 33(6). doi:10.1177/0263774X15614700.

T.C. Çevre, Şehircilik ve İklim Değişikliği Bakanlığı. (2026). COP31 yolunda İklim Dirençli Şehirler Zirvesi. Ankara. https://csb.gov.tr/haberler/cop31-yolunda-iklim-direncli-sehirler-zirvesi-306372.

T.C. İklim Değişikliği Başkanlığı. (2025). İklim Kanunu. Ankara. https://iklim.gov.tr/yerel-iklim-degisikligi-eylem-planlari-ile-il-iklim-degisikligi-koordinasyon-kurullari-hakkinda-yonetmelik-resmi-gazetede-yayimlandi-duyuru-41

T.C. İklim Değişikliği Başkanlığı. (2025). Türkiye Cumhuriyeti İkinci Ulusal Katkı Beyanı. https://iklim.gov.tr/db/turkce/icerikler/files/%C4%B0kinci%20Ulusal%20Katku%20Beyan%C4%B1%20(NDC%203.0).

United Nations Framework Convention on Climate Change [UNFCCC]. (2026a). UN Climate Change Conference – Antalya, November 2026 (COP31). https://unfccc.int/cop31.

United Nations Framework Convention on Climate Change [UNFCCC]. (2026b). Belém Mission to 1.5. https://unfccc.int/process-and-meetings/conferences/un-climate-change-conference-antalya-november-2026/belem-mission-to-15.

United Nations Framework Convention on Climate Change [UNFCCC]. (2026c). COP30 Action Agenda Outcomes Report. https://unfccc.int/sites/default/files/resource/COP30%20Action%20Agenda_Final%20Report.

Digital Communication In Fighting Wildfires: An Examination Of Municipalities' Social Media Use

Doç. Dr. Miray Özden[1] **Doç. Dr. Seray Özden Keleş[2]**

[1] Tekirdağ Namık Kemal University, Social Sciences Vocational School, Local Governments, mirayozden@nku.edu.tr, ORCID: 0000-0001-7998-9699

[2] Kastamonu University, Forest Faculty, Forest Engineering, sozden@kastamonu.edu.tr, ORCID: 0000-0002-2379-5331

Abstract: Wildfires are becoming an increasingly significant area of disaster and risk management for local governments due to climate change, drought, extreme temperatures, and human-induced pressures. During wildfire emergencies, the rapid dissemination of accurate and reliable information is critical for evacuation, response, relief, and coordination processes. Social media provides municipalities with the capacity to communicate directly with citizens, share real-time developments, and disseminate warnings and guidance. This study aims to comparatively assess the digital communication practices of local governments during the wildfires that occurred in İzmir between 29 June and 4 July 2025, particularly affecting Seferihisar and Menderes. Publicly accessible official digital communication content of İzmir Metropolitan Municipality, Seferihisar Municipality, and Menderes Municipality was examined through qualitative document analysis and content analysis. The analytical framework consists of six dimensions: real-time situation updates, risk and warning communication, visibility of response and coordination, citizen guidance, solidarity and relief communication, and post-fire communication. The assessment indicates that municipalities used digital channels particularly to communicate response activities, disseminate official warnings, and make inter-institutional coordination visible. However, two-way communication, standardized evacuation information, and pre-disaster wildfire risk communication remain areas for improvement. The study argues that social media should be considered not merely as an institutional visibility tool but as a functional component of local disaster governance.

Keywords: Wildfires, Disaster Communication, Social Media, Local Governments, Digital Communication

1. INTRODUCTION

Wildfires are disasters in which natural and anthropogenic factors interact and which can have serious consequences for ecosystems, settlements, economic activities, and human life. In the Mediterranean basin, rising temperatures, drought, and extreme weather conditions increase wildfire risk, while development in wildland–urban interface areas also increases the likelihood of fires reaching settlements. This situation requires wildfire management to be addressed not only in terms of firefighting capacity but also through the dimensions of risk reduction, preparedness, coordination, and communication.

During disasters, the need for information increases rapidly compared with normal periods. The timely dissemination of information concerning the location and direction of a fire, evacuated areas, road closures, safe zones, response capacity, and relief points can directly influence citizens' behaviour. Disaster communication should therefore be regarded not merely as a complementary component of disaster management, but as one of the fundamental functions determining the effectiveness of emergency response.

Social media offers significant advantages for disaster communication in terms of speed, accessibility, and direct communication. However, the effective use of these platforms does not depend solely on the frequency of posts. Information must be verified, consistent, comprehensible, and actionable; messages issued by different institutions should not contradict one another; and citizens should know which official sources to follow. Studies conducted in Türkiye on wildfires also demonstrate that public institutions make extensive use of social media for information provision and explanation, while their capacity for dialogic communication may remain limited (Boztepe Taşkıran & Ağca, 2023: 1–25).

Yazar (2022) examined Twitter posts by public actors during the 2021 wildfires in the Aegean and Mediterranean regions and drew attention to the importance of coordination, preparedness, and information management in crisis communication. Emiroğlu Bayır and Koçyiğit (2022), meanwhile, found that disaster management, cooperation and assistance, and the use of technology were among the prominent themes on social media during the 2021 wildfires. These studies demonstrate that social media has become an important sphere for both institutional information provision and societal response during wildfire emergencies.

On 29 June 2025, a wildfire that started in a forested area between Kuyucak neighbourhood in Menderes and Orhanlı neighbourhood in Seferihisar expanded rapidly under the influence of strong winds and affected numerous settlements. According to data from İzmir Metropolitan Municipality, ten neighbourhoods in Seferihisar and several neighbourhoods in Menderes were affected in the following days, while approximately 10,000 hectares of land were damaged (İzmir Metropolitan Municipality, 2025d). This event provides an appropriate case for examining the digital communication practices of metropolitan and district municipalities during the same disaster.

The main research question of this study is formulated as follows: "For what communication purposes do municipalities at different administrative scales use social media and official digital channels during a wildfire?" Accordingly, İzmir Metropolitan Municipality, Seferihisar Municipality, and Menderes Municipality are examined comparatively.

2. THE IMPORTANCE OF DISASTER COMMUNICATION AND SOCIAL MEDIA FOR LOCAL GOVERNMENTS

Disaster communication encompasses different stages, including making risks understandable before a disaster, disseminating accurate and timely information during a disaster, and informing the public about the recovery process in the aftermath. Therefore, communication is not limited to announcements made during moments of crisis. Promoting protective behaviours during the risk reduction and preparedness phases, preventing information gaps by providing reliable information during disasters, and transparently communicating recovery activities after disasters are all components of the same communication cycle.

Digital platforms offer significant advantages, particularly during rapidly evolving wildfires. Recent research indicates that social media and electronic alerts are useful for communicating evacuation decisions in response to rapidly changing wildfire conditions. At the same time, it emphasizes the importance of coordinating messages among local institutions and establishing centralized sources of information that citizens can trust (Sandoval et al., 2025).

From the perspective of local governments, social media serves two primary functions. The first is a public communication function through which information on risks, emergency response, evacuation, and relief is provided to citizens. The second is an institutional communication function that makes municipal activities in the field, inter-institutional coordination, and the use of resources visible to the public. Maintaining a balance between these two functions is particularly important during disasters. Although communicating institutional activities is legitimate, allowing such content to overshadow actionable information that helps citizens make informed decisions may reduce the effectiveness of disaster communication.

The content analysis conducted by Boztepe Taşkıran and Ağca (2023: 1–25) on the wildfires of 2021 and 2022 demonstrates that informing, legitimizing, and explaining were prominent purposes in public institutions' social media posts, whereas dialogic communication remained limited. This finding supports the need to assess municipalities' use of social media not merely in terms of posting frequency, but also according to the purpose of the messages and their practical value for citizens.

3. MATERİAL AND METHOD

The research was designed within a qualitative research framework, employing document analysis and comparative content analysis methods. The wildfires that affected İzmir between 29 June and 4 July 2025 were selected as the case study. The units of analysis are İzmir Metropolitan Municipality, Seferihisar Municipality, and Menderes Municipality. These three municipalities were selected because they were directly affected by the same wildfire event and represent different administrative positions at the metropolitan and district municipality levels.

The dataset is based on a qualitative assessment of announcements, statements, warnings, visual/video content, and guidance related to the wildfire published through the municipalities' publicly accessible official websites and social media channels. Since social media content may be deleted over time, platform accessibility may change, and user comments are dynamic in nature, the study does not provide a quantitative performance ranking based on the number of posts. Instead, the analysis focuses on the communication functions of the accessible official content.

The coding framework was developed in accordance with the relevant disaster and risk communication literature and consists of six dimensions: (1) real-time situation updates, (2) risk and warning communication, (3) visibility of emergency response and inter-institutional coordination, (4) citizen guidance and actionable information, (5) solidarity and relief communication, and (6) post-wildfire recovery and risk reduction communication. A dimension was coded as "Prominent" when it was explicitly and repeatedly observed in the content, "Partial" when it appeared in a limited or indirect manner, and "Limited" when no clear manifestation of the relevant dimension was identified in the accessible content.

The purpose of the research is not to measure the operational performance of municipalities in wildfire management, but rather to describe their digital communication approaches during the disaster. Therefore, the findings should not be interpreted as a performance ranking of the municipalities' overall disaster management capacities.

4. FINDINGS

4.1. İzmir Metropolitan Municipality

İzmir Metropolitan Municipality has regularly published statements through its official digital channels since 29 June 2025, when the wildfire began, providing information on the areas affected by the spreading fire, locations of emergency response activities, firefighting capacity, and inter-institutional coordination. In statements entitled "İzmir on Alert for Wildfires and Storms" and "İzmir Fire Department Fully Mobilized in the Field," the municipality informed the public about response locations in Menderes, Seferihisar, and other districts. It also stated that a coordination centre had been established in Ürkmez and that response activities were being carried out in cooperation with different institutions (İzmir Metropolitan Municipality, 2025a; 2025b).

At the metropolitan level, communication particularly emphasized the scope of field operations and coordination capacity. Subsequent statements provided information on neighbourhoods affected by the wildfire, response activities, and the extent of the damage. In a statement issued on 1 July, the public was informed about the affected neighbourhoods in Seferihisar and Menderes and that approximately 10,000 hectares of land had been damaged (İzmir Metropolitan Municipality, 2025d). These contents provide a strong example of real-time situation updates and the visibility of institutional coordination.

İzmir Metropolitan Municipality's wildfire communication was not limited to the emergency response phase. The *"Wildfire Emergency Action Plan for Municipalities",* prepared by the municipality in 2025, addresses pre-fire technological monitoring, education of local communities, response capacity, post-fire ecosystem restoration, and long-term communication strategies in an integrated manner (İzmir Metropolitan Municipality, 2025e). This is particularly significant in terms of linking digital communication with the risk reduction and preparedness dimensions of wildfire management.

4.2. Seferihisar Municipality

For Seferihisar Municipality, the main focus of communication was to keep citizens informed about the current situation and to encourage them to follow official warnings, particularly as the wildfire approached the district boundaries and residential areas. In a statement issued by the Mayor on 29 June, information was provided on the time the fire started and the initial response, the aerial and ground vehicles deployed in the field, newly emerging fire locations, and the role of the municipality's Directorate of Disaster Affairs in the response operations. Citizens were also urged to follow the warnings issued by official authorities and to take the necessary precautions.

This approach demonstrates that Seferihisar Municipality's digital communication combined real-time situation updates, risk warnings, and inter-institutional coordination. The municipality's 2025 Annual Activity Report also records that municipal personnel provided uninterrupted support in response to the wildfire between 29 June and 2 July (Seferihisar Municipality, 2026).

In the case of Seferihisar, one of the strengths of communication at the local level is its ability to convey developments at the neighbourhood and locality levels in a more immediate and concrete manner for citizens. Nevertheless, adopting a more standardized structure for disaster communication could further strengthen the actionable nature of digital communication. In particular, presenting information such as safe assembly areas,

evacuation routes, relief points, and the time of the latest update in a consistent format could enable citizens to access critical information more effectively.

4.3. Menderes Municipality

Menderes is one of the districts at the centre of the wildfire event, as the fire originated in the Kuyucak area and subsequently affected other settlements in the following days. Information provided by İzmir Metropolitan Municipality and national sources identifies response and affected areas around Kuyucak, Keler, Yeniköy, and Gümüldür in Menderes. Menderes Municipality's official communication infrastructure integrates its website, social media accounts, and WhatsApp communication channel (Menderes Municipality, 2026).

Based on the accessible digital content, the case of Menderes demonstrates the importance of municipalities avoiding dependence on a single communication platform during disasters. The combined use of social media, official websites, and direct messaging channels is particularly important in situations where access to a platform may be disrupted or critical information may become difficult to locate within rapidly changing social media feeds. However, due to the limited availability of archived content accessible within the scope of this study, no quantitative or definitive ranking of Menderes Municipality's social media performance has been made.

Table 1. Comparison of Municipalities' Digital Communication Approaches During the Wildfire Period

Analysis Dimension	İzmir Metropolitan Municipality	Seferihisar Municipality	Menderes Municipality
Real-Time Situation Updates	Prominent	Prominent	Partially *
Risk and Warning Communication	Prominent	Prominent	Partially *
Visibility of Response and Coordination Activities	Prominent	Prominent	Partially *
Citizen Guidance and Actionable Information	Partially	Partially	Partially *
Solidarity and Relief Communication	Prominent	Prominent	Partially *
Post-Wildfire Recovery and Risk Reduction Communication	Prominent	Prominent	Partially *
Prominent Communication Approach	Operational Situation, Coordination, and Long-Term Preparedness	Local Situation, Warnings, and Field Coordination	Multi-Channel Local Communication; Limited Archived Data

Note: * Due to the limited availability of accessible archived official content for Menderes Municipality, the assessment was conducted cautiously. The categories do not represent quantitative performance scores.

Source: *Prepared by the authors based on the municipalities' publicly accessible official digital content and relevant institutional documents.*

5. DISCUSSION

The comparative assessment demonstrates that municipalities may develop different communication priorities during the same wildfire depending on their administrative scale and institutional responsibilities. While İzmir Metropolitan Municipality emphasized its broad geographical scope, firefighting capacity, and inter-institutional coordination, Seferihisar Municipality communicated developments at the neighbourhood and locality levels, as well as warnings directed at citizens, more prominently. This differentiation indicates that disaster communication is closely associated with institutional responsibilities and administrative scale.

The findings are consistent with those of Boztepe Taşkıran and Ağca (2023: 1–25), who found that public institutions predominantly use social media for information provision and explanation during wildfires. Similarly, communicating emergency response activities and providing up-to-date situation information are among the primary functions observed in the municipal content examined in this study. Nevertheless, there remains a need

to develop more standardized forms of actionable information that can facilitate citizens' decision-making during emergencies.

It is also important that disaster communication should not be regarded solely as crisis communication that becomes operational after a wildfire has already started. Recent studies on risk communication demonstrate that regularly promoting protective behaviours, raising awareness of high-risk activities, and familiarizing citizens with official information sources before the wildfire season can strengthen communication capacity during an emergency. A recent study examining the social media use of the General Directorate of Forestry also draws attention to the limited presence of risk communication content and emphasizes the need to strengthen inter-institutional coordination.

Accordingly, a three-stage communication model can be proposed for municipalities' social media strategies: risk awareness and preparedness before a wildfire; verified real-time information, evacuation/guidance, and coordination during a wildfire; and communication concerning damage, relief, ecological recovery, and reconstruction after a wildfire. Such a model can move digital communication beyond the boundaries of institutional public relations and transform it into an integral component of local disaster governance.

6. CONCLUSION

This study evaluated the digital communication approaches of İzmir Metropolitan Municipality, Seferihisar Municipality, and Menderes Municipality in the context of the wildfires that occurred in İzmir between 29 June and 4 July 2025. The findings indicate that social media and other official digital channels performed important functions during the wildfire, including providing up-to-date situation information, making emergency response activities visible, disseminating official warnings, and communicating inter-institutional coordination to the public.

However, effective digital disaster communication should not be understood merely as the production of a high volume of content. Messages need to be verified, time-stamped, location-specific, and actionable, while critical information such as evacuation areas, safe routes, relief points, and contact numbers should be presented in a standardized format. It is also important for municipalities to use social media, official websites, SMS/messaging systems, and other local communication channels within an integrated and complementary communication structure.

The main limitation of the study is the varying accessibility of historical content on social media platforms and, in particular, the limited availability of archived official content for Menderes Municipality. Therefore, the study does not provide a quantitative performance ranking among the municipalities; instead, it focuses on the communication functions of the accessible official content. Future research could construct a comprehensive dataset of Instagram, X, and Facebook posts related to a specific wildfire event and employ quantitative content analysis to examine posting times, content types, engagement levels, citizen questions, and municipal responses.

In conclusion, social media should be regarded not merely as a channel through which municipalities publicize their institutional activities in the context of wildfire management, but as a strategic public communication infrastructure that supports risk reduction, crisis management, citizen guidance, and post-disaster recovery.

REFERENCES

Boztepe Taşkıran, H. ve Ağca, M. E. (2023). Kamusal Halkla İlişkiler Perspektifinden Afet İletişimi Ve Sosyal Medya Kullanımı: Orman Yangınları Üzerine Bir İnceleme. Kastamonu İletişim Araştırmaları Dergisi, 11, 1-25. doi:10.56676/kiad.1251910.

Emiroğlu Bayır, A. ve Koçyiğit, N. (2022). 2014'ten Günümüze Risk Yönetim Politikaları Ve 2021 Temmuz Ve Ağustos Ayı Orman Yangınlarının Sosyal Medyada Yansımalarının Risk Yönetimi Açısından Değerlendirilmesi. Afet ve Risk Dergisi, 5(1).

İzmir Büyükşehir Belediyesi. (2025a). İzmir'de Yangın Ve Fırtına Teyakkuzu. 29 Haziran 2025. https://itfaiye.izmir.bel.tr/tr/HaberDetay/11306/59

İzmir Büyükşehir Belediyesi. (2025b). İzmir İtfaiyesi Tüm Gücüyle Sahada. 29 Haziran 2025. https://itfaiye.izmir.bel.tr/tr/HaberDetay/11307/59.

İzmir Büyükşehir Belediyesi. (2025c). Büyükşehir Ekipleri Tüm Birimleriyle Sahada. 30 Haziran 2025. https://www.izmir.bel.tr/tr/Haberler/buyuksehir-ekipleri-tum-birimleriyle-sahada/56485/156.

İzmir Büyükşehir Belediyesi. (2025d). Son Üç Günde Çıkan Yangınlar Yaklaşık 10 Bin Hektarlık Alanı Küle Çevirdi. 1 Temmuz 2025. https://www.izmir.bel.tr/tr/Haberler/son-uc-gunde-cikan-yanginlar-yaklasik-10-bin-hektarlik-alani-kule-cevirdi/56491/156

İzmir Büyükşehir Belediyesi. (2025e). İzmir Büyükşehir Belediyesi, Yangınlar İçin Acil Eylem Planı Hazırladı. 10 Haziran 2025. https://www.izmir.bel.tr/tr/Haberler/izmir-buyuksehir-belediyesi-yanginlar-icin-acil-eylem-plani-hazirladi/56368/156

Menderes Belediyesi. (2026). İletişim Ve Resmî Dijital Kanallar. Menderes Belediyesi.

Seferihisar Belediyesi. (2026). 2025 Faaliyet Raporu. Seferihisar Belediyesi.

Yazar, F. (2022). 2021 Yılında Akdeniz Ve Ege Bölgesinde Gerçekleşen Orman Yangınlarının Afet Kriz İletişimi Yönetimi Bağlamında İncelenmesi. Selçuk Üniversitesi Sosyal Bilimler Enstitüsü Dergisi.

Sandoval, S., Bui, J. and Hopfer, S. (2025). Wildfire and Smoke Risk Communication: A Systematic Literature Review from a Health Equity Focus. Systematic literature review.

Avrupa Birliği Vergi Politikası ve Vergilendirme Yetkisinin Sınırlandırılması

Dr.Öğr.Üyesi Aykut Tavşancı

Trakya Üniversitesi/İİBF, Maliye Bölümü, aykuttavsanci@trakya.edu.tr, 0000-0002-5796-5888

Özet: Avrupa Birliği üye devletlerin egemenliklerini belli ölçüde sınırlandırdıkları, egemenliğin kapsadığı yetkilerin bir kısmını birlik kurumlarına devrettikleri bir ekonomik bütünleşmedir. Avrupa Birliği kendine ait hukuk düzeni olan tek örgüttür. Birliğe üye devletlerin egemenlikleri kapsamındaki bir kısım yetkileri birliğe devretmeleri sonucunda oluşmuştur. Vergi politikası ikincil bir politika olup, bu politikanın saptanmasında ve uygulanmasında ikincil AB hukuku belirleyici bir işleve sahiptir.

Anahtar Kelimeler: Avrupa Birliği, Vergi Politikası, Vergilendirme Yetkisi

European Union’s Tax Policy and the Limitation of Taxing Powers

Abstract: The European Union is a form of economic integration in which the member states have agreed to limit certain aspects of their sovereignty by transferring some of the powers traditionally associated with state sovereignty to the Union institutions. The European Union is the only international organization that possesses its own autonomous legal power. The Union emerged through the delegation of specific sovereign competences from its members to the Union institutions. Tax policy constitutes a secondary policy area within the EU, and secondary European Union law plays a decisive role in both the formulation and implementation of this policy.

Keywords: European Union, Tax Policy, Taxing Power.

1.GİRİŞ

Avrupa kurumları, birleşik bir Avrupa inşa etmek amacıyla İkinci Dünya Savaşı sonrasında başlayan, genel Avrupa bütünleşmesi sürecinin çekirdeğidir. Avrupa Birliği üç Topluluk üzerine inşa edilmiştir: 1951 yılında Paris Anlaşması ile kurulan Avrupa Kömür ve Çelik Topluluğu, 1957 yılında Roma Anlaşması ile kurulan Avrupa Atom Enerjisi Topluluğu ve 1992 yılında Maastricht Anlaşması ile Avrupa Birliği olarak adlandırılan Avrupa Ekonomik Topluluğu. Üç Avrupa Topluluğu tarafından paylaşılan AB kurumları da birbirini tamamlamaktadır (www.deltur.cec.eu.int).

Avrupa Birliği üye devletlerin egemenliklerini belli ölçüde sınırlandırdıkları, egemenliğin kapsadığı yetkilerin bir kısmını birlik kurumlarına devrettikleri bir ekonomik bütünleşmedir (Çağan, 1990:87). Avrupa Birliği kendine ait hukuk düzeni olan tek örgüttür. Birliğe üye devletlerin egemenlikleri kapsamındaki bir kısım yetkileri birliğe devretmeleri sonucunda oluşmuştur.

Vergi politikası ikincil bir politika olup, bu politikanın saptanmasında ve uygulanmasında ikincil AB hukuku belirleyici bir işleve sahiptir.

2. AVRUPA BİRLİĞİNDE VERGİ POLİTİKASI

Vergilendirme konusu, AB içerisinde güncelliğini koruyan ve tartışmalara neden olan bir konudur. Çünkü Topluluk bünyesinde gerçekleştirilecek vergi düzenlemeleri, ulusal düzeydeki bazı yetkilerin devredilmesini içermektedir. Topluluğun ortak nitelikte bir vergi politikası da yoktur.Vergi ve maliye politikası, üye devletlerin ulusal yetki sınırları içinde bulunmaktadır (Batırel, 1990:70).

Avrupa Birliğinde vergi politikası, Avrupa bütünleşmesine göre şekil olan ikincil bir politikadır. Nitekim Roma Anlaşmasının vergi ile ilgili hükümleri, Topluluğun temel ilkeleri arasında değil, Topluluğun Politikası başlıklı üçüncü kısımda rekabet kurallarından hemen sonra ve mevzuatın yakınlaştırılması ile ilgili hükümlerden önce yer almaktadır. Ayrıca vergi politikasının saptamasında ve uygulanmasında ikincil AB Hukuku (AB kurumlarının işlemleri) belirleyici bir işleve sahiptir.

Vergi politikası belirlenirken AB’nin amacı ve hedef aldığı bütünleşme modeli, önemli rol oynamaktadır. Üye devletlerin izledikleri ekonomik ve sosyal politikalar kendi ulusal yetki alanları içinde kaldığından vergilendirmenin AB düzeyinde ekonomik ve sosyal politika amaçları ile kullanılması söz konusu olmamaktadır. Roma Anlaşması, AB’de ekonomi ve maliye politikasını ortak politika alanı olarak kabul etmemiştir. Bu nedenle AB’nin ulusal devletlerde geçerli olan ekonomik ya da sosyal amaçlı asli nitelikte bir vergi politikası bulunmamaktadır. Buna karşılık AB’nin izlediği ya da izlemesi gereken temel politikaların tümünün vergilendirme ile ilgili belli yönleri ya da sonuçları bulunmaktadır. Örneğin malların, kişilerin, hizmetlerin ve sermayenin serbest

dolaşımının tarım, ulaştırma ve rekabet politikaları ile bölgesel politikanın vergilendirme ile ilişkisi bulunmaktadır. Dolayısıyla AB'nin de mali ihtiyaçları ve bütünleşme aşamalarının gerektirdiği vergi düzenlemelerine ihtiyacı bulunmaktadır. Bu nedenle vergi politikası, AB'nin temel amaçlarına ulaşmasında önemli bir rol oynamaktadır (Çağan, 1995:147).

Avrupa Birliği, vergi politikasını, vergi uyumlaştırması düzenlemeleri ile uygulamaktadır. Vergi uyumlaştırmasının konularını ve kapsamını bütünleşmesinin ekonomik ve sosyal hedefleri belirlemektedir. Bu açıdan bakıldığında vergi uyumlaştırması tek başına bir amaç değil, ekonomik ve siyasal bütünleşme sürecini geliştirmeye yönelik bir araçtır (Günay, 2000:133).

Avrupa Birliği'nde vergiye yönelik genel yaklaşım, üye devletlerin vergi sistemlerinde farklılıkların yol açtığı haksız rekabet ortamlarını engellemek amacıyla, üye devletler arasında ayrımcı vergilemenin önlenmesi, çifte vergilemenin önlenmesi ve vergi kaçakçılığıyla mücadele ile birlikte, üye devletlerin ulusal vergi yasalarının uyumlaştırılmasını kapsamaktadır. Üye devletlerin uyguladıkları vergileri tanım, matrah ve oranları yönünden uyumlaştırmak ve Topluluk kurumlarının bu konularda aldığı kararlara uyma zorunlulukları bulunmaktadır (Yıldız, 2002:49).

Avrupa Konseyi'nin Mart 2000 tarihli Lizbon Zirvesi'nde Birliğin stratejik amacı, Avrupa Birliği'ni dünyanın en iyi rekabet edebilen ve dinamik, bilgiye dayalı bir ekonomi alanı haline getirmek şeklinde belirlenmiştir.

Komisyon, Lizbon Zirvesi'ni takiben, AB'de uygulanacak vergi politikalarını ve bunlar arasından önümüzdeki yıllar için öncelik taşıyanları belirleyen bir bildiri hazırlayarak Avrupa Konseyi'ne ve Parlamentosu'na sunmuştur. Bu bildiride Komisyon, AB'nin gelecek yıllarda uygulaması gereken vergi politikasına ilişkin temel önceliklerini belirlemiş, AB'nin diğer politik amaçlarını dikkate alarak genel vergi politikasını belirlemeye çalışmıştır.

Komisyona göre, AB vergi politikasının öncelikle dört temel hakkı (Yerleşim serbestisi, serbest mal ve sermaye dolaşımı ile hizmet özgürlüğü) dikkate alacak şekilde vatandaşların ve ekonominin çıkarlarını ön planda tutması gerekmektedir. O halde, öncelikle bu temel hakka aykırı olan vergisel engeller ortadan kaldırılmalı, vergi sistemleri basit ve şeffaf olmalıdır.

İkinci olarak, AB'nin vergi alanındaki girişimlerinin, vergi sistemlerinin mal, hizmet ve sermaye piyasalarının işlemlerini etkin bir şekilde yerine getirecek ve iş piyasasının da sorunsuz çalışmasını sağlamaya yönelik olması gerekmektedir. Vergi politikası bakımından bunun anlamı, AB içindeki farklı vergi sistemleriin varlığından kaynaklanan kayıpların, vergisel engeller ve bozuklukların ortadan kaldırılmasıdır.

Son olarak, vergi politikası, üye ülkelerin, vergi sistemlerinden kaynaklanan ekonomik bozuklukları ortadan kaldırmak amacıyla matrah tabanının genişletilmesiyle eş zamanlı şekilde nominal vergi oranlarını indirme çabalarını desteklemelidir (Yavaşlar, 2002:365,366).

Avrupa Birliği'nin belirtilen hedeflere ulaşabilmesi için; tarım, ticaret, taşıma ve vergi politikalarının uyumlu hale getirilmesi, birlik üyesi devletlerin arasındaki farklılıkların giderilmesi gerekmektedir.

Avrupa Birliği'ne üye devletler arasındaki ekonomik ve mali ilişkinin geliştirilmesi mal ve hizmet hareketlerindeki tek bir ülke gibi hareket edilebilmesi için çeşitli politikaların yanı sıra, üye ülkelerin vergi sistemlerinin uyumlaştırılması da gerekmektedir. Bu bağlamda, vergilendirme alanında Birlik uyum çalışmaları Roma Anlaşmasının 100. maddesi hükmüne uygun olarak direktifler aracılığıyla yürütülmektedir. Ancak, üye devletlerin vergi sistemleri halen tam olarak uyumlaştırılamamıştır.

Avrupa Birliği'ne üye devletler arasındaki vergi eşitsizliğinin ortadan kaldırılması amacıyla öncelikle, vergi politikasındaki farklılıkların giderilmesi gerekmekte olup, bu da vergi uyumlaştırmasıyla mümkün olmaktadır. Ülkeler arası üretim faktörleri hareketliliğinin vergi eşitsizliği nedeniyle ticaret saptırıcı sonuçlara yol açmaması ve rekabeti engellememesi isteniyorsa, dolaylı ve dolaysız vergi yasalarının üye devletler arasında uyumlaştırılması gerekmektedir.

2.1. Vergi Uyumlaştırma Çalışmaları ve Hukuki Dayanağı

Vergi uyumlaştırması; Birliğe üye devletler arasında sıkı bir ekonomik ilişkinin kurulması, sürekli ve dengeli gelişmenin sağlanması ve ticaret saptırıcı ve rekabeti önleyici vergi eşitsizliğinin ortadan kaldırılması amacıyla üye devletlerin vergi mevzuatlarının birbirine yakınlaştırılması olarak tanımlanabilir (Saraçoğlu, Ejder, 2002: 123).

Avrupa Birliği, üye devletler arasında ekonomik ilişkilerin geliştiği, serbest rekabet kuralları içinde rekabet eşitliğine dayanan, ekonomik ve sosyal açıdan devamlı gelişen ve güçlenen bir topluluk yaratmak istemekte, bu

amaçlarına ulaşmak için vergi uyumlaştırılması üzerinde durmaktadır (TOBB, 2001,117). Ekonomik, sosyal, mali ve siyasal açıdan tek bir ülke gibi hareket etmek isteyen AB'nin bu amaca ulaşması, vergilendirmeye yönelik ortak politika uygulamasını gerektirmektedir. Bu nedenle üye devletler arasında gerek dolaylı, gerekse dolaysız vergilerde uyumlaştırma gereği ortaya çıkmaktadır.

Vergi uyumlaştırmasındaki amaç, üye ülkelerin vergi sistemlerini tek ve eşit duruma getirmek olarak anlaşılmamalıdır. Vergi uyumlaştırması, üretim faktörleri hareketlerinin serbestleşmesi temelinde üye ülkeler arasında ticaret saptırıcı ve rekabeti bozucu vergi oranları ve vergi yapısı farklılıklarının ortadan kaldırılarak birlik içinde rekabete ve etkinliğe dayalı bir ticari ilişkinin konulması amacını içermektedir (Kopits, 1992:3). Bilindiği gibi, vergi uyumlaştırmasının sağlıklı temellere dayandırılması, hukuki altyapısının olmasına ve Konseyin bu konuda direktif çıkarmasına bağlı olmaktadır.

Birlik vergi politikasının ana hukuksal dayanağı olan ve topluluğun kurulmasına yol açan Roma Anlaşması'nda, uygulanacak vergi politikalarına yol gösteren ekonomik amaçlı hükümler belirtilmekte ve bu amaçlara ulaşmak için araçlar sıralanmaktadır (Kirazcı,1987:38). Anlaşmanın 2. ve 3. maddelerinde Topluluğun amaçlarına ulaşmak için gerekli araçlar belirtilmiş, 95-99. maddelerinde de vergi uyumlaştırmasıyla ilgili hükümlere yer verilmiştir. Uyumlaştırma için ise hukuki dayanakların yanı sıra, Konsey tarafından direktifler çıkarılması gerekmektedir. Direktifler aracılığıyla en anlamlı uyumlaştırma KDV alanında gerçekleştirilmiş olup, verginin kabulü ve matrahın uyumlaştırılmasıyla ilgili olarak ikinci ve altıncı direktifler çıkarılmış ve bu direktiflerde ayrıntılı düzenlemelere yer verilmiştir.

Avrupa Birliği'nde vergi uyumlaştırması konusunda katma değer vergisiyle ilgili ayrıntılı direktifler çıkarılmasına rağmen; dolaysız vergiler alanında özellikle de gelir vergisiyle ilgili ayrıntılı direktifler bulunmamaktadır. Birlik içinde genellikle dolaylı vergilerde uyumlaştırma üzerinde durulmaktadır. Ancak, dolaysız vergiler de üretim maliyetleri arasında yer almakta olup, ticari hayatı ve rekabeti etkilemekte, bu nedenle dolaysız vergilerin de uyumlaştırılması gerekmektedir

3.AVRUPA BİRLİĞİ'NDE ÜYE DEVLETLERİN VERGİLENDİRME YETKİLERİNİN SINIRLANDIRILMASI

Devletler vergilendirme yetkilerini sınırlandırırken çok duyarlı davranırlar; kendi ekonomik, tarihi, kültürel ve dini özelliklere ve geleneklere bağlı olarak geliştirdikleri vergi sistemlerini çok kısa zamanda değiştirmeleri kolay olmamaktadır. Diğer taraftan ülke parlamentolarının vergilendirme yetkisini kazanması, demokratik gelişiminin öncüsü olmuştur. Buda devletlerin vergilendirme yetkilerini sınırlandırırken titiz davranmalarına neden olmaktadır (Arıkan, 1994:104).

Vergilendirme yetkisi Birlik hukuk düzeni çerçevesinde bir takım sınırlandırmalara tabidir. Üye devletlerin vergilendirme yetkileri anlaşma hükümleri ile getirilen düzenlemelerle ve Birlik kurumlarının anlaşmanın öngördüğü hedefler doğrultusundaki işlemleri ile sınırlandırılmaktadır (Çağan,1982:241).

3.1. Gümrük Vergileri ve Eş Etkili Vergilerin Kaldırılması

Roma Anlaşması'nın 9. maddesine göre Avrupa Birliği, gümrük birliği üzerine kurulmuştur. Ekonomik bütünleşmeler içerisinde gümrük birliğinin sahip olduğu özellik; üye devletler arasındaki gümrüklerin sıfırlanması ve üye olmayan devletlere karşı ortak gümrük tarifesi uygulanmasıdır. Üye devletlerin kendilerine ait gümrük tarifesi yoktur. Gümrük Birliğine üye devletler tek bir gümrük tarifesi uygulamak zorundadırlar (Gökbel,1996:72). Bu madde hükmüyle üye devletler arasında gerek ithalata, gerek ihracata konu olan mallara ilişkin gümrük vergisi ve buna eş etkili sonuçlar doğurabilecek her türlü mali yükümlülük bu yasağın kapsamı içine girmektedir. Üye devletler gümrük birliği kurarak bu alandaki yetkilerini birbirlerine karşı kullanmaktan sürekli olarak vazgeçmişler ve yetkilerini topluluğa devretmişlerdir.

Roma Anlaşması'nın 11. maddesinde de, "Üye devletler belirlenen süreler içinde gümrük vergileri konusunda, bu anlaşmaya uygun olarak hükümetlerinin kendilerine düşen yükümlülükleri yerine getirebilmelerine olanak sağlayacak her türlü uygun önlemi alırlar" hükmü yer almıştır. Bu hüküm ile, üye devletlerin hukuk sistemleri içinde gümrük vergileri alanındaki yetkinin bölüşümüne de müdahale edilmektedir (Çağan,1990:241).

Anlaşmanın 12. maddesi ile, "üye devletler kendi aralarındaki ihracat ve ithalata yeni gümrük vergileri ya da eş etkili resimler koymaktan ve karşılıklı ticari ilişkilerine uyguladıklarını arttırmaktan kaçınırlar" hükmü getirilmiştir. Bu hüküm ile, üye devletler arasında var olan farklı gümrük tarifelerindeki gümrük vergilerinin arttırılmasını ve yeni vergiler konmasını önleyerek üye devletlerin bu konudaki vergilendirme yetkilerini kullanmalarına kısıtlama getirilmiştir.

Roma Anlaşması'nın 12. madde hükmü Adalet Divanı tarafından oldukça geniş yorumlanmaktadır. Bu konuda iki örnek karar bulunmaktadır (Kabaalioğlu, 1995:77). Birincisi İtalyan Hükümetinin sanat eserleri dışsatımı üzerine, bu eserlerin ülke dışına çıkışına engel olmak amacıyla koyduğu dışsatım vergisini, sanat eseri satışını ticari işlem niteliğinde sayarak, bu mal üzerine konan vergiyi gümrük vergisi ile eş etkili olarak kabul etmiştir. İkinci örnek ise, Belçika'nın elmas dışalımı üzerine, elmas sanayinde çalışan işçilere fon aktarmak amacıyla vergi koymasını kabul etmemiştir. Divana göre, 12. madde de yer alan yasak, sağlanacak gelirin nerede harcanacağı veya amacının ne olduğuna bağlı değildir. Hangi amaçla alınırsa alınsın ve toplanan para nerede harcanırsa harcansın, bir malın devletler arasında alım satımında sınırdan geçişinde ödenen bir bedel, anlaşmaya aykırı olmaktadır.

Görüldüğü gibi, Roma Anlaşması sadece gümrük vergilerinin değil aynı zamanda gümrük vergileriyle eş etkili tüm ödemelerinde kaldırılmasını öngörmektedir. Herhangi bir üye devletin gümrük vergisi konusunda kaldırılan vergilendirme yetkisi, gümrük vergisi olmasa dahi aynen gümrük vergisi ile eş etkili ödemelerle ilgili olarak ta kullanılamamaktadır.

Eş etkili ödeme kavramı, ülkeye giren veya ülkeden çıkan mala, gümrük vergisi uygulanmamakla beraber, başka gerekçelerle sınırdan geçen mallar için ödenmesi istenen bedeldir (Kabaalioğlu, 1995:78). Adalet Divanı gümrük vergilerini eş etkili ödemelerden ayırmak için bu kavramların şu özellikleri üzerinde durmaktadır (Çağan,1990:153).

Gümrük vergileri, üye devletlerin ulusal gümrük mevzuatlarında belirlenen, tarifeye, bağlanan ve malların ülke sınırından geçmesi sırasında alınan vergilerdir. Gümrük vergilerine eş etkili ödemeler ise dar anlamda gümrük vergilerinin dışında kalan ve birlik içi ticarete konu olan mallar üzerinden, bunların gerek dışalımı gerek dışsatımı sırasında, sınırdan geçmeleri nedeniyle konulan parasal yükümlülüklerdir.

Gümrük vergisine eş etkili yükümlülükler koyma yasağının uygulanmasında belirleyici ölçüt, yükümlülüğün niteliğinden çok etkileridir. Bu yükümlülüğün isminin vergi, resim, pay veya ücret olması, miktarının küçük olması, tanım veya tahsil şekli önemli değildir. Parasal yükümlülük, gümrük vergileri gibi, malın maliyet bedelini değiştirerek ve buna bağlanmış olan idari formalitelerle birlikte malların serbest dolaşımını olumsuz etkilemektedir.

Bu yükümlülüklerin konuluş amacının mali, sosyal veya idari olması, yasağın uygulanması açısından önem taşımamaktadır.

İthalat üzerine konulan yükümlülükler bakımından; aynı nitelikteki yerli ürünlerin benzer başka yükümlülüklere tabi tutulması yasağın geçerliliğini etkilememektedir.

Yükümlülüğün, gümrük vergisine eş etki olarak nitelendirilebilmesi için bir üye devlet tarafından tek taraflı olarak konulması gerekmektedir. Ancak, mali yükümlülüğün söz konusu üye devletin yararına konulmuş olması veya kamu hukukuna tabi bir kuruluş tarafından konulmuş olması, bu niteliği değiştirmemektedir.

3.2. Devlet Yardımlarının ve Teşvik Tedbirlerinin Yasaklanması

Roma Anlaşması (Madde 92-94) kural olarak üye devletlerin kendi işletmelerine, sanayilerine, ürünlerine ve belirli bölgelere üye devletler arası ticareti olumsuz etkileyecek nitelikte yardım yapmalarını yasaklamaktadır. Roma Anlaşması madde 92/1'e göre, "Bu anlaşmada aksi öngörülmedikçe, devletler tarafından doğrudan ya da devlet kaynakları aracılığı ile bazı işletme veya bazı malların üretimi yararına yapılan ve rekabeti bozan ya da bozma tehlikesi yaratan her çeşit yardım üye devletler arasındaki ticareti etkilediği ölçüde ortak pazarla bağdaşmaz" denilmektedir. Görüldüğü gibi, bu hükme göre devlet yardımı kavramı esnek ölçüler içinde değerlendirilmektedir. Bu çerçeve içinde üye devletlerin belli sanayilere, işletmelere ve bölgelere tanıdıkları vergi muaflıkları, istisnaları, vergi iadeleri, indirimleri ve başka yollardan sağladıkları teşvik tedbirleri bu yasağın kapsamına girmektedir.

Bununla beraber Roma Anlaşması, belirli sosyal ve bölgesel dengesizliklerin düzeltilebilmesi için Anlaşmada açık olarak tanımlanmış ve sınırlandırılmış olan sosyal, bölgesel ve sektörel yardımların yapılabileceğini kabul etmiştir (madde 92/2, 3). Örneğin, ürünlerin menşei bakımından herhangi bir ayrım yapılmamak koşulu ile tüketicilere yapılan sosyal nitelikteki yardımlar; doğal afetler veya olağanüstü olaylardan sonra meydana gelen zararları önlemeye yönelen yardımlar; Avrupa'nın ortak çıkarına bir projenin gerçekleştirilmesini sağlamaya veya üye devletlerden birinin ekonomisinde ortaya çıkan ciddi bir bozukluğu düzeltmeye yönelen yardımlar gibi (Çağan,1995:155).

Diğer devlet yardımlarında olduğu gibi vergilere ilişkin devlet yardımlarında da devlet yardımlarının yapılması konusu yalnızca devlete tanınan bir yetki olmaktan çıkmıştır. Bu alandaki yetkiler Birlik kurumlarına

devredilmiştir. Çok istisnai bazı durumlarda, üye devletlere bazı tasarrufları ve yardımları yapma konusunda bırakılan yetkiler önce Komisyon daha sonra da Konseyin denetimine tabi yetkiler haline getirilmiştir (Doğan,197966). Komisyon Avrupa'nın dünya piyasasında rekabet gücünün azaldığı duyarlı sanayiler (Demir, Çelik, Tekstil, Gemi inşa) ile ABD ve Japonya'nın rekabeti dolayısıyla devlet yardımına ihtiyaç gösteren ileri teknoloji sanayilerine sektörel yardım programlarına izin vermektedir. Ancak Komisyon, yardımın Birlik hedefleri ile çelişmemesi ve Birlik içi rekabet dengesini bozmaması koşullarını aramaktadır (Çağan,1995:155).

Üye devletlerin ekonomik ve sosyal politika amaçları ile belli ürünlere veya belli koşulları taşıyan üreticilere vergi muaflıkları, istisnaları veya indirimleri tanımaları, diğer üye ülkelerden ithal edilen ürünler aleyhine ayırım yapılmaması koşulu ile geçerli olmaktadır.

Anlaşılacağı gibi, Roma Anlaşması devlet yardımlarında da üye devletlerin vergilendirme yetkilerini kaldırmakta ya da sınırlandırmaktadır.

3.3. Üye Devletlerde Ayırımcı Vergilendirmenin Önlenmesi

Avrupa Birliği, 1957 yılında imzalanan ve Roma Anlaşması ile başlayan süreçten günümüze önemli aşamalar kaydetmiştir. Roma Anlaşması'nın vergi ile ilgili düzenlemeleri (madde 95-99) incelendiğinde rekabeti bozucu vergisel uygulamaların ortadan kaldırılması ve devletler arasında ortak bir vergi temelinin oluşturulması hedeflenmektedir. Bu bağlamda devletler arasındaki vergisel farklılıklar, Birlik içindeki malların, hizmetlerin ve üretim faktörlerinin dolaşımını engelleyecek ya da etkinliği sınırlayacak ve dolayısıyla Birlik refahının artışını olumsuz etkileyebilecektir (Önder, 1987:65).

Roma Anlaşması, kapsamına giren konularda, uyrukluk temeline dayanılarak yapılan bütün ayrımcı işlemleri yasaklamaktadır. Bu ilke Anlaşmanın iç pazarla ilgili bir çok maddesinde ve AB mevzuatında özel yansımalarını bulmuştur. Bu düzenlemelere bakıldığında, ayrım yapmama ilkesinin Anlaşmanın bütününe nüfus ettiği görülmektedir. Nitekim Adalet Mahkemesi'nin yerleşik içtihadı, " Anlaşmanın ayrım yapmama ilkesini içeren özel düzenlemeler Birlik hukukunun ilkelerinden biri olan genel eşitlik ilkesinin ifadesinden başka bir şey olmadığı" yönündedir. Yine Mahkemeye göre, "Vatandaşlığa dayalı ayrımcılık yasağı ancak Birlik hukukunun kapsamına giren bir durum için Anlaşmada özel bir ayrım yapmama ilkesi yer almıyorsa uygulanabilir" denilmektedir (Soydan, 2002:149,150).

Roma Anlaşması'nın iç vergilerle[3] ilgili hükümleri (madde 95-99) bir taraftan vergilendirme alanında ulusçuluk temeline dayanılarak ayrım yapılmasını önlemeye yönelmekte, diğer taraftan da üye devletlerin sistemleri arasındaki rekabeti bozucu farklılıkların giderilmesini amaçlamaktadır.

Anlaşmanın 95. maddesine göre, "Hiçbir üye devlet diğer üye devletlerin ürünlerine doğrudan veya dolaylı olarak, benzeri kendi ürünlerine doğrudan veya dolaylı olarak uyguladıklarından hangi nitelikte olursa olsun daha fazla iç vergiler koyamaz. Ayrıca, hiçbir üye devlet, diğer üye devletlerin ürünlerine dolaylı olarak koruyacak nitelikte iç vergiler koyamaz." 96. maddede de "Üye devletlerin birinin ülkesine ihraç edilen ürünler, doğrudan ya da dolaylı olarak tabi oldukları vergilerden daha yüksek hiçbir iç vergi iadesinden yararlanamazlar" hükmü yer almaktadır. Bu hükümlerle üye devletlerin yerli üreticileri korumak amacı ile yapacakları vergi düzenlemeleri önlenmek istenmiştir. Gerçekten ithalat üzerine konulan denkleştirici vergiler ve ihracatta iade edilen vergiler üye devletler arasındaki rekabet dengesini bozabilmektedir.

Açıklamalarımızdan da anlaşılabileceği gibi, ayrım yapmama ilkesiyle de üye devletlerin vergilendirme yetkilerine sınırlandırmalar getirilmiştir.

Üye devletlerin vergilendirme yetkilerine getirilen bir diğer sınırlandırma şekli de, Birlik kurumlarının işlemleridir. Bilindiği gibi, Birlik hukukunun ikincil kaynağı Topluluk kurumlarının işlemleridir. Anlaşma hükümleri ile olduğu gibi bu işlemlerle de üye devletlerin vergilendirme yetkileri sınırlandırılabilmektedir. Roma

Anlaşması'na göre Topluluk kurumları tüzük ve direktif çıkartabilir, karar alırlar, tavsiye ve görüş bildiriminde bulunabilirler. Vergilendirme alanında da Konseyin çıkarttığı çeşitli direktif ve kararlarla Komisyonun çıkarttığı tavsiye kararları bulunmaktadır.

[3] Burada iç vergiler deyimi mamulün üzerine doğrudan ya da dolaylı (ham madde, yarı mamul ve ara malların üzerine konulan) konulan vergileri ifade etmektedir.

Birlik kurumlarının üye devletlerin vergilendirme yetkilerini sınırlandıran işlemleri, uluslarüstü yasama işlemleridir. Bu işlemler, ulusal vergi mevzuatlarında değişiklik getirdikleri ölçüde, ulusal parlamentoların ve hükümetlerin serbestileri azalmaktadır (Çağan, 1982:254).

Açıklamalarımızda da anlaşılabileceği gibi, vergilendirme yetkisi Birlik hukuk düzeni çerçevesinde bir takım sınırlandırmalara tabi tutulmuştur. Üye devletlerin vergilendirme yetkileri anlaşma hükümleri ile getirilen düzenlemeler ve Topluluk kurumlarının işlemleri ile sınırlandırılmaktadır. Bu bağlamda, Avrupa'nın geleceği ilgili çalışmalarda en hassas konu, AB ile üye devletlerin yetkileri arasındaki sınırların nasıl belirleneceği olmaktadır. AB'nin kendine özgü konumu nedeniyle, sorun sadece AB ile üye devletler arasındaki yetkiyi paylaştırmak değil, aynı zamanda bu yetkilerin karşılıklı kullanım sınırını da tespit edebilmektir.

Avrupa Birliği Kurumları ile üye devletler arasındaki yetki paylaşımı konusunda mevcut siyasi ve teknik güçlükler dikkate alındığında, üye sayısının giderek artması AB'nin yeni sorunlarla karşılaşması kaçınılmaz olacaktır. Böyle bir ortamda, AB içinde kurulmuş dengelerin, yapıların ve çalışma metotlarının da gözden geçirilmesi gerekmektedir.

4.SONUÇ

Vergilendirme konusu, Avrupa Birliği içinde güncelliğini koruyan ve tartışmalara neden olan bir konudur. Birliğin ortak nitelikte bir vergi politikası yoktur. Vergi ve maliye politikası, üye devletlerin ulusal yetki sınırları içinde bulunmaktadır. Birlik ortak bir vergi politikasına sahip olmamasına rağmen, üye devletler arasında gümrük vergilerinin kaldırılması, ortak gümrük tarifesinin uygulanması ve ayrımcı verginin olmamasıyla üye devletlerin vergilendirme yetkilerinde sınırlandırmalara gitmektedir.

Avrupa Birliği'nde vergi politikası, Avrupa bütünleşmesine göre şekil alan ikincil bir politikadır. Vergi politikası belirlenirken Avrupa Birliği'nin amacı ve hedef aldığı bütünleşme modeli önemli rol oynamaktadır. Avrupa Birliği vergi politikasını, vergi uyumlaştırması düzenlemeleri ile uygulamaktadır. Uyumlaştırma konusunda dolaylı vergilerdeki uyumlaştırma çalışmaları dolaysız vergilerdeki uyumlaştırma çalışmalarına göre öncelikli olarak yürütülmektedir. Bu durumun öncelikli nedeni, söz konusu vergilerin, malların maliyet bedelini direkt olarak etkilemeleri dolayısıyla rekabet eşitliğinin sağlanmasında oynadıkları büyük roldür. Diğer nedeni ise, dolaysız vergilerin uyumlaştırması konusunda Birlik üyesi devletlerin egemenlik haklarının zedelenmemesi konusunda gösterdikleri hassasiyetlerdir. Tüm çalışmalara rağmen, üye devletlerin vergi sistemleri halen tam olarak uyumlaştırılamamıştır.

KAYNAKÇA

Arıkan, Zeynep, (1994), "Demokratik Gelişim Sürecinde Vergilendirme Yetkisinin Kullanımı ve Sınırları (Türkiye Analizi)", **Yayınlanmamış Doktora Tezi**, Dokuz Eylül Üniversitesi, Sosyal Bilimler Enstitüsü, Maliye Anabilim Dalı, İzmir

Batırel, Ömer Faruk,(1990), "Avrupa Birliği Vergi Politikası ve Tam Üyeliğin Türk Vergi Politikasına Muhtemel Etkileri", **Maliye Araştırma merkezi Konferansları**, Otuzüçüncü Seri, Sene 1989/1990, İstanbul

Çağan, Nami,(1982), **Vergilendirme Yetkisi**, Kazancı Hukuk Yayınları, İstanbul, 1982

Çağan, Nami,(1990), **Avrupa Topluluğunda Vergi Politikası ve Türk Vergi Sistemi**, Hacettepe Üniversitesi İ.İ.B.F. Maliye Bölümü Yayını

Çağan, Nami,(1995)," Avrupa Birliği Vergi Politikası ve Türkiye Üzerindeki Etkileri", **Avrupa Birliği El Kitabı**, TC Merkez Bankası Yayını, Ankara

Doğan, İzzettin,(1979), **Türk Anayasal Düzeninin Avrupa Toplulukları Hukuk Düzeniyle Bütünleşme Sorunları**, İstanbul Üniversitesi Hukuk Fakültesi Yayını, No: 2473/555, İstanbul

Gökbel, Doğan,(1996). "Vergilendirme Yetkisinin Uluslararası Alanda Sınırlandırılması**,** Avrupa Birliği ve Gümrük Birliği Sürecinde Türkiyenin Vergilendirme Yetkisi", **Yayınlanmamış Yüksek Lisans Tezi**, Anadolu Üniversitesi, Sosyal Bilimler Enstitüsü, Eskişehir

Günay, Ayşe,(2000), " Türk Vergi Sisteminin Avrupa Birliği Vergi Sistemi İle Uyumlaştırılmasının Türk Anayasa Hukuku ve Türk Vergi Hukuku Açısından Değerlendirilmesi", **Vergi Sorunları**, S: 140, Mayıs

Kabaalioğlu, Haluk,(1995), "Gümrük Birliği Uygulamasına İlişkin Sorunlar", **Mükellefin Dergisi**, S: 33, Eylül

Kirazcı, Deniz,(1987), " Avrupa Ekonomik Topluluğu'nda Vergi Politikası", **Vergi Dünyası**, S: 69, Mayıs

Kopits, George,(1992), **Tax Harmonization in the European Community**, IMF Occasional Paper, Washington DC, July

Önder, İzzettin,(1987), "Vergi Ahenkleştirmesi Sorunu Üzerine Düşünceler", **Maliye Yazıları**, S: 7, Haziran/Temmuz

Saraçoğlu, Fatih, Ejder, Haydar,(2002), " Vergi Uyumlaştırması Açısından AB Ülkelerinde Gelir Vergisi Uygulamalarının Değerlendirilmesi", **Vergi Sorunları**, S: 164, Mayıs

[TOBB,(2001), **Vergilemede Global Eğilimler, AB ve Türk Vergi Sistemi**, Özel İhtisas Komisyon Raporu, Ankara

Soydan, Billur Yaltı,(2002), "Avrupa Birliği'nde Dolaysız Vergiler: Uyumlaştırmak ya da Uyumlaştırmamak", **Avrupa Birliğine Geçiş Süreci ve Türk Maliyesinin Uyumu**, 17. Türkiye Maliye Sempozyumu, TÜRMOB Yayınları – 185

Yavaşlar, Funda Başaran,(2002) „ Avrupa Birliği ve Konsolide Bir Kurumlar Vergisi Matrahı", **Avrupa Birliğine Geçiş Süreci ve Türk Kamu Maliyesinin Uyumu**, 17. Türkiye Maliye Sempozyumu, TÜRMOB Yayınları-185

Yıldız, Mircan,(2002), „ Avrupanın Ekonomik ve Parasal Bütünleşmesinde Maliye Politikasının Rolü ve Türkiye Açısından Bir Değerlendirme", **Avrupa Birliğine Geçiş Süreci ve Türk Kamu Maliyesinin Uyumu**, 17. Türkiye Maliye Sempozyumu, TÜRMOB Yayınları-185

www.deltur.cec.eu.int, 15.09.2003

Avrupa Birliği ve Türkiye İlişkilerinin Anayasa Hukuku Açısından Değerlendirilmesi

Dr.Öğr.Üyesi Aykut Tavşancı

Trakya Üniversitesi/İİBF, Maliye Bölümü, aykuttavsanci@trakya.edu.tr, 0000-0002-5796-5888

Özet: Avrupa Birliği, kendi içinde Birliğe üye devletlerin refahının en üst düzeye çıkartılması amacına yönelik olarak kurulmuş bir uluslararası örgüttür. Birliğin refahının en üst düzeye çıkartılması ise, öncelikle, kişilerin, malların, hizmetlerin ve sermayenin serbest dolaşımını engelleyen hukuki ve siyasal engellerin kaldırılması koşuluna bağlıdır. Böyle bir serbest dolaşım ise, ancak üye devletlerin, gerekli ekonomik ve mali önlemleri almaları ile söz konusu olabilir. Hiç kuşkusuz, mali önlemlerin başında ise, vergi uyumlaştırması gelmektedir.

Anahtar Kelimeler: AB, Anayasa, Vergilendirme Yetkisi

An Assessment on the European Union-Turkey Relations from the Perspective of Constitutional Law

Abstract: The European Union is an international organization established with the aim of maximizing the walfare of its member states. Achieving this objective depends, first and foremost, on the removal of legal and political barriers that restrict the free movement of persons, goods, services and capital. Such freedom of movement can only be realized if the member states adopt the necessary economic and fiscal measures. Among these measures, tax harmonisation undoubtedly occupies a central place, as it provides an essential foundation for the functioning of the internal market.

Keywords: European Union, Constitution, Taxation Power.

1.GİRİŞ

Avrupa Birliği, kendi içinde Birliğe üye devletlerin refahının en üst düzeye çıkartılması amacına yönelik, bir uluslararası örgüttür. Birliğin refahının en üst düzeye çıkartılması ise, kişilerin, malların, hizmetlerin ve sermayenin serbest dolaşımını engelleyen hukuki ve siyasal engellerin öncelikle kaldırılması koşuluna bağlıdır. Böyle bir serbest dolaşım ise, ancak üye devletlerin, gerekli ekonomik ve mali önlemleri almaları ile söz konusu olabilir. Hiç kuşkusuz, mali önlemlerin başında ise, vergi uyumlaştırması gelmektedir.

Küreselleşme eğiliminin bölgesel bütünleşmeler aracılığıyla hız kazandığı günümüzde Türkiye çeşitli alternatifler arasından tercihini, coğrafi ve siyasi koşulları da göz önüne almak suretiyle Avrupa Birliği'nden yana kullanmıştır. Dolayısıyla, vergi uyumlaştırması bir araç olarak, tam üye olması söz konusu olan Türkiye'nin Birlikle ilişkileri açısından önemlidir. Türk Vergi Sisteminin AB Vergi Sistemi ile uyumlaştırılması, vergi politikasını düzenleyen vergi hukukunun ve başta Anayasa olmak üzere diğer hukuk sistemlerinin birleşme doğrultusunda uyumlaştırılmasını gerektirmektedir

2. TÜRKİYE – AVRUPA BİRLİĞİ İLİŞKİLERİNİN TARİHSEL GELİŞİMİ

Türkiye'nin, AB ile olan ilişkilerinde 60 yılı aşkın bir geçmişi bulunmaktadır. Türkiye, Avrupa Ekonomik Topluluğunun 1958 yılında kurulmasından kısa bir süre sonra Temmuz 1959'da Topluluğa üye olmak için başvurmuştur. Tam üyelik başvurumuza verilen yanıtta, Türkiye'nin kalkınma düzeyinin tam üyeliğin gereklerini yerine getirmeye yeterli olmadığı bildirilmiş ve tam üyelik koşulları gerçekleşinceye kadar geçerli olacak bir ortaklık anlaşması imzalanması önerilmiştir. Söz konusu anlaşma 12 Eylül 1963 tarihinde Ankara'da imzalanmıştır (www. mfa. gov. tr/turkce/grupa/ab/abab/ilişki.htm).

Ankara Anlaşması'nda Türkiye'nin AB ile ilişkileri hazırlık, geçiş ve son dönem olmak üzere üç aşamalı olarak saptanmıştır. 1 Aralık 1964'de hazırlık dönemi başlamış olup bu dönem anlaşmada beş yıl olarak belirlenmiş, fakat fiilen sekiz yıl sürmüştür (Tunç,2002:7). Bu süreçte Türk ekonomisinin, AET'nin de mali yardımları ile, daha gelişmiş bir düzeye ulaştırılarak geçiş ve son aşama süreçleri için hazırlıklı olması amaçlanmıştır (Aslan,2000:11). Hazırlık dönemini takiben, 1 Ocak 1973 tarihinde yürürlüğe giren Katma Protokol ile taraflar arasında giderek bir gümrük birliği kurulmasını amaçlayan geçiş dönemi başlatılmıştır. Bu dönemde, birkaç istisna dışında sanayi ürünleri ihracatına daha ilk günden serbesti, tarım ürünlerine çeşitli sürüm kolaylıkları ve Türk ekonomisine mali yardım öngörülürken, karşılığında da Türkiye'nin 22 yıla yayılan bir takvim çerçevesinde Gümrük Birliği'ni gerçekleştirme ve ekonomisini AB'ye katılmaya hazırlama yükümlülüğü getirilmiştir. AB, daha Katma Protokol yürürlüğe girmeden 1 Eylül 1971'de Türkiye çıkışlı sanayi ürünlerinden alınan her türlü vergi ve resimler ile her

türlü kısıtlamaları tek taraflı olarak kaldırmıştır. Ayrıca 1 Ocak 1987'den itibaren Türkiye menşeli tarım ürünlerinde gümrükleri kaldırmıştır. Türkiye ise, 1973'de ilk gümrük indirimlerini yapmış ve 1975'ten itibaren gelişen politik, ekonomik ve sosyal sorunlar nedeniyle AB'ne karşı yükümlülüklerini yerine getirmemiştir (Tunç,2002:7,8). 12 Eylül 1980 döneminde ve Yunanistan'ın 1980'de Topluluğa tam üye olmasıyla Topluluk-Türkiye ilişkileri dondurulmuştur.

İkili ilişkilerin 1986 yılında tekrar başlamasından sonra 14 Nisan 1987 tarihinde, Türkiye Roma Anlaşması'nın 237. maddesi gereğince Avrupa Birliği Konseyi'ne tam üye olarak kabul edilme talebinde bulunmuştur. Komisyon tam üyelik başvurumuza 1989 yılında verdiği yanıtta, Türkiye'nin AB'ne üyelik konusundaki ehliyetini kabul etmekle birlikte, Topluluğun kendi içindeki derinleşme sürecini tamamlamasına ve gelecek genişlemesine kadar beklemesini ve bu arada Türkiye ile Gümrük Birliği sürecinin tamamlanmasını önermiştir. Bu öneri tarafımızdan da olumlu değerlendirilmiş ve Gümrük Birliği'nin Katma Protokolde öngörüldüğü şekilde 1995 yılında tamamlanması için gerekli hazırlıklara başlanmıştır. İki yıl süren görüşmeler sonunda 5 Mart 1995 tarihinde yapılan Ortaklık Konseyi toplantısında alınan karar uyarınca Türkiye ile AB arasındaki Gümrük Birliği 1 Ocak 1996 tarihinde yürürlüğe girmiştir.

Aralık 1997'de gerçekleştirilen Lüksemburg Zirvesi sonunda alınan kararlar, Türkiye ile AB ilişkilerinde yeni bir süreç başlatmıştır. Zirvede, Türkiye'nin ehliliği teyit edilmekte ve diğer başvuran ülkelerle aynı işlemi göreceği belirtilmiş, ayrıca Ankara Anlaşması'nın çerçevesinin genişletilmesi, Gümrük Birliğinin derinleştirilmesi, mali işbirliğinin yürürlüğe konulması, AB yasaları ve ilkelerine uyum sağlanması ile Topluluk mali programlarından Türkiye'nin yararlandırılması gibi bazı öneriler getirilmiş ve Avrupa Konferansına katılım öngörülmüştür. Ancak belirlenen genişleme perspektifi kapsamında, diğer ülkelerle müzakerelere başlanmış, bu durum karşısında Türkiye AB ile ilişkilerini askıya alma kararı almıştır (Hamzaçebi,,2002:11).

Birlik ile Türkiye arasında esen soğuk rüzgarlar 1999 yılında yapılan Helsinki Zirvesine kadar devam etmiştir. 10-11 Aralık 1999'da gerçekleşen zirvede adaylığı kabul edilen Türkiye'nin aday ülke olmanın gereklilikleri olduğu hatırlatılarak üyelik için gerekli reformları yapması istenmiş ve Türkiye'nin AB müktesebatını üstlenmesine yönelik olarak Ulusal Plan hazırlanması kararlaştırılmıştır (Duyar,2001:27). 4 Aralık 2000 tarihinde Nice Zirvesinde AB, Türkiye'nin Birliğe katılım sürecinde yolunu çizen Katılım Ortaklığı Belgesi'ni imzalamıştır (Tunç,2002:12). Katılım Ortaklığı Belgesi, Avrupa Birliği'nce Türkiye'nin uymasını istediği, ekonomik ve siyasi kriterlerle yine Türkiye'den yapılmasını istediği işlemleri sıralayan kısa ve orta vadeli önceliklerden oluşmaktadır (Duyar,2001:27).

Katılım Ortaklığı Belgesinin vergilendirme bölümünde şu ifadeler yer almaktadır (Hamzaçebi,,2002:12).: "Özellikle oranlar, işlem muafiyeti kapsamı, vergilendirme kapsamı ve vergi yapısı olmak üzere tüketim vergileri ve KDV konularında uyuma başlanması; yeni vergi önlemlerinin kurumlar vergisi işleyiş prensipleri ile uyumlu olmasının güvenceye alınması ve ayrımcı önlemlerin elenmesi. Ulusal mevzuatın AB müktesebatı ile uyumuna başlanması".

Yukarıda ifade edilen hususlar kısa vadeli öncelikler arasında sayılmış olup, uzun vadeli hedefler konusunda ise, "Ulusal mevzuatın AB müktesebatıyla uyumunun tamamlanması", şeklinde bir amaç ortaya konmuştur.

Katılım Ortaklığı Belgesine paralel olarak, tüm aday ülkelerin yapmış oldukları gibi Türkiye'de Katılım Ortaklığı Belgesini tamamlayıcı nitelikte bir Ulusal Program sürecine girmiş, Ulusal Program 19.03.2001 tarihinde Bakanlar Kurulu tarafından onaylanarak 24.3.2001 tarihinde Resmi Gazetede yayınlanmıştır. Program, Türkiye'nin AB'ne tam üyelik süreci içinde kısa ve orta vadede öngörülen çalışmaları kapsamaktadır. Yani ülkemizin her alanda yapacaklarının çerçevesini çizen bir kılavuz olmaktadır.

Ulusal Program, bir anlamda Türk tarafının yapacaklarına ilişkin AB'ye söz vermesidir. Ulusal Programın oluşturulması sırasında en önemli kaynak AB tarafından hazırlanan Katılım Ortaklığı Belgesidir. Kamuoyunda çoğunlukla ülkemizin AB'ye tam üyelik sürecinde uyacağı kriterleri gösteren yol haritası olarak adlandırılmıştır (Avrupa Birliği Genel Sekreterliği).

Katılım Müzakerelerinde mevcut durumda şu ana kadar 16 fasıl müzakerelere açılmış, bir tanesi geçici olarak kapatılmıştır (ikv.org.tr).

2. TÜRK ANAYASA HUKUKU AÇISINDAN DEĞERLENDİRME

Avrupa Birliği hukuk düzeni, üye devletlerin egemenlik yetkilerinin bir bölümünü süresiz olarak Birlik Kurumları lehine devretmeleri sonucunda münhasır yetkiler ile donatılan, tasarrufları bazen üye devletleri, bazen de üye devletler ile birlikte kişileri de bağlayan kendine özgü hukuki koruma düzeni bulunan üye devletlerin hukuk düzenlerinden de bağımsız yeni uluslaraüstü bir hukuk düzenidir (Doğan,1979:789).

Türk hukuk düzeni ile Birlik hukuk düzeninin yakınlaştırılması amacı ile taraflar arasında çeşitli anlaşmalar imzalanmış bulunmaktadır.

Avrupa Birliği ve Türkiye arasında imzalanan bu anlaşmalar, Birliğe tam üyeliğe hazırlık teşkil eden anlaşmalardır. Türkiye'nin bu hazırlık dönemine sadece ekonomik yapısının değil, hukuki yapısının da Birlik koşullarına uyumu gerekmektedir. Türkiye'nin ekonomik yapısının Birlik yapısına uydurulması ortaklık anlaşmasına tam üyelik için bir ön koşul olarak açıkça dile getirilmesine (Ankara Anlaşması madde4), Türkiye'nin hukuki yapısının Birlik Koşullarına uydurulması Birliğe üyeliğin doğal bir sonucu olarak kabul edilmektedir (Uludağ,1988:142).

Türkiye'nin Avrupa Birliği'ne katılımının gerçekleşmesi ile Türkiye, uluslarüstü yetkiyle donatılmış olan bir örgüte tam üye olacaktır. Böylece Topluluğun kurucu anlaşmaları ile Birlik kurumlarının aldıkları kararlar, diğer üye ülkelerde olduğu gibi Türkiye'de de doğrudan uygulanacak ve Topluluk hukuku ile ulusal hukuk çatıştığı zaman Topluluk hukukunun üstünlüğü kabul edilecektir. Yani Türkiye, topluluk müktesebatını oluşturan Konsey kararlarını, tüzükleri, diğer ülkeler ile yapılan anlaşmaları, aynen kabul edecektir (Karluk,1998:466).

Uluslarüstü hukuk düzeninin sağlanabilmesi için Topluluğa üye devletler, üye olmadan önce ya da sonra anayasalarında yer alan egemenlik ulusundur şeklindeki kuraldan vazgeçmişler ve giderek egemenliğin bir bölümünü Topluluğa tanıyan bir yaklaşım benimseyerek anayasalarını bu yolla değiştirmişlerdir. Anayasa değişikliği yapan ülkelerce değişiklik yapılan egemenliğe ilişkin maddeler şöyledir (Karluk,1998:467):

İtalya Anayasası Madde 11: "İtalya, diğer devletlerle karşılıklılık koşulu içinde, devletler arasında barış ve adaleti sağlayan bir düzen için gerekli olan egemenlik kısıtlamalarını kabul eder."

Almanya Anayasası Madde 24: "Federasyon, devletler arası kurumlara egemen haklar devredebilir."

Belçika Anayasası Madde 25: " Belli yetkilerin kullanılması bir anlaşma ya da yasa ile devletler hukuku kurumlarına bırakılabilir."

Lüksemburg Anayasası Madde 49: " Yasama, yürütme, yargı yetkileri, bir sözleşme ile uluslararası örgütlere devredilebilir."

Hollanda Anayasası Madde 92: "Yasama, yürütme ve yargı yetkileri bir sözleşme ile uluslararası örgütlere devredilebilir."

Yunanistan Anayasası Madde 28: "Yunanistan'ın taraf olduğu uluslararası sözleşmeler iç hukuktan üstündür ve bir iç yasa hükmü ile çatışma halinde uluslararası sözleşmeler uygulanır. Bir uluslararası anlaşma ile ulusal kurumların anayasada öngörülen yetkileri uluslararası kuruluşlara devredilebilir."

Fransa Anayasası Madde 55: "Devletler hukuku anlaşmalarının karşılıklı olmak kaydı ile ulusal hukuka nazaran önceliği kabul edilmektedir."

Görüldüğü gibi, Avrupa Birliği'nde çatışma normu sorunu, açıkça çözümlenmiş ve üye devletler anayasalarında yaptıkları değişikliklerle Topluluk hukukunun önceliğini tanımışlardır ve ulusal egemenliklerini kısıtlamışlardır. Türkiye'nin Avrupa Birliği'ne üyeliği durumunda, egemenlik kısıtlamalarına hazır lıklı olması gerekmektedir. AB'nin uluslarüstü niteliği ile 1982 Anayasası'nın egemenliğine ilişkin ilkeleri bağdaşmamaktadır. Bu nedenle, Anayasanın ilgili maddelerinin değişmesi gerekmektedir.

1982 tarihli Anayasamızda Devletler Hukukunun Türk Hukuk düzeninin bir parçası olduğu hakkında herhangi bir hükme rastlanmamaktadır. Anayasanın sadece 15, 16,42, ve 92. maddeleri (Temel hak ve hürriyetlerin kullanılmasının durdurulması, Yabancıların durumu, Eğitim ve öğrenim hakkı ve ödevi, Savaş hali ilanı ve silahlı kuvvet kullanılmasına izin verme başlıklarını taşıyan maddeler) belirli konularda Devletler Hukuku kurallarının Türk Hukuk düzeninde doğrudan hüküm doğurmasına olanak verir gözükmektedir. Anayasanın diğer hükümleri ise, Devletler Hukuku kurallarının iç hukuk düzenimizde doğrudan hüküm doğurmasına müsait değildir. Anayasamızın anlaşmaların yapılması ve etkileri konusunu düzenleyen 90. maddesinin son fıkrası "usulüne göre yürürlüğe konulmuş milletlerarası anlaşmalar kanun hükmündedir." şeklinde bir hükmü öngörmektedir ve usulüne uygun bir şekilde yürürlüğe konulmayan anlaşmaların Türkiye'yi bağlamayacağını belirtmiş olmaktadır. Bu hüküm sadece yetki aşım sonucu yapılan anlaşmaların değil, onaylanmayan ve Türkiye'nin taraf olmadığı anlaşmalarında Türkiye bakımından geçerli olmayacağını dile getirmektedir. Anayasamıza göre, sadece usulüne uygun olarak yürürlüğe konulan anlaşma hükümleri iç hukuk düzenimizde uygulanabilmektedir (Uludağ,1988:143).

Türkiye'nin Avrupa Birliği'ne üye olması, bu hukuk düzeninin niteliği ve yapısı göz önünde bulundurulduğunda Türkiye'nin yasama, yürütme ve yargı yetkilerinin bir bölümü Birlik Kurumlarına süresiz olarak aktarması,

devretmesi anlamını taşımaktadır. Kurucu anlaşmaların hükümleri incelendiğinde Topluluk hukuk düzeninin yeni bir Uluslararası Hukuk düzeni olduğu anlaşılmaktadır. Bu düzen üye devletlerin egemenlik yetkilerinin bir bölümünü süresiz olarak Topluluk Kurumları lehine devretmeleri ya da icrasından vazgeçmeleri sonunda meydana gelmiştir. Türkiye'de bu Uluslararası Hukuk düzenine katılmak istendiğinde, kaçınılmaz olarak diğer üye devletler gibi, egemenlik yetkilerinin bir bölümünü Topluluk Kurumlarına süresiz olarak devretmek zorundadır. Böylece Türkiye'nin Avrupa Birliğine üye olması ve Türk Anayasa düzeninin Topluluk Hukuk düzeniyle uyum sorunu, Türkiye'nin egemenlik yetkilerinin bir bölümünden uluslarüstü nitelikteki Topluluk Kurumları lehine feragat etmesi sorununa dönüşmektedir.

Anayasamızda açıkça düzenlenmediği takdirde Topluluk yetkili kurumlarının ulusal egemenlik alanında tasarrufta bulunması mümkün olmamaktadır.

2.1. Anayasanın Egemenlik Yetkisine İlişkin Hükümleri

1982 Anayasası'nın 6. maddesi egemenlik kavramını düzenlemektedir. Söz konusu madde hükmüne göre:

"Egemenlik, kayıtsız şartsız Milletindir.

Türk Milleti, egemenliğini, Anayasanın koyduğu esaslara göre, yetkili organları eliyle kullanır.

Egemenliğin kullanılması, hiçbir surette hiçbir kişiye, zümreye veya sınıfa bırakılamaz. Hiçbir kimse veya organ kaynağını Anayasadan almayan bir Devlet yetkisi kullanamaz." denilmektedir.

Anayasamızın 7, 8 ve 9 maddelerinde belirtildiği gibi egemenlik ulus adına üç şekilde kullanılmaktadır. Ya yasama şeklindedir, bunun asli organı TBMM'dir ve bu yetki devredilemez. Ya yürütmedir, bunun asli organı Cumhurbaşkanı ve Bakanlar Kuruludur. Ya da yargıdır, bunun da asli organı bağımsız mahkemelerdir. Bu asli organlar dışında Anayasada adı geçen kuruluşların, Türk ulusu adına egemenliği kullanması söz konusu olmamaktadır.

Görüldüğü gibi, Anayasamız egemenliğin, yasama, yürütme ve yargı organları dışında kullanılmasını ve bu yetkilerin devrini yasaklamıştır. Bu durumda egemenlik hakkının devrine ilişkin hükümler bulunmadığı için vergilendirme yetkisinin de uluslararası kuruluşlara yönelik hukuk sistemlerine terk edilmesi düşünülemez.

Uluslararası anlaşmaların uygun bulunması ile ilgili Anayasanın 90. maddesine göre:

"Türkiye Cumhuriyeti adına yabancı devletlerle ve milletlerarası kuruluşlarla yapılacak anlaşmaların onaylanması, Türkiye Büyük Millet Meclisinin, onaylamayı bir kanunla uygun bulmasına bağladır.

.... Milletlerarası bir anlaşmaya dayanan uygulama anlaşmaları ile kanunun verdiği yetkiye dayanılarak yapılan ekonomik, ticari, teknik veya idari antlaşmaların Türkiye Büyük Millet Meclisince uygun bulunması zorunluluğu yoktur; ancak, bu fıkraya göre yapılan ekonomik, ticari veya özel kişilerin haklarını ilgilendiren antlaşmalar, yayımlanmadan yürürlüğe konulamaz.

.... Usulüne uygun yürürlüğe konulmuş milletlerarası antlaşmalar kanun hükmündedir. Bunlar hakkında Anayasaya aykırılık iddiası ile Anayasa Mahkemesine başvurulamaz" denilmektedir.

Cumhurbaşkanının görev ve yetkilerini düzenleyen Anayasanın 104. maddesinde yürütme alanına ilişkin olanlar başlığı altında Cumhurbaşkanına " Milletlerarası antlaşmaları onaylamak ve yayımlamak" görevi verilmiştir.

Anayasanın 90. maddesine göre, Türkiye Cumhuriyeti adına yabancı devletler ve milletlerarası kuruluşlarla yapılacak anlaşmaların onaylanması, TBMM'nin onaylamayı bir yasayla uygun bulmasına bağlıdır. Bu hüküm egemenlik yetkilerinin kullanılmasını düzenleyen 6, 7, 8 ve 9. madde hükümleri çerçevesinde yorumlandığı takdirde, uluslararası kuruluşlara egemenlik devrinin mümkün olmadığı sonucu doğmaktadır. Diğer bir söyleyişle, egemenlik yetkilerinin ulusal organlar arasında devredilmesini kabul etmeyen bir anayasa karşısında Anayasanın 90. maddesine istinaden uluslararası kuruluşlara egemenlik haklarının devrini öngören anlaşmaların onaylanması imkansızdır. Anayasanın 90. ve 104. maddeleri, Anayasanın kurduğu bu sistemin bir istisnasını teşkil etmemektedir. Egemenlik, Anayasamızın öngördüğü sisteme göre ulusa aittir. Egemenliği sadece kullanma yetkisine sahip olan TBMM, Anayasada açık bir düzenleme yapılmaksızın, egemenlik yetkilerinden feragat edilmesini onların devredilmesini gerektiren Devletler Hukuku anlaşmalarının bir yasayla uygun bulamaz (Arsava,1985:439).

2.2. Anayasada Yasama, Yargı ve Yürütme Erkinin Birlik Hukuku Karşısındaki Konumu

Bir ülkenin Birliğe katılması ile iç hukuk sisteminde hukuki sonuçlar doğuran tasarruflar ihdas edebilmesi, yetkinin ulusa ait olma fikri ile çelişir niteliktedir. Genelde her ülke ihdas edebilecek yasalarını Anayasalarına aykırılık teşkil edip etmemesi incelenmektedir. Anayasaya uygunluk denetimi yetkili ulusal organlar tarafından yapılmaktadır. Ulus iradesinin üstünlüğüne dayalı ulusal organlarca yasama, yürütme ve yargı erki kullanılmaktadır. Dolayısıyla, Birliğe Türkiye'nin katılması ile ulus iradesinin iç hukuk uygulaması dışında uluslararası hukuk sistemine bırakılması ilk bakışta itirazları haklı çıkarmaktadır (Uludağ,1988:145,146).

Birliğe katılma anlaşmasına karşı yapılabilecek en önemli itiraz, bu anlaşmanın Anayasanın temel yapı ilkeleri ile bağdaşmadığı yolunda olacaktır. Anayasanın temel yapı ilkeleri egemenlik konusunu düzenleyen 6. madde ve diğerlerinde düzenlenmiştir. Anayasanın 6. maddesinde " Egemenlik, Kayıtsız şartsız Milletindir" hükmü yer almaktadır. Ulus, bu egemenliği Anayasanın koyduğu esaslara göre, yetkili organlar eli ile kullanmaktadır. Egemenlik özü itibariyle Ulusa ait olmakla birlikte, Anayasanın öngördüğü organlar tarafından kullanılmaktadır. Anayasada açık olarak düzenlenmediği takdirde, Anayasada belirlenen ulusal organlar yerine, Birlik organlarının ulusal egemenlik alanında tasarrufta bulunması uygun değildir. Anayasanın 7. maddesinde yasama yetkisinin devri lafzen yasaklanmaktadır. Yasama yetkisinin bu hükme göre sadece TBMM tarafından kullanılabilir. Ulusal egemenlik alanında münhasır bir yasama yetkisine sahip olan TBMM'nin Birliğe tam üyelik durumunda, Birliğe entegre edilen alanlarda yasama yetkisini kullanmaktan feragat etmesi, koordine edilen alanlarda ise, yasama Birlik hukukunun gereklerine göre kullanması gerekecektir (Uludağ,1988:146). Birlik hukukunun önceliği ve üstünlüğü ilkesine göre Konseyin yasama görevi icra ettiği alanda düzenleme yapamayacaktır. Yasama yetkisi bakımından varılan bu sonuç, yürütme ve yargı yetkisinin kullanılması bakımından da geçerli olmaktadır (Günay,2000:140).

Anayasamızın 8. maddesinde " Yürütme yetkisi ve görevi, Cumhurbaşkanı ve Bakanlar Kurulu tarafından Anayasaya ve kanunlara uygun olarak kullanılır ve yerine getirilir" hükmüne yer verilmiştir. Bu hükme göre, yürütme organının Anayasa ve yasalarda öngörülmeyen konularda yetkili ve görevleri olması mümkün değildir.

Birliğe üyelik halinde ulusal yürütme organlarının yetkilerinin kullanılmasından vazgeçilmesi sonucu Komisyona yürütme görevinin bazıları devredilecektir. Böylece Komisyonun yetkileri ulusal yürütme organının yetkilerinin yerine geçmektedir. 8. madde ise bu çelişkiyi gidermeye yeterli değildir. Uluslararası bir organın ulusal hukuk düzeninde yürütme organı yerine yetkili kılınması Anayasanın yürütme yetki ve görevini düzenleyen 8. maddesini aşmaktadır (Günay,2000:140).

Anayasanın 9. maddesi, "Yargı yetkisi Türk Milleti adına bağımsız mahkemelerce kullanılır" demektedir.

Avrupa Topluluğu Adalet Divanı (ATAD) Topluluk hukukunun yorumlanmasında ve uygulanmasında yetkili ve görevlidir. Kararlar AET anlaşmasının 169. maddesine göre üye devletler için bağlayıcıdır. Bu nedenle ulusal mahkemeler Anayasa Mahkemesine başvurmadan Topluluk hukukunun kararlarını yükümlü olmaktadırlar. Bu durum ise bizim Anayasa sistemimize aykırıdır. Anayasanın 148. maddesi ile yasaların Anayasaya uygunluğu denetimi Anayasa Mahkemesi'ne aittir. Yine AET anlaşmasının 177. maddesine göre ATAD'ın verdiği karara ulusal yargı organları uymak zorundadır. Bu alanda da Anayasada, Topluluk hukuku ile uyumlu duruma getirilecek değişikliklere ihtiyaç vardır.

2.3. Anayasanın Diğer Hükümleri

Türkiye'nin Avrupa Birliğine tam üye olması durumunda, Türk Anayasa düzeni ile Topluluk hukuk düzeni arasında uyumu sağlanması gereken Anayasa hükümleri sadece yukarıda sözü edilen temel hükümlerden ibaret değildir. Bunun yanında, Topluluk hukuk düzenine dahil olmakla bazı özel hükümler de etkilenebilecek, kısıtlanabilecektir. Kısaca bunlar da açıklanmaya çalışılacaktır. Temel Haklar konusunda, vatandaşlar arasında ayrım yapılmasını mümkün kılan değişiklik yapılması gerekecektir. AET anlaşması 5 ve 7. maddeleri Topluluk Vatandaşları ayrı bir muameleyi yasaklamaktadır. Bu durum da Anayasanın 16. maddesinin Topluluk vatandaşlarının istisna edilerek yeniden düzenlenmesi gerekmektedir. Anayasa madde 16'da " Temel hak ve hürriyetler, yabancılar için, milletlerarası hukuka uygun olarak kanunla sınırlanabilir" hükmü yer almaktadır.

Anayasamızda kişi hakları bakımından Yerleşme ve Seyahat Hürriyeti (madde 23), Çalışma ve Sözleşme Hürriyeti (madde 48), Çalışma Hakkı ve Ödevi (madde 49), Çalışma Şartları ve Dinlenme Hakkı (madde 50), Ücrette Adalet Sağlanması (madde 55), Sağlık Hizmetleri ve Çevrenin Korunması (madde 56) ve Sosyal Güvenlik Hakkı'na (madde 60) ilişkin haklar Birlik kurumları olan, özellikle Avrupa Konseyi ve uygulamada Avrupa Komisyonunun yetki alanına girecektir. Bu kurumlar anlaşmaları bütün üye devletlerde aynı düzeyde ve kapsamda gerçekleştirmek

için kararname, karar ya da direktifler düzenleyebileceklerdir. Bu tasarruflar ise Anayasa da dahil bütün içi hukuk tasarruflarının üstünde yer alacaktır (Günay,2000:141).

Anayasanın Sosyal ve Ekonomik Haklar ve Ödevler başlığı altında düzenlenen Kamulaştırma (madde 46) ve Devletleştirme (madde 47) hükümleri Kamu yararı amacıyla yerine getirilirken Birlik yararına da aykırı olmayacaktır. Yani bu haklar kamu yararı amacı ile kullanılırken, üyelik durumunda Birlik hukukunun getirdiği ilkelere de bağlı kalınacaktır. Ayrıca Siyasi Haklar ve Ödevler bölümünde düzenlenen vergi konusu Topluluk alanında koordine edilmesi öngörülen bir konu olmaktadır.

Roma anlaşmasının 95 ve onu izleyen hükümlerinin üye devletlerin vergi koyma yetkilerini sınırlamasının yanı sıra üye devletler arasındaki ithalat ve ihracatta da her türlü yükümü yasaklamıştır. Bu durumda Anayasanın 73/3 ve 167/2 maddeleri Anlaşma hükümleriyle çelişmektedir. "Vergi, resim, harç ve benzeri mali yükümlülükler kanunla konulur, değiştirilir veya kaldırılır" hükmü ile Roma Anlaşmasının doğrudan geçerliliğe sahip 95. maddesinde yer alan hükümlere ve Topluluk direktiflerine göre değişikliğe uğraması gerekmektedir (Güneş,1998:190,191).

Topluluk Anlaşmalarında işbirliği yapılması öngörülen alanlarda anayasa normları ve diğer ulusal düzenlemelerle Topluluk normları arasında asgari bir uyum yaratma yükümlülüğü bulunmaktadır. Bu işbirliği yükümlülüğü en tipik şekilde ekonomi politikası alanında ortaya çıkmaktadır. AET Anlaşmasının 2. maddesine göre üye devletler ekonomi politikaları arasında uyum sağlamakla yükümlüdür. Bu yükümlülüğü Türkiye esasen ortaklık anlaşmasının 4/3 maddesi ile üstlenmiştir. Tam üyelik durumunda Türkiye'nin ekonomi politikasının Topluluğun amaçları ile çatışmayacak şekilde, diğer üye devletlerle uyum içinde planlaması gerekecektir. Bu nedenle "planlama başlığını taşıyan Anayasanın 166. maddesinin ekonomi politikasının planlamasında Toplulukla koordinasyon sağlayacak şekilde değişikliğe uğratılması gerekecektir.

3.SONUÇ

Türkiye'nin Avrupa Birliği'ne tam üye olması durumunda Anayasanın temel yapısı Topluluk hukukunun gereklerini karşılayamayacaktır. Anayasanın gerek temel hükümlerinde, gerekse özel hükümlerinde birçok düzenleme, özellikle egemenliğin devri konusu Topluluk hukuku ile çatışmaktadır. Türkiye'nin geçiş sürecinde ulusal hukuk ile Topluluk hukuku arasında uyum sağlaması gerekmektedir.

1982 Anayasası'nda yapılması zorunlu bu değişikliklerin öncelikle egemenliğin devri ve uluslararası anlaşmalarla iç hukuk açısından tanınacak üstünlük konusunda alması gereklidir.

Egemenlik, Anayasanın 6. maddesine göre özü itibariyle ulusa aittir ve kullanılması da ulus adına yasama, yürütme ve yargı organlarındadır. Topluluk hukukuna uygunluk için yasama, yürütme ve yargı yetkilerinin devri gerektiğinde, bu devri, egemenliğin özüne sahip olan ulustan başka hiçbir merciin gerçekleştiremeyeceği açıktır. Çünkü, Anayasayı değiştirmeye yetkili olan TBMM Anayasa değişikliğine karar verirken yasama yetkisini kullanmış olacaktır. Ancak egemenliğin devri yolunda bir kararı tek başına vermesi TBMM'nin özü itibariyle sahip olmadığı bir hakkı devretmesi anlamındadır. Oysa genel hukuk ilkeleri açısından " sahip olunan haktan fazlasının devri olanaksızdır. Bu nedenle Topluluk hukukuna uyumun sağlanabilmesi için egemenliğin Topluluk organlarına devrine ilişkin Anayasa değişikliklerinin halk oyuna sunulması gerekmektedir. Bununla birlikte, iç hukuk karşısında uluslararası anlaşmalara üstünlük tanınmasına ilişkin değişikliklerin de karşılık ilkesi çerçevesinde düzenlenmesi doğru olacaktır.

Sonuç olarak, Türkiye'nin Avrupa Birliği'ne tam üyeliğinin gerektireceği Anayasa değişiklikleri ve çözüm önerileri şu şekilde düzenlenebilir:

Anayasanın 6 ve 7. maddeleri, yani egemenliğin kayıtsız şartsız milletindir ve yasama yetkisinin devredilemeyeceği hükümleri tam üyelik için elverişli değildir. Birliğe tam üyelik için Anayasada bu açıdan değişiklik yapmak gerekecektir. TBMM'nin, Topluluğa entegre edilen alanlarda yasama yetkisini kullanmaktan feragat etmesi, koordine edilen alanlarda ise, yasama yetkilerini Topluluk hukukunun gereklerine göre kullanması gerekecektir. Ya da 7. maddenin "Konsey tasarruflarıyla hükümlerini doğrudan doğruya doğuran anlaşmalar ve Komisyonun yasama yetkisini kullandığı alanlar dışında yasama yetkisi TBMM'nindir" şekline dönüşmesi gerekecektir.

Bilindiği gibi Topluluk Anlaşmalarında Komisyona uluslar üstü nitelikte yetkiler verilmiştir. Komisyon bazen doğrudan doğruya anlaşmalardan bazen de Konseyin havalesiyle üstün yürütme yetkileri kullanabilmektedir. 1982 Anayasası'nda çalışma alanı yasalarla belirlenen yürütme organının, Komisyonun yetki tasarruflarıyla çalışma alanının daralması kaçınılmazdır. Bu nedenle Birliğe tam üye olunduğunda, yürütme organı Topluluk Komisyonu'nun alt icra organı görev yapacaktır. Anayasanın yürütme organının görevlerini düzenleyen 8.

maddesinin "yürütme görevi kanun ve Avrupa Topluluğu anlaşmaları çerçevesinde Cumhurbaşkanı ve Bakanlar Kurulu tarafından yerine getirilir" şekline dönüştürülmesi gerekecektir. Ancak yasama prosedürünün yavaş işlemesi nedeniyle Roma Anlaşması'nın 11. maddesinde, üye devletlerin anlaşma ile yüklenilen görevlerin çabuk yerine getirilmesi amacıyla, üye devletlerin yürütme organlarına gerekli yetkileri vermeleri öngörülmüştür. Bugün Anayasadaki yasama yetkisinin devrini yasaklayan maddesi karşısında buna olanak yoktur. Anayasanın 8. maddesinin Topluluk hukukunun ihtiyaçlarına yanıt verecek şekilde genişletilmesi gerekecektir.

Anayasanın vergi ödevini düzenleyen 73/3 maddesinde değişiklik yapılarak vergi, resim, harç ve benzeri mali yükümlülüklerin topluluk kararları ya da direktifleriyle konulabileceğinin hükme bağlanması gerekecektir.

Avrupa Birliği'ne tam üyelik gerçekleşmese dahi, öncelikle ele alınması gereken bir konu, uluslararası hukukun iç hukuka üstünlüğünün Anayasaya eklenmesi gereğidir. 1982 Anayasası'nın 90/5 maddesi, "usulüne göre yürürlüğe konulmuş milletlerarası anlaşmalar kanun hükmündedir" demektir. Yani uluslararası anlaşmalar iç hukuk normlarıyla eşit düzeyde tutulmuştur. DPT'nin 1983 tarihli Özel İhtisas Komisyonu raporunda da bu konu üzerinde durulmuş ve uluslararası anlaşmaların, iç hukuka üstünlüğünün tanınması gereği vurgulanmıştır. Uluslararası anlaşmaların gücüne açıklık getirecek şekilde, bu anlaşmaların onaylanmasını ve yürürlüğünü düzenleyen 90. maddenin son paragrafına, "Usulüne göre yürürlüğe konulmuş anlaşmalar yasaların üstünde yer alır" şeklinde bir hükmün eklenmesi ve 90. maddenin 5. fıkrasının kaldırılması yerinde olacaktır.

Tam üyelik durumunda karşılaşacağımız anayasal bir diğer sorun da, yapılacak değişikliklerin nasıl olması gerektiğidir. Bunun için:

Yukarıda belirttiğimiz egemenlik yetkisi ve bunun kullanılması ile ilgili Anayasa maddeleri tek tek ele alınarak değiştirilebilir.

Anayasamıza 90/A şeklinde yeni bir madde eklenerek; "Karşılıklılık koşuluyla uluslararası ya da üstü örgütler katılmanın gerekli kılacağı egemenlik yetkilerinin devrine bu Anayasa engel oluşturmaz" şeklinde yeni bir hüküm getirilebilir.

KAYNAKÇA

Arsava, Ayşe Füsun,(1985), **Avrupa Toplulukları Hukuku ve Bu Hukukun Ulusal Alanda Uygulanmasından Doğan Sorunlar**, Ankara Üniversitesi, Siyasal Bilgiler Fakültesi Yayınları, Ankara

Aslan, Rıza,(2000), "Türkiye-Avrupa Birliği: Sancılı Gelişen İlişki",**Ankara Üniversitesi, S.B.F. Dergisi**, S: 3, Temmuz – Eylül

Devlet Planlama Teşkilatı,(1995), "Türkiye ve Avrupa Entegrasyonu", **Yedinci Beş Yıllık Kalkınma Planı, Özel İhtisas Komisyonu Raporu**, Ankara

Doğan, İzzettin,(1979), **Türk Anayasal Düzeninin Avrupa Toplulukları Hukuk Düzeniyle Bütünleşme Sorunları**, İstanbul Üniversitesi Hukuk Fakültesi Yayını, No: 2473/555, İstanbul

Duyar, Metin,(2001), "AB Katılım Ortaklığı Belgesi ve Türkiye Ulusal Programı Beklentiler – Vaadler", **İktisat Dergisi**, S: 409, Ocak

Günay, Ayşe,(2000), "Türk Vergi Sisteminin Avrupa Birliği Vergi Sistemi ile Uyumlaştırılmasının Türk Anayasa Hukuku ve Türk Vergi Hukuku Açısından Değerlendirilmesi", **Vergi Sorunları**, S: 140, Mayıs

Güneş, Gülsen,(1998), **Verginin Yasallığı İlkesi**, Alfa Basım Yayım Dağıtım, İstanbul

Hamzaçebi, Akif,(2002), "Türkiye – AB İlişkilerinde Vergilendirme ve 2001 İlerleme Raporunda Vergilendirmeye İlişkin Konuların Değerlendirilmesi", **Avrupa Birliğine Geçiş Süreci ve Türk Kamu Maliyesinin Uyumu**" 17. Türkiye Maliye Sempozyumu, TÜRMOB Yayınları – 185

Karluk, S. Rıdvan,(1998), **Avrupa Birliği ve Türkiye**, Beta Basım Yayım Dağıtım, İstanbul

Palamut, Mehmet E.,(2002), "Ulusal Egemenlik Bağlamında Vergilendirme Yetkisi ve Türkiye'nin AB Karşısındaki Konumu", **Avrupa Birliğine Geçiş Süreci ve Türk Kamu Maliyesinin Uyumu**, 17. Türkiye Maliye Sempozyumu, 2002, TÜRMOB Yayınları, No: 185

Tunç, Havva,(2002), "AB – Türkiye İlişkilerinin Değişen Boyutu", **Banka ve Ekonomik Yorumlar Dergisi**, S: 12, Aralık

Uludağ, Ramazan,(1998), **Avrupa Topluluğu ve Türk Vergi Sisteminin Topluluk Modeline Uyumu**, Ankara

İkv.org.tr

www. mfa. gov. tr/turkce/grupa/ab/abab/ilişki.htm

Tarife ve Kıymet İhtilafları Bağlamında Gümrük Kabahatleri: Gümrük Kanununun 234 üncü Maddesi Kapsamında Değerlendirmeler

Doç.Dr. Raşit Gültekin[1]

[1] Trakya Üniversitesi, İktisadi ve İdari Bilimler Fakültesi, Maliye Bölümü, rasitgultekin@trakya.edu.tr, ORCID: https://orcid.org/0000-0001-8390-327X

Özet: Dış ticaretin işleyişi ve gümrük vergileriyle ilgili tahsilat düzenini korumak için çeşitli kanunlara dayanılarak düzenlenmiş çeşitli türde gümrük suçları ve kabahatleri bulunmaktadır. Gümrük kabahatleriyle bağlantılı ihlallere ve işlem hatalarına, vergi kaybı oluşturması ve usul-şekil uyumsuzlukları gözetilerek, 4458 sayılı Gümrük Kanununda ayrıntılı olarak yer verilmiştir. Bu açıdan Gümrük Kanununun 234 ünü maddesi gümrük vergilerinde eksikliğe yol açan beyan hatalarını ve bu hatalar sonucu uygulanan vergi farkı ile idari para cezalarını düzenleyen temel gümrük hukuku normu niteliği taşımaktadır. Anılan maddede tarife, ölçü ve miktar hatalarından kaynaklanan gümrük kabahatleri, kıymet noksanlığından kaynaklanan gümrük kabahatleri ile maddi hesap hataları ve küçük hesap hatalarından kaynaklanan gümrük kabahatleri düzenlenmiş ya karşılığında idari yaptırımlar öngörülmüştür. Ancak tarife ve kıymet gibi gümrük vergilerinin anılan temel unsurları bakımından gümrük idaresi ile gümrük yükümlüleri arasında yorum farklılıkları oluşabilmekte ve bu durum idari çözüm yolları ile yargı yolları bakımından önemli bir ihtilaf konusu halini almaktadır. Bu çalışma Gümrük Kanununun anılan düzenlemesi bağlamında tarife ve kıymet ihtilaflarına ilişkin sorunlu konuları incelemek ve çözüme kavuşturulmasına katkı sağlamak amacıyla literatür taraması ve doküman incelemesi yöntemiyle hazırlanmıştır. Çalışmanın bulguları gümrük idaresinin yaklaşımı ile yargı kararları arasında belirgin yorum farkı olduğuna işaret etmektedir. Bu farklılık gümrük hukuku literatüründe de göze çarpmaktadır. Çalışma kapsamında vergi hukuku perspektifinden çözüm önerileri sunulmuştur.

Anahtar Kelimeler: Gümrük, Gümrük Vergileri, Gümrük Kabahatleri, Gümrük Kıymeti, Tarife.

Customs Offenses in the Context of Tariff and Valuation Disputes: Evaluations under Article 234 of the Customs Law

Abstract: There are various customs crimes and misdemeanors established under various laws to safeguard the functioning of foreign trade and the system for collecting customs duties. Customs Law No. 4458 details violations and procedural errors associated with customs misdemeanors, taking into account resulting tax losses and non-compliance with procedural or formal requirements. In this context, Article 234 of the Customs Law serves as a fundamental legal norm governing declaration errors that lead to deficiencies in customs duties, as well as the resulting tax differentials and administrative fines. This article regulates—and prescribes administrative sanctions for—customs misdemeanors arising from errors in tariff classification, measurements, and quantities; valuation shortfalls; and material or minor calculation errors. However, differences in interpretation regarding fundamental elements of customs duties—such as tariff classification and valuation—can arise between customs authorities and liable parties, becoming a significant source of dispute in both administrative and judicial proceedings. This study was prepared using literature review and document analysis methods to examine problematic issues concerning tariff and valuation disputes within the framework of the aforementioned Customs Law provision and to contribute to their resolution. The study's findings indicate a distinct divergence in interpretation between the approach of the customs administration and judicial rulings. This distinction is also evident in the customs law literature. Within the scope of the study, proposed solutions are presented from the perspective of tax law.

Keywords: Customs, Customs Duties, Customs Misdemeanors, Customs Value, Tariff.

1. GİRİŞ

Gümrük kabahatleri genel olarak vergi kaybına bağlı kabahatler ile usulsüzlük kabahatleri şeklinde iki gruba ayrılmaktadır. Bu kapsamda temel amaç gümrük düzeninin, gümrük vergilerinin doğru ve zamanında tahakkukunun, gümrük denetim sisteminin ve mevzuata uyumun korunmasıdır. Gümrük kabahatlerinin önemli bir kısmı Gümrük Kanununun 234 üncü maddesinde düzenlenen hükümlerden kaynaklanmaktadır. Zira hüküm kapsamında belirli gümrük rejimleri kapsamında beyana aykırılık oluşturan gümrük tarifesi unsurlarında, vergilendirmeye esas miktar ve ölçülerde veya gümrük kıymetinde meydana gelen farklılıklar belirli koşullar altında gümrük idaresince yaptırıma bağlanmaktadır.

Gümrük beyanı, eşyanın bir gümrük rejimine tabi tutulması talebini ifade eden ve beyan sahibini hukuken bağlayan temel gümrük işlemidir. Beyannamede eşyanın rejime tabi tutulması için gerekli tüm bilgilerin doğru şekilde gösterilmesi ve gerekli belgelerin sunulması gerekir. Beyan sahibinin sunduğu bilgiler gümrük idaresince belge kontrolü, eşyanın muayenesi ve teslim sonrası denetim gibi yöntemlerle kontrol edilmektedir. Bu nedenle gümrük beyanı yalnızca eşyanın bir rejime sokulmasını sağlayan bir usul işlemi değil, aynı zamanda gümrük yükümlülüğünün ve kabahat sorumluluğunun belirlenmesinde temel hukuki araçtır. Bu noktada beyan sahibinin

sorumluluğunun sınırlarının nerede başladığı ve nerede bittiği önem arz etmektedir. Aynı şekilde gümrük rejimlerinin gümrük yükümlüğü karşısındaki durumu ve ithalat vergilerinin kapsamında ilişkin belirsizlikler de gümrük kabahatlerinden sorumluluk bakımından izaha muhtaç konuları oluşturmaktadır.

Bu bağlamda çalışmanın temel amacı Gümrük Kanununun 234 üncü maddesine dayana gümrük kabahatlerinin maddi içeriğinin ortaya konulması ve uygulamada sorunlu konu olarak öne çıkan konulara gümrük ve kabahatler hukuku perspektifinden açıklık kazandırmaktır. Bu bağlamda çalışma dört kısımda kurgulanmıştır. Birinci kısımda genel olarak kabahatler rejimi ile gümrük kabahatleri; ikinci kısımda çalışmanın konusunu oluşturan hükmün maddi içeriği; üçüncü kısımda hükümde tanımlanan kabahatler ve dördüncü kısımda da kabahatlere ilişkin yaptırım rejimi incelenmiş ve elde edilen bulgular üzerinden değerlendirilmiştir.

2. GENEL OLARAK KABAHATLER REJİMİ VE GÜMRÜK KABAHATLERİ

Türk hukukunda kabahatlere ilişkin genel hükümler Kabahatler Kanununda yer almaktadır. Özel hükümler ile genel hükümlere ilişkin bazı özel durumlar ise özel kanunlarda yer almaktadır. Bu bağlamda kabahatler için genel ve çerçeve kanun niteliği taşıyan Kabahatler Kanununun genel hükümleri, zamanaşımı, uzlaşma ve itiraz gibi özel durumlar dışında, gümrük kabahatleri için de geçerlidir. Bu durum Kabahatler Kanununda "*Kanunun; a) İdari yaptırım kararlarına karşı kanun yoluna ilişkin hükümleri, diğer kanunlarda aksine hüküm bulunmaması halinde, b) Diğer genel hükümleri, idari para cezası veya mülkiyetin kamuya geçirilmesi yaptırımını gerektiren bütün fiiller hakkında, uygulanır*"(KK, m.3/1) şeklinde ifade edilmiştir.

Türk Dil Kurumu Genel (TDK) Türkçe Sözlükte "*uygunsuz hareket, çirkin, yakışıksız davranış*" ve "*hafif hapis, para cezası veya meslek ve sanattan alıkonulma ile cezalandırılan suç*"(TDK, 2026) şeklinde tanımlanan kabahat kavramı Kabahatler Kanununda "*kanunun, karşılığında idari yaptırım uygulanmasını öngördüğü haksızlık*"(KK, m.2/1) şeklinde tanımlanmış ve "*hangi fiillerin kabahat oluşturduğu, kanunda açıkça tanımlanabileceği gibi; kanunun kapsam ve koşulları bakımından belirlediği çerçeve hükmün içeriği, idarenin genel ve düzenleyici işlemleriyle de doldurulabilir; kabahat karşılığı olan yaptırımların türü, süresi ve miktarı, ancak kanunla belirlenebilir"*(KK, m.4/1-2) düzenlemesine yer verilmiştir. Gümrük mevzuatında gümrük kabahati kavramına özgü bir tanım bulunmamaktadır. Kısaca "*karşılığında kanunlarında idari yaptırım öngörülen kanuna aykırılıklar veya ihlaller*" olarak tanımlanabilecek gümrük kabahatleri gümrük mevzuatıyla belirlenmiş emir ve yasaklara aykırılık taşıması nedeniyle vergi kaybı doğurması veya buna potansiyeli olması ve usul/şekil kurallarına uymaması dolayısıyla karşılığında Gümrük Kanununda idari yaptırım öngörülen fiillerdir. Gümrük kabahatleri, gümrük işlemlerinin kapsamlı ve birçok mevzuatla ilgili olması nedeniyle, Gümrük Kanunu dışındaki başka kanunlar da düzenleme konusu yapılabilmektedir (Gültekin, 2019:133-134). Öte yandan mali hukukta vergi kabahatleri açısından kabul gören genel yaklaşım çerçevesinde gümrük kabahatleri de "*vergi kaybına bağlı olan kabahatler*" ile "*usulsüzlük kabahatleri*" şeklinde iki gruba ayrılmaktadır (Karakoç, 2022:10).

Kabahatler Kanununda kabahatler rejimimin esasları belirtilerek amacın "*toplum düzenini, genel ahlakı, genel sağlığı, çevreyi ve ekonomik düzeni korumak*"(KK, m.1) olduğu hususuna yer verilmiştir. Gümrük kabahatleri bakımından amaç, diğer bir ifadeyle gümrük kabahatlerinin varlık nedeni, gümrük düzeninin korunmasıdır. Bu bağlamda gümrük vergileriyle ilgili belge, beyan, denetim ve tahakkuk düzeninin korunması, tüketicinin korunması, gümrük uyumsuzluklarının giderilmesi ve gümrük uyumu gösteren kişilerin hak ve menfaatlerinin korunması; kısacası gümrük emir ve yasaklarına aykırılıkların engellenmesi amacını taşımaktadır. Bu noktada gümrük vergilerinin vergilendirme amaçlarına uygun şekilde şekillendirildiği ve mali (devlete gelir sağlama) ve ekonomik/politik (yurt içi sanayiyi korumak) şeklinde temelde iki amaca yöneldiğinden (Selen, 2020:179) gümrük kabahatlerinin de bu amaçlara ulaşılması noktasında fonksiyon gördüğü söylenebilir. Öte yandan gümrük kabahatleri, dahilde uygulaması olan vergilerle olan ilişkisi nedeniyle, gümrük vergileri alanında bu vergiler bakımından cezasızlık alanı oluşmaması bakımından da önem taşımaktadır.

Kabahatler Kanununda yer alan ve "*kanunilik*", "*ihmali davranış*", "*kast ve taksir*", "*hukuka uygunluk nedenleri ile kusurluluğu ortadan kaldıran nedenler*", "*iştirak*", "*içtima*", "*yaptırım türleri*" ve "*karar alma süreci ve yerine getirilmesi*" konularına ilişkin "*Kabahat, icrai veya ihmali davranışla işlenebilir. İhmali davranışla işlenmiş kabahatin varlığı için kişi açısından belli bir icrai davranışta bulunma hususunda hukuki yükümlülüğün varlığı gereklidir*"(KK, m.7/1), "*Kabahatler, kanunda açıkça hüküm bulunmayan hallerde, hem kasten hem de taksirle işlenebilir*"(KK, m.9/1), "*Bu Kanunda aksine hüküm bulunmayan hallerde, Türk Ceza Kanununun hukuka uygunluk nedenleri ile kusurluluğu ortadan kaldıran nedenlere ilişkin hükümleri, kabahatler bakımından da uygulanır"(KK, m.12/1), "Kabahate teşebbüs cezalandırılmaz. Ancak, teşebbüsün de cezalandırılabileceğine dair ilgili kanunda hüküm bulunan haller saklıdır. Bu durumda, Türk Ceza Kanununun suça teşebbüse ve gönüllü vazgeçmeye ilişkin hükümleri, kabahatler bakımından da uygulanır"*(KK, m.13/1), "*Kabahatin işlenişine birden fazla kişinin iştirak*

etmesi halinde bu kişilerin her biri hakkında, fail olarak idari para cezası verilir. …Kabahate iştirak için kasten ve hukuka aykırı işlenmiş bir fiilin varlığı yeterlidir. Kabahatin işlenişine iştirak eden kişi hakkında, diğerlerinin sorumlu olup olmadığı göz önünde bulundurulmaksızın idari para cezası verilir..."(KK, m.14), "*Bir fiil ile birden fazla kabahatin işlenmesi halinde bu kabahatlere ilişkin tanımlarda sadece idari para cezası öngörülmüşse, en ağır idari para cezası verilir. Bu kabahatlerle ilgili olarak kanunda idari para cezasından başka idari yaptırımlar da öngörülmüş ise, bu yaptırımların her birinin uygulanmasına karar verilir. Aynı kabahatin birden fazla işlenmesi halinde her bir kabahatle ilgili olarak ayrı ayrı idari para cezası verilir. Kesintisiz fiille işlenebilen kabahatlerde, bu nedenle idari yaptırım kararı verilinceye kadar fiil tek sayılır. Bir fiil hem kabahat hem de suç olarak tanımlanmış ise, sadece suçtan dolayı yaptırım uygulanabilir. Ancak, suçtan dolayı yaptırım uygulanamayan hallerde kabahat dolayısıyla yaptırım uygulanır*"(KK, m.15/1-3), "*Kabahatler karşılığında uygulanacak olan idari yaptırımlar, idari para cezası ve idari tedbirlerden ibarettir. İdari tedbirler, mülkiyetin kamuya geçirilmesi ve ilgili kanunlarda yer alan diğer tedbirlerdir*"(KK, m16/1-2) ve "*İdari para cezası, maktu veya nispi olabilir…, kanunda alt ve üst sınırı gösterilmek suretiyle de belirlenebilir. Bu durumda, idari para cezasının miktarı belirlenirken işlenen kabahatin haksızlık içeriği ile failin kusuru ve ekonomik durumu birlikte göz önünde bulundurulur… Kanunlarında ödeme süresi düzenlenmemiş olan idari para cezaları, tebliğinden itibaren bir ay içinde ödenir. İdari para cezasının ödeme süresi içinde ödenmesi halinde, cezadan %25 oranında indirim yapılır. Ödeme yapılması, kişinin bu karara karşı kanun yoluna başvurma hakkını etkilemez*"(KK, m.17/1-6) hükümleri gümrük kabahatleri bakımından da uygulama alanı bulunmaktadır. Zira gümrük kabahatleri nedeniyle yaptırım kararı alınırken aykırılıkların kasten veya taksirle işlenmiş olmasına bakılmamakta, aykırılığın hem kaçakçılık suçu hem de gümrük kabahati oluşturması halinde Gümrük Kanununa göre idari yaptırım kararı alınmakla birlikte para cezaları emanet hesabına alınmakta ve yerine getirilmesi için yargı kararı beklenmekte, bir aykırılığın iki ayrı gümrük kabahati oluşturması halinde bunlardan ağır olanın cezası ile varsa idari tedbirler uygulanmakta ve idari para cezasının kesilmesi için vergilerin kesinleşmesi beklenmemektedir (Ercan, 2019:81; Selen, 2020:257-258; Gerçek, 2020:299).

Öte yandan gümrük kabahatleri için nispi, maktu ve asgari-maktu idari para cezası öngörülmüştür. Ayrıca gümrük mevzuatında idari tedbir niteliğinde idari yaptırımlara da yer verilmektedir. Bu noktada izin/ruhsat iptali ile mülkiyetin kamuya geçirilmesi ve gümrük işlemlerine özgü bir uygulama olarak eşyanın tasfiyesi öne çıkmaktadır. Gümrük idaresince kesilen idari para cezalarında ceza muhatapları idari/yargısal yollara başvuru hakları kısıtlanmaksızın peşin ödeme indiriminden yararlandırılmaktadır.

3. HÜKMÜN MADDİ İÇERİĞİNE İLİŞKİN DEĞERLENDİRMELER

3.1. Genel Olarak Hükmün Kapsamı ve İlişkili Olduğu Gümrük Konuları

Gümrük Kanununun tarife ve kıymet aykırılıklarına ilişkin gümrük kabahatleri bakımından kanuni unsur veya kanuni dayanak niteliği taşıyan hükmü şu şekildedir; "*1. Serbest dolaşıma giriş rejimi veya kısmi muafiyet suretiyle geçici ithalat rejimine tabi tutulan eşyaya ilişkin olarak, yapılan beyan ile muayene ve denetleme veya teslimden sonra kontrol sonucunda; a) 15 inci maddede belirtilen Gümrük Tarifesini oluşturan unsurlarda veya vergilendirmeye esas olan sayı, baş, ağırlık gibi ölçülerinde aykırılık görüldüğü ve beyana göre hesaplanan ithalat vergileri ile muayene sonuçlarına göre alınması gereken ithalat vergileri arasındaki fark %5'i aştığı takdirde, ithalat vergilerinden ayrı olarak bu farkın üç katı para cezası alınır. b) Kıymeti üzerinden ithalat vergilerine tabi eşyanın beyan edilen kıymeti, 23 ila 31 inci maddelerde yer alan hükümler çerçevesinde belirlenen kıymete göre noksan bulunduğu takdirde, bu noksanlığa ait ithalat vergilerinden başka vergi farkının üç katı para cezası alınır. c) Satış birimine göre miktar itibarıyla %5'i geçmeyen bir fark ile maddi hesap hatasından doğan noksan kıymet beyanlarında, bu farklara ait ithalat vergilerinden başka vergi farkının yarısı tutarında para cezası alınır. 2. Dahilde işleme rejimi, gümrük kontrolü altında işleme rejimi ve tam muafiyet suretiyle geçici ithalat rejimi hükümlerine tabi eşyaya ilişkin olarak yapılan beyan ile muayene ve denetleme veya teslimden sonra kontrol sonucunda; birinci fıkrada belirtilen farklılıkların tespiti durumunda vergi farkının yarısı tutarında idari para cezası verilir. 3. Yukarıda belirtilen aykırılıkların gümrük idaresince tespit edilmesinden önce beyan sahibince bildirilmesi durumunda söz konusu cezalar yüzde on nispetinde uygulanır. 4. Genel yönetim kapsamındaki kamu idareleri için yukarıda belirtilen cezalara ilişkin hükümler uygulanmaz. Bu gibi hallerde, 241 inci maddenin birinci fıkra hükmüne göre işlem yapılır. 5. 194 üncü maddenin birinci fıkrası uyarınca doğan gümrük yükümlülüğü kapsamında ödenmesi gereken ithalat vergilerinin anılan maddenin dördüncü fıkrasında öngörülen tarihe kadar hiç ödenmemiş veya eksik ödenmiş olduğunun gümrük idarelerince yapılan kontrol sonucunda tespit edildiği durumda, ödenmesi gereken ithalat vergilerinin söz konusu dördüncü fıkrada belirtilen faizi ile birlikte tahsilinin yanı sıra, yükümlüsü hakkında bu vergilerin dörtte biri tutarında para cezasına hükmedilir. Bu fıkrada belirtilen hiç ödenmeyen veya eksik ödenen ithalat vergilerinin yükümlüsünce gümrük idaresinin tespitinden önce*

bildirilmesi durumunda bu cezaya hükmedilmez. 194 üncü maddenin dördüncü fıkrası uyarınca işlem yapmakla yetinilir. 6. Bir ila üçüncü fıkralara göre verilen cezalar 241 inci maddenin birinci fıkrasında belirtilen miktardan az olamaz."(GK, m.234). Bu bağlamda anılan hükümde vergi kaybıyla ilişkili aykırılıklardan kaynaklanan gümrük kabahatleri bakımından "gümrük beyanı", "gümrük rejimleri", "kabahatin işlendiği an ve kabahatin ortaya çıkarılması", "kabahatin unsurları", "yaptırım rejimi", "kamu idarelerinin sorumluluğu" ve "telafi edici vergi" konularına ilişkin düzenlemelere yer verilmiştir. Bu nedenle anılan konuların doğru anlaşılması ve yorumlanması geniş bir mevzuat külliyatının ayrıca göz önünde bulundurulmasını zorunlu kılmaktadır.

Belirtilmelidir ki gümrük mevzuatına ilişkin ikincil düzenlemelerde de Gümrük Kanununa (GK, m.234) istinaden işlem tesis edileceği belirtilmektedir. Örneğin Sınır Ticaretinin Düzenlenmesine İlişkin Kararda "*gerçek dışı menşe belgesi ibraz edilerek ithal edildiği tespit olunan ürünler için eşyanın ithalinde ödenmesi öngörülen gümrük vergisi, eş etkili vergi, diğer vergi, mali ve ek mali yüklerin tamamı…Amme Alacaklarının Tahsil Usulü Hakkında Kanun hükümlerine göre ilgililerden tahsil edilir ve Gümrük Kanunu (m.234/1.a) çerçevesinde para cezası uygulanır*"(STDK, m.17/1) ifadesi yer almaktadır. Bu bakımdan madde hükmünün kapsamı ve uygulama alanı oldukça geniştir. Gümrük Kanununun bu hükmü "*Bu Kanunda ayrı bir ceza tayin edilmiş haller saklı kalmak üzere, bu Kanuna aykırı hareket edenlere söz konusu düzenlemelerde açıkça öngörülmüş olması kaydıyla altmış TL* [2026 yılı için 1.494,00 TL] *usulsüzlük cezası uygulanır*"(GK, m.241/1)(GGT, Seri No: 217, m.2) ifadesini içeren Kanunun 241/1 inci maddesiyle ilişkili düzenlemeler de içermektedir.

Gümrük Kanununun 234 üncü maddesinde düzenlenen aykırılıkla gümrük beyanı ile beyanın ilişkili olduğu gümrük rejimleri ve beyanın gümrük idaresince denetimi konularıyla ilişkilendirilmiştir. Bu bağlamda anılan madde esas itibariyle yanlış beyan edilmesi ithalat vergilerinde kayba sebebiyet verebilen ithal eşyanın "girdiği gümrük tarifesine", "spesifik vergiye tabi olduğu durumlarda, vergi hesabına esas olan (sayı, baş, ağırlık gibi) ölçülerine" ve "gümrük kıymetine" ilişkin belirli işlemleri hüküm altına almıştır (Yerci, Tarihsiz). Esasında Türk Gümrük mevzuatında, gümrük vergilerine ilişkin temel unsurlar kıymet, tarife, menşe ve miktar olarak sayılmaktadır (Kumcuoğlu, 2017). Dolayısıyla gümrük işlemlerinin mevzuatına uygun şekilde sonuçlandırılması ve özellikle de doğu vergilendirme işleminin yapılması için bu unsurların ilgili gümrük rejimleri çerçevesinde tam, zamanında ve doğru olarak beyanı zorunludur.

3.1.1. Gümrük Beyanı

Kavram olarak "gümrük beyanı"(*customs declaration*) elektronik beyanlar ile çift hat (kırmızı/yeşil) esasında yolcuların yaptığı beyan da dahil olmak üzere "*gümrük idaresince öngörülen veya kabul edilen herhangi bir biçimde, gümrük idaresinin talep ettiği bilgileri veya ayrıntıları sağlayan her türlü beyan veya işlem*" anlamını taşımaktadır(WCO, 2024). Gümrük Kanununda gümrük beyanının "*…belirlenen usul ve esaslar çerçevesinde eşyanın bir gümrük rejimine tabi tutulması talebinde bulunulmasını*"(GK, m.3/16) ifade ettiği; bir gümrük rejimine tabi tutulmak istenen eşyanın "*bu rejime uygun şekilde yetkili gümrük idaresine beyan edileceği*"(GK, m.58/1), gümrük beyanına ilişkin işlemlerin "*süresi içerisinde tamamlanacağı*"(GK, m.46/2) ve söz konusu işlemlerin yerine getirilmemesi halinde "*eşyanın tasfiye edileceği*"(GK, m.50; m.70) belirtilmiştir. Bu bakımdan gümrük rejimleri gümrük idaresince re'sen uygulanan işlemler kapsamına girmediğinden bu işlemlerin bir beyanname kapsamında yapılacak beyanla gümrük idaresinden talep edilmesi gerekmektedir.

Gümrük Kanununda beyanın "*yazılı olarak, bilgisayar veri işleme tekniği yoluyla, sözlü olarak ve eşya sahibinin eşyayı bir gümrük rejimine tabi tutma isteğini ifade ettiği herhangi bir tasarruf yoluyla*"(m.59/1), yapılabileceği, gümrük işlemlerinin *"şekil ve içeriği yönetmelikle belirlenen beyannameyle yapılmasının zorunlu olduğu*"(GK, m.60/4), "*beyannamenin eşyanın beyan edildiği gümrük rejimini düzenleyen hükümlerin uygulanması için gerekli bütün bilgileri ihtiva etmesi ve imzalanması gerektiği*"(GK, m.60/1), "*eşyanın beyan edildiği gümrük rejimini düzenleyen hükümlerin uygulanması için gerekli bütün belgeler beyannameye ekleneceği*"(GK, m.60/2.a) ve "*beyannameye eklenmesi gereken belgelerin beyanname ile birlikte ibrazının istenmediği hallerde gümrük idaresince istediğinde ibraz edilmek üzere beyan sahibince saklama süresince muhafaza edilmesi gerektiği*"(GK, m.60/2.b) ifade edilmiştir. Öte yandan Kanunda "*belirtilen şartlara uygun beyannamelerin, ait oldukları eşyanın gümrüğe sunulmuş olması halinde tescil edileceği*"(GK, m.61/1), "*eşyanın beyan edildiği gümrük rejimine ilişkin tüm hükümlerin uygulanmasında esas alınacak tarihin beyannamenin tescil edildiği tarih olduğu*"(GK, m.61/2), "*tescil edilmiş beyannamenin ait olduğu eşyanın vergileri ve para cezalarından dolayı taahhüt niteliğinde beyan sahibini bağlayacağı ve gümrük vergileri tahakkukuna esas tutulacağı*"(GK, m.61/3), "*bir beyannamenin iki veya daha fazla kalemi kapsaması halinde, her kaleme ilişkin bilgilerin ayrı bir beyan sayılacağı; bir kalemin eksik veya fazlası diğer kalemin fazla veya eksiğine mahsup edilemeyeceği*"(GK, m.67/2), "*beyannameye eklenmesi gereken belgelerden bazılarının eklenmemesi, kaydedilmesi gereken bazı bilgilerin beyannameye yazılmaması;*

beyanname yerine gümrük rejimine tabi tutulma talebini içeren ticari veya idari bir belgenin verilmesi, beyannamenin tescili ile aynı hukuki niteliği taşıyan bir kayıt yoluyla gümrük rejimine geçiş yapılması ve bunlara ilişkin basitleştirilmiş işleme ilişkin beyannamelerin tescil tarihinden itibaren hüküm ifade eden tamamlayıcı beyanda bulunulması hususlarına izin verilmesi konusunda gümrük idaresinin yetkili olduğu"(GK, m.71/1-3)ve yazılı beyan dışındaki usullerin Yönetmelikle düzenleneceği (GK, m.72) belirtilmiştir.

Gümrük Yönetmeliğinde ise "*serbest dolaşıma girişte, ticaret politikası önlemlerine, ilave gümrük vergisine veya ek mali yükümlülük gibi diğer mali yükümlülüklere tabi eşyanın menşei, menşe şahadetnamesi ile ispat olunacağı ve menşe şahadetnamesinin eşyanın serbest dolaşıma girişine ilişkin beyanname ekinde ibraz edileceği; bu kapsamdaki eşyadan Türkiye'nin bazı ülkeler veya ülke grupları ile yaptığı anlaşmalar çerçevesinde veya tek taraflı olarak tanıdığı tercihli tarife uygulamasından faydalanmak amacıyla eşyanın tercihli menşeini tevsik eden belgelerin ibraz edilmesi, Serbest ticaret anlaşmaları veya Genelleştirilmiş Tercihler Sistemi çerçevesinde tercihli tarife uygulamasının ortadan kalktığı tarihten önce gümrük gözetimi altında bulunan serbest dolaşımda olmayan eşyaya ait ilgili belgelerin ibraz edilmesi, doğrudan ticaret politikası önleminin uygulandığı ülkeden ithal edilen veya ticaret politikası önlemi, ilave gümrük vergisi veya ek mali yükümlülük gibi diğer mali yükümlülük uygulanan ülke menşeli olduğu beyan edilen eşyanın serbest dolaşıma girişinde, 1/95 sayılı Ortaklık Konseyi Kararı (m.47) saklı kalmak üzere, AB'ye üye ülkelerden A.TR Dolaşım Belgesi eşliğinde gelen eşyanın serbest dolaşıma girişinde menşe şahadetnamesi aranmayacağı; ancak eşyanın aynı zamanda birden fazla ticaret politikası önlemi, ilave gümrük vergisi veya ek mali yükümlülük gibi diğer mali yükümlülüklere tabi olması ya da aynı düzenleme kapsamında ülkesine göre farklı oranların belirlenmiş olması durumunda menşe şahadetnamesi aranacağı; menşe şahadetnamesi ibraz edilmemesi halinde, tahsil edilmesi gerekenlerden en yüksek tutarlar esas alınarak işlem yapılacağı*"(GY, m.205/3-4) belirtilmiştir. Uygulamaya ilişkin Ticaret Bakanlığı tarafından yayımlanan 2021/20 sayılı Genelgede (Genelge 2021/20) "*eksik beyana konu beyannamenin tamamlayıcı beyanla bir bütün haline geldiği ve tamamlayıcı beyanla birlikte nihai hali oluşan yükümlü beyanının beyannamenin tescilinden itibaren hüküm doğurduğu; bu bakımdan eksik beyanın tamamlanması neticesinde yeşil hat beyannamelerinin ibraz edilemediği veya ibraz edilen belgelerin ilk beyannamede belirtilen belgeyle uyumlu olmadığı veya usulüne uygun olmadığının anlaşılması (örneğin gümrük idaresine daha önce ibraz edilmeyen menşe belgesinin ibrazı istenmesine rağmen belge asılları veya örneklerinin ibraz edilememesi veya ilk beyannamede belirtilen belgeyle uyumlu olmaması) halinde belgelerin olmadığı duruma göre hesaplanacak ek vergi tutarı tahakkuk ettirilerek gecikme faizi tatbik edileceği; ayrıca Gümrük Kanunu (m.234) uyarınca işlem yapılacağı"* ifadelerine yer verilmiştir.

Gümrük Yönetmeliğinde "*yazılı beyanın, ek-14'te bir örneği yer alan gümrük beyannamesi ile yapılacağı ve gümrük beyannamesinin doldurulmasında anılan ekte yer alan kullanma talimatının esas alınacağı*"(GY, m.112/1; GY, 14 Nolu Ek), *"beyannamede imzası bulunanların cezai hükümlerin uygulanması açısından beyannamede belirtilen bilgiler ile beyannameye ekli belgelerin doğruluğu ve ilgili rejimin gerektirdiği bütün yükümlülüklere uyulmasından sorumlu olduğu; doğrudan temsil durumunda bu sorumluluk adına hareket edilenlere ait olduğu; beyanın bağlayıcı olması nedeniyle beyannamenin başkasına devredilemeyeceği; eşyanın başkalarına satılmasının beyan sahiplerini yükümlülüklerinden kurtarmayacağı; bilgisayar sisteminde yer alan, eşyanın beyan edildiği gümrük rejimi bakımından tahsili veya teminata bağlanması gereken vergiler ile beyannameye eklenmesi öngörülen belgeler ile ilgili verilerden yükümlülerin yol gösterici mahiyette istifade edebileceği; anılan verilerden istifade edilmesinin sorumlulukları ortadan kaldırmayacağı*"(m.113/1-2) belirtilmiştir ve "*tercihli tarife uygulanabilmesi için gerekli olan belgeler ile vergilendirmeyi doğrudan etkileyen veya yükümlüye vergi avantajı sağlayan belgeler, kanun veya uluslararası düzenlemelerin açık hükmü gereği, gümrük beyannamesi ekinde ibrazı zorunlu belgeler, İthalat Rejim Kararında belirtilen ticaret politikası önlemlerine ilişkin belgeler, ilgili gümrük rejimleri itibariyle, beyannamenin tescil işlemi öncesinde temin edilen ayniyat tespitine ilişkin belgeler ve diğer kurumlarca yapılacak resmi kontrollere ilişkin izin veya belgeler*"(GY, m.114/1) beyannameye eklenmesi zorunlu olan belgeler arasında sayılmıştır.

Gümrük Kanununda "*posta yoluyla gelen ticari mahiyetteki eşyanın olağan şekilde beyan dileceği; ticari mahiyette olmayan eşyanın beyanı amacıyla kullanılan uluslararası kabul görmüş belgelerin beyanname hükmünde olduğu, bu nedenle ayrıca beyanname aranmayacağı*"(GK, m.175/1-2), Gümrük Yönetmeliğinde ise gümrük beyannamesi yerine kullanılan "*Elçilik Mektubu, Kurye Mektubu, TIR Karnesi, ATA Karnesi, Kumanya Listesi, Özel Fatura, Déclaration en Douane, CPD Karnesi, Yolcu Beraberi Numune, Sergi ve Fuar Eşyası Beyan Formu ve Sözlü Beyan Formu gibi belgelerin beyanname mahiyetinde olmadığı*"(GY, m.131/1), "*diplomatik muafiyet işlemlerinde kullanılan beyanname hükmünde olan elçilik mektuplarının şekil ve içereceği bilgilerin ek-18'de gösterildiği*"(GY, m.443/1) ve "*posta yolu ile gelen ve ticari nitelikte olmayan hediyelik, numunelik, zat ve*

aile ihtiyaçlarını karşılayan ve benzeri eşya için Déclaration en Douane'ların beyanname olarak kabul edileceği"(GY, m.459/1) ifade edilmiştir.

Gümrük beyanı bazı özellik arz eden işlemlerde farklı usul ve esaslara tabi tutulabilmektedir. Örneğin Gümrük Yönetmeliğinde "*belirli nitelikteki eşya ile CIF kıymeti 500 Avro'yu geçmeyen eşyanın, aynı gümrük idaresinden sürekli ve periyodik olarak ithal edenlerin beyanname yerine ticari veya idari bir belge üzerinden tescil ve işlem yapılmasına yönelik yazılı taleplerinin altı ay süreyle*"(GY, m.148/1), "*aynı tarife pozisyonunda sınıflandırılmış eşyayla ilgili sürekli olarak gümrük antrepo rejim beyanında bulunan kişilerin, beyanname yerine ticari veya idari belge üzerinden tescil ve işlem yaptırmaya yönelik yazılı taleplerinin*"(GY, m.165/1)kabul edileceği, "*B ve F tipi antrepolar hariç, yetkilendirilmiş yükümlü sertifikasına sahip kişilere eşyanın antrepo rejimine girişinin kayıt yoluyla yapılmasına*"(GY, m.166/1) izin verileceği ve "*Gümrük Yönetmeliğinde (m.175-177) belirtilen eşyanın iki hat sisteminin çalıştığı gümrük idarelerinde yeşil veya 'beyana tabi eşyam yoktur' hattından geçirilmesi, hat sisteminin çalışmadığı bir gümrük idaresinden beyan yapılmaksızın geçirilmesi, sahipsiz/kayıp bagaj formuyla veya münhasır olmak üzere Bakanlıkça belirlenecek formla yapılan beyan başka bir tasarruf yoluyla beyan olduğu; şartlara uygun şekilde beyan gerçekleştiğinde eşyanın Gümrük Kanunu (m.61/1) çerçevesinde gümrük idaresine sunulduğu, buna ilişkin beyannamenin tescil edildiği ve eşyanın teslim edildiğinin kabul edileceği ancak beyan gerçekleştiği halde söz konusu şartların yerine getirilmediğinin yapılan inceleme sonucunda anlaşılması durumunda cezai işlem yapılacağı*"(GY, m.178) hususları belirtilmiştir. Gümrük Yönetmeliğinde eşyanın kayıt yoluyla rejime geçişi "*eşyanın rejime geçişine ilişkin gümrük işlemlerinin gümrük idaresi yerine yükümlünün kendi tesislerinde yerinde gümrükleme yoluyla gerçekleştirilmesi ve gümrük idaresince uygun bulunması halinde, beyanın beyanname verilmesi yerine ticari kayıtlara giriş yoluyla yapılmasını*"(GY, m.3/1.d) ifade ettiği ve uygulamaya ilişkin Ticaret Bakanlığı tarafından yayımlanan 2003/6 sayılı Genelgede (Genelge 2003/6) "*serbest dolaşıma giriş beyanına ilişkin olarak beyan konusu eşyanın tespitini mümkün kılacak bilgilerin (eşyanın cins, nev'i, niteliği, markası, adedi, ağırlığı, ölçü ve kıymeti) yer alması koşuluyla, fatura ve taşıma belgelerinin 'ticari belge', kamu kuruluşlarının resmi yazılarının ise 'idari belge' olarak kabul edilmesi ve taahhütnamenin alınması gerektiği*" belirtilmiştir.

Yukarıda yer alan düzenlemeler birlikte değerlendirildiğinde gümrük beyanı, eşyanın tabi olacağı gümrük rejimini ve bu rejimin uygulanması için gerekli bilgi ve belgeleri içeren, beyan sahibini hukuken bağlayan bir gümrük işlemi olduğu; gümrük mevzuatında bazı basitleştirmeler belirlenmiş olsa da beyanın eksik, yanlış veya gerçeğe aykırı yapılması ile gümrük kabahati arasında doğrudan illiyet bağı kurulduğu; bu nedenle gümrük beyanının, yalnızca eşyanın bir gümrük rejimine tabi tutulmasını sağlayan bir usul işlemi olmadı, aynı zamanda beyan sahibinin gümrük yükümlülüklerini ve olası kabahat sorumluluğunu belirleyen temel hukuki araçlardan biri olduğu sonucuna ulaşılmaktadır.

3.1.2. Gümrük Rejimleri

Genel mevzuatının temel konuları arasında yer alan "gümrük işlemleri"(*customs formalities*) ve "gümrük rejimleri"(*customs procedure*) kavramlarının ayrı anlamı bulunmaktadır. Gümrük işlemleri kavramı "*gümrük mevzuatına uyulması amacıyla ilgili kişiler ve gümrük idareleri tarafından gerçekleştirilmesi gereken tüm işlemler*"; eşyanın gümrük bölgeleri içerisinde hareket tarzını belirleyen gümrük rejimi kavramı ise "*gümrük denetimine tabi eşyaya gümrük idaresi tarafından uygulanan işlemler*" anlamına gelmektedir (WCO, 2024). Türk gümrük mevzuatında bu ayrımın açıkça yapıldığını söylemek güç olmakla birlikte Gümrük Kanununda ve ikincil düzenlemelerde gümrük rejimlerine ilişkin gümrük idarelerince ve/veya bu idarelerin muhataplarınca yerine getirilmesi gereken birçok işlem bulunmakla birlikte Kanunda gümrük idaresiyle muhatap olan kişilerin genel olarak "*bu Kanun ve Cumhurbaşkanlığı kararnameleri ile bunlara dayanılarak çıkarılan mevzuat hükümlerine uymak; gümrük idarelerinin gerek bu Kanunda gerek diğer mevzuat hükümlerine göre yapacağı gözetim ve kontrollere tabi olmak; bu idarelerin kendi adına veya başka idareler nam veya hesabına tahsil edeceği her tür vergi, resim, harç ve ücretleri ödemek veya bunların teminata bağlamak; mevzuat hükümlerinin uymayı zorunlu kıldığı her tür işlemleri yerine getirmekle sorumlu oldukları*"(GK, m.4) belirtilmiştir.

Gümrük Kanununda gümrük rejimleri sekiz ad altında ve özellik taşımayan gümrük rejimleri (serbest dolaşıma giriş ve ihracat rejimleri), şartlı muafiyet rejimleri (transit, gümrük antrepo, şartlı muafiyet sistemi kapsamında dahilde işleme, gümrük kontrolü altında işleme ve geçici ithalat rejimleri) ve ekonomik etkili gümrük rejimi "gümrük antrepo, dahilde işleme, gümrük kontrolü altında işleme, geçici ithalat ve hariçte işleme rejimleri) olmak üzere üç grup altında sayılmıştır (GK, m.77; m.79). Bunlardan serbest dolaşıma giriş rejimi, dahilde işleme rejimi, geçici ithalat rejimi ve gümrük kontrolü altında işleme rejimine ilişkin giriş beyanından kaynaklanan aykırılıklar,

gümrük yükümlülüğü içeriği göz önünde bulundurularak, Gümrük Kanununun 234 üncü maddesi kapsamında gümrük kabahati olarak tanımlanmıştır.

Gümrük Kanununda ve Gümrük Yönetmeliğinde serbest dolaşıma giriş rejimine ilişkin açık bir tanım yapılmamış ancak Kanunda "*Türkiye Gümrük Bölgesine gelen eşyanın serbest dolaşıma girişi; ticaret politikası önlemlerinin uygulanması, eşyanın ithali için öngörülen diğer işlemlerin tamamlanması ve kanunen ödenmesi gereken vergilerin tahsili ile mümkündür*"(m.74) ve Gümrük Yönetmeliğinde "*ithalatta gümrük yükümlülüğü; ithalat vergilerine tabi eşyanın, serbest dolaşıma girmesi için normal usulde yapılan beyanlarda gümrük beyannamesinin tescil tarihinde, basitleştirilmiş usulde yapılan beyanlarda basitleştirilmiş işlemlere ilişkin beyannamenin ya da gümrük idaresince kabul edilen ticari veya idari belgenin tescil edildiği ya da tescil hükmünde kayıt işleminin yapıldığı tarihte başlar*"(GY, m.483/1) ifadelerine yer verilmiştir. Bu bakımdan rejim Türkiye gümrük bölgesine kesin olarak girecek eşya için yerine getirilecek işlem ve uygulamaları kapsamaktadır.

Gümrük Kanununda geçici ithalat rejimi "*serbest dolaşıma girmemiş eşyanın ithalat vergilerinden tamamen ya da kısmen muaf olarak ve ticaret politikası önlemlerine tabi tutulmaksızın, Türkiye Gümrük Bölgesi içinde kullanılması ve bu kullanım sırasındaki olağan yıpranma dışında, herhangi bir değişikliğe uğramaksızın yeniden ihracına olanak sağlayan hükümlerin uygulandığı rejim*"(GK, m.128) şeklinde tanımlanmıştır. Geçici ithalat rejimi ithalat vergilerinden "*tam muafiyet*" ve "*kısmi muafiyet*" sağlaması bağlamında iki sistemde işlemektedir. Gümrük Kanununda tam muafiyet kapsamına girmeyen eşyanın belirli hallerde kısmi muafiyet sisteminde geçici ithalat rejiminden yararlanabileceği (GK, m.132/1); bu durumda ithalat vergilerinin "*geçici ithalat rejimine ilişkin beyannamenin tescil tarihinde, söz konusu eşyanın serbest dolaşıma girmiş olması halinde alınacak vergiler tutarının %3'ü olarak tespit edileceği; vergilerin eşyanın rejimden yararlandığı her ay için alınacağı ve faiz hariç olmak üzere serbest dolaşıma girmesi halinde alınacak vergi tutarını aşmayacağı*"(GK, m.133) belirtilmiştir.

Gümrük Kanununda dahilde işleme rejimi "*şartlı muafiyet*" ve "*geri ödeme*" şeklinde işleyen iki farklı sistem şeklinde düzenlenmiştir. Bu bağlamda dahilde işleme rejimi kapsamında şartlı muafiyet sistemi "*serbest dolaşımda olmayan eşyanın, işlem görmüş ürünlerin üretiminde kullanılmasından sonra Türkiye Gümrük Bölgesinden yeniden ihraç edilmesi amacıyla, gümrük vergileri ve ticaret politikası önlemlerine tabi tutulmaksızın ve vergileri teminata bağlanmak suretiyle geçici olarak ithal edilmesi ve eşyanın işlem görmüş ürünlerin ihracı halinde teminatın iade edilmesi*"(GK, m.108/1) ve geri ödeme sistemi "*serbest dolaşımda bulunan eşyanın işlem görmüş ürünlerin üretiminde kullanılmasından sonra Türkiye Gümrük Bölgesinden ihraç edilmesi halinde, bu eşyanın serbest dolaşıma girişi esnasında tahsil edilmiş olan ithalat vergileri, dahilde işleme rejimi kapsamından geri verilmesi*"(GK, m.108/2) şeklinde ifade edilmiştir. Dahilde işleme rejimi kapsamında gümrük yükümlülüğü doğması mümkün olup bu durumda Kanunda "*gümrük vergilerinin, ithal eşyasının dahilde işleme rejimine ilişkin beyannamenin tescil tarihindeki vergi oranı ve diğer vergilendirme unsurları göz önünde bulundurularak hesaplanacağı*"(GK, m.114/1) belirtilmiştir.

Gümrük Kanununda gümrük kontrolü altında işleme rejimi "*serbest dolaşıma girmemiş eşyanın Türkiye Gümrük Bölgesinde, ithalat vergilerine veya ticaret politikası önlemlerine tabi tutulmaksızın, niteliğini veya durumunu değiştiren işlemlere tabi tutulmaları ve bu işlemlerden elde edilen ürünlerin gümrük vergileri üzerinden serbest dolaşıma girmelerine ilişkin hükümlerin uygulandığı rejim*"(GK, m.123/1) şeklinde tanımlanmıştır.

Gümrük rejimleri, eşyanın tabi tutulduğu rejime göre gümrük vergilerinin doğup doğmayacağını, ertelenmesini, teminata bağlanmasını veya gümrük verilerinden muaf/istisna tutulmasını belirleyen hukuki düzenlemeleri oluşturmaktadır. Gümrük yükümlülüğünün doğduğu hallerde eşyanın beyan edilen kıymeti, tarifesi, menşei veya diğer vergilendirme unsurlarına ilişkin aykırılar ödenmesi gereken vergilerin noksan hesaplanmasına neden olabilmektedir. Bu bağlamda gümrük rejimleri gümrük vergilerinin doğumu ve tahakkukunu belirleyen hukuki çerçeveyi oluştururken, gümrük kabahatleri bu çerçeveye aykırı davranışların özellikle eksik veya yanlış vergi tahakkuku bakımından yaptırıma bağlanmasını sağlamaktadır. Bu noktada eşyanın şartlı muafiyetleri içeren dahilde işleme, gümrük kontrolü altında işleme ve tam muafiyet sistemine tabi geçici ithalat rejimine tabi tutulmasının gümrük yükümlülüğü başlatan olaylardan olmadığı, dolayısıyla bu rejimlere giriş beyanında tarife, miktar, kıymet aykırılıkları beyanın tescil edildiği tarih itibariyle vergi kaybına işaret etmeyeceği ve Danıştay kararlarında da gümrük idarelerince Gümrük Kanunu (m.234/1) uyarınca ceza kararı alınsa da belirtilen rejimler bağlamında farklı gümrük tarife istatistik pozisyonu (GTİP) beyanlarının vergi kaybı bulunmadığı gerekçesiyle hukuka uygun bulunmamaktadır (Yerci, 2025:781). Öte yandan söz konusu rejimlerde teminat uygulaması bulunmaktadır ve de teminatın hesaplanabilmesi için vergi hesaplamasına ve ödenmesi muhtemel vergi tutarının bilinmesine de ihtiyaç bulunmaktadır (Beyribey, 2023:313).

3.1.3. Gümrük Yükümlülüğü

Gümrük Kanununda gümrük yükümlülüğü "*yükümlünün gümrük vergilerini ödemesi zorunluluğu" ve* yükümlü *"gümrük yükümlülüğünü yerine getirmekle sorumlu bütün kişiler*"(GK, m.3/8-b; m.11) olarak tanımlanmıştır. Gümrük yükümlülüğünün doğması ve başladığı an bağlamında Gümrük Kanununda "*ithalat vergilerine tabi eşyanın serbest dolaşıma girişi ve ithalat vergilerinden kısmi muafiyet suretiyle geçici ithalatta verilecek gümrük beyannamesinin tescil tarihinde başladığı; ithalatta gümrük yükümlülüğünde yükümlünün beyan sahibi olduğu, dolaylı temsilde temsilcinin yükümlülüğünün beyanda kullanılan verilerin yanlış olduğunu bildiği veya mesleği icabı ve mutat olarak bilmesi gerektiği durumlarla sınırlı olduğu, ayrıca serbest dolaşıma giriş ve kısmi muafiyet sistemini içeren geçici ithalat rejimlerine ilişkin beyanda kullanılan verilerin, kanunen alınması gereken vergilerin tamamen veya kısmen tahsil edilememesine sebep olduğu takdirde, beyanın yapılabilmesi için bu verileri veren ve bu verilerin yanlış olduğunu bilen veya bilmesi gereken kişilerin de gümrük vergilerinden sorumlu olduğu*"(m.181/1-3), "*ithalat vergilerine tabi eşyanın, Gümrük Kanununa aykırı şekilde Türkiye Gümrük Bölgesine girmesi ya da bir serbest bölgede bulunan ithalat vergilerine tabi eşyanın bu Kanuna aykırı olarak Gümrük Bölgesinin başka bir yerine gitmesi hallerinde gümrük yükümlülüğünün doğduğu ve yükümlülüğün eşyanın Türkiye Gümrük Bölgesine bu Kanuna aykırı olarak girişi tarihinde başladığı; eşyanın kanuna aykırı olarak girişini gerçekleştiren, eşyanın kanuna aykırı girişine iştirak eden ve girişin kanuna aykırı olduğunu bilen veya normal olarak bilmesi gereken kişiler ile bu nitelikteki eşyayı elde eden veya elinde bulunduran ve bu eşyayı elde ettiği veya aldığı sırada eşyanın kanuna aykırı olarak girdiğini bilen veya normal olarak bilmesi gereken kişilerin gümrük vergilerinden sorumlu oluğu*"(GK, m.182/1-3) ve "*Türkiye'nin taraf olduğu anlaşmalara göre dahilde işleme rejimi altında elde edilen Türk menşeli eşyanın anlaşmalara taraf ülkelere ithalinde, tercihli tarife uygulamasından yararlanmasının, bunların bünyelerine giren serbest dolaşımda olmayan eşyanın ithalat vergilerinin ödenmesi ve buna ilişkin belgelerin onaylanması koşuluna bağlı olması halinde ithalata ilişkin gümrük yükümlülüğü doğduğu, gümrük yükümlülüğünün eşyanın ihracına ilişkin gümrük beyannamesinin gümrük idaresi tarafından tescil edildiği tarihte başlayacağı ve ithalat vergilerinin ihracata ilişkin beyannamenin tescili tarihindeki vergi oranı ve diğer vergilendirme unsurlarına göre hesaplanacağı*"(GK, m.194/1-2) belirtilmiştir. Gümrük Yönetmeliğinde ise "*eşyanın serbest dolaşıma girişinde, o tarihte yürürlükte bulunan ticaret politikası önlemlerine, ilave gümrük vergisine veya ek mali yükümlülük gibi diğer mali yükümlülüklere ilişkin mevzuatla konulmuş hükümlerin de uygulanacağı ve belirtilen hususların uygulanmasında serbest dolaşıma giriş beyannamesinin tescil tarihinin esas alınacağı*"(GY, m.205/1-2) ifadelerine yer verilmiştir.

Gümrük yükümlülüğünün hesaplanması bağlamında Gümrük Kanununda, aksine hükümler saklı kalmak kaydıyla "*ithalat vergileri tutarının gümrük yükümlülüğünün başladığı tarihteki vergi oranları ve diğer vergilendirme unsurlarına göre belirleneceği*, *bu tarihin kesin olarak tespit edilemediği hallerde dikkate alınacak tarihin gümrük idarelerinin gümrük yükümlülüğü başladığı sonucuna vardıkları tarih olduğu; ancak gümrük yükümlülüğünün daha önceki bir tarihte başladığının tespit edilmesi halinde ise en eski tarihteki vergi oranları ve diğer vergilendirme unsurlarının esas alınacağı; hatalı beyan sonucu hiç alınmayan veya noksan alınan gümrük vergileri için faiz uygulanacağı*"(GK, m.193/1-3) ifade edilmiştir.

Gümrük yükümlülüğünün sona ermesi bağlamında Gümrük Kanununda, Amme Alacaklarının Tahsil Usulü Hakkında Kanun hükümleri saklı kalmak üzere gümrük yükümlülüğünün "*vergilerin ödenmesi, vergilerin kaldırılmasına karar verilmesi, gümrük beyannamesinin iptal edilmesi, eşyanın bir gümrük rejimi kapsamında tesliminden önce zapt ve müsadere edilmesi veya imha edilmesi, imha veya terk edilmesi, doğal özellikleri veya beklenmeyen haller yahut mücbir sebep nedeniyle telef veya kaybı ve kanuna aykırı girişi nedeniyle müsadere edilmesi hallerinde sona erdiği*"(GK, m.208) ve telafi edici vergi bağlamında gümrük yükümlülüğünün ise "*buna ilişkin işlemlerin iptal edilmesiyle ortadan kalkacağı*"(GK, m.209) belirtilmiştir.

Gümrük yükümlülüğünün maddi boyutunu gümrük vergileri oluşturmaktadır. Gümrük Kanununda gümrük vergileri "*ilgili mevzuat uyarınca eşyaya uygulanan ithalat vergilerinin ya da ihracat vergilerinin tümü*", ithalat vergileri "*eşyanın ithalinde ödenecek gümrük vergisi ile diğer eş etkili vergiler ve mali yükler ile tarım politikası veya tarım ürünlerinin işlenmesi sonucu elde edilen bazı ürünlere uygulanan özel düzenlemeler çerçevesinde ithalatta alınacak vergileri ve diğer mali yükler*"(GK, m.3/8-a; m.3/9) olarak tanımlanmıştır.

Gümrük Kanununda bir grup verginin ortak adı olarak ifade edilen gümrük vergilerinin kapsamına hangi vergilerin girdiği konusunda tam bir görüş birliğinin ve hukuki belirliliğin olduğunu söylemek oldukça güçtür (Gültekin, 2022:73). Teoride ithalat vergilerinin yalnızca ithalatta alınan ve ithal edilen malın maliyetini yükselten vergi ve mali yükler olması dolayısıyla gümrük idaresince alınan her vergi ithalat vergileri tanımı ve kapsamında girmediği; bu açıdan gümrük vergisi, ilave gümrük vergisi, dampinge karşı vergi, sübvansiyona karşı telafi edici vergi, toplu konut fonu (ek mali yükümlülük), kaynak kullanımını destekleme fonu gümrük vergileri kapsamına girerken katma

değer vergisi, özel tüketim vergisi, TRT bandrol ücreti, fikir ve sanat eserleri kesintisi ve damga vergisi bu kapsama girmediği; bir mali unsurun ithalat vergileri kapsamı bakımından durumunun açıklığa kavuşturulmasının ise cezaların doğru uygulanması ve uyuşmazlık kaynağı olmaması bakımından önem arz ettiği hukuki gerekçelere dayandırılarak ve detaylı olarak açıklanmaktadır (Yerci, 2025:42-48). Bu durum vergilerin tarife unsurunu taşımaları bağlamında önem arz etmekte; tarifa kapsamına girmeyen vergiler bakımından Gümrük Kanunu (GK, m.234/1) uygulamasını hukuki ihtilaf haline sokmaktadır. Öte yandan Danıştay dampinge karşı vergi ile kaynak kullanımını destekleme fonunun eksik ödenmesi hakkında Gümrük Kanununda cezalı tarhiyata ilişkin hüküm olmaması nedeniyle Gümrük Kanununa (m.234/1.a) göre idari yaptırım uygulanmasını hukuka aykırı bulmuştur (Kaya, 2026:330-331).

Gümrük Uzlaşma Yönetmeliğinde gümrük vergileri kavramının "*ilgili mevzuat uyarınca eşyanın ithali veya ihracında uygulanan ve gümrük idarelerince tahsili gereken gümrük vergisi, eş etkili vergiler ve mali yüklerin tümünü*"(GUY, m.3/1.ç) ifade ettiği ve kapsamına "*gümrük vergisi, ilave gümrük vergisi, tek ve maktu vergi, dampinge karşı vergi, subvansiyona karşı telafi edici vergi, katma değer vergisi, özel tüketim vergisi, ek mali yükümlülük, toplu konut fonu, tütün fonu, ek fon, kaynak kullanımını destekleme fonu, çevre katkı payı, telafi edici vergi(ihracat) ve TRT bandrol ücreti (ticari olmayan eşyada)*"(GUY, 1 No'lu Ek) girdiği belirtilmiştir. Bunlardan gümrük vergisi, ilave gümrük vergisi ve ek mali yükümlülük Gümrük Kanunu, Gümrük Giriş Tarife Cetveli Hakkında Kanun (GGTCK), İthalat Rejimi Kararı (İRK) ve İthalatta İlave Gümrük Vergisi Uygulanmasına İlişkin Karar (İİGVK) çerçevesinde uygulanan vergi ve mali yüklerdir. Tek ve maktu vergi Gümrük Kanununda ticari mahiyet taşımayan eşya (GK, m.167/son) ve sınır ticareti (GK, m.172) bakımından uygulanan; detayları ise Gümrük Kanununun Bazı Maddelerinin Uygulanması Hakkında Kararın "*vergileri ödenmek suretiyle yolcu beraberinde veya posta yoluyla ya da hızlı kargo taşımacılığı yoluyla serbest dolaşıma sokulacak eşya*"(BKK, m.62), "gümrük vergilerinden muaf olarak ithal edilecek yakıt"(BKK, m.96/3) ve Sınır Ticaretinin Düzenlenmesine ilişkin Kararının "ithalat"(CBK, m.9/2) düzenlemelerinde yer alan vergidir. Vergi mi yoksa mali önlem mi olduğu tartışmalı olan dampinge karşı vergi ile sübvansiyona karşı telafi edici vergi İthalatta Haksız Rekabetin Önlenmesi Hakkında Kanun (İHRÖK, m.7) kapsamında uygulanmaktadır. Katma değer vergisi, Özel Tüketim Vergisi ve TRT Bandrol ücreti ise kendi kanunlarında düzenlenen, dahilde uygulaması olan ancak ithalata ilişkin hükümler çerçevesinde gümrük idarelerince de tahsilatı veya ödenme durumları denetlenen vergi ve mali yükler olup gümrük vergileri içerisindeki yeri tartışmalıdır. Kaynak kullanımını destekleme fonu "*ihracatın ve yatırımların teşviki amacıyla kredili işlemlerden (ithalat işlemleri bağlamında mal mukabili ödeme, kabul kredili ödeme ve vadeli akreditifle ödemeden) alından*" bir mali yüktür (Uyanık, 2021:186). Çevre katkı payı "*Çevre Kanunu kapsamında ve çevre kirliliğinin önlenmesi, çevrenin iyileştirilmesi ve çevreyle ilgili yatırımların desteklenmesi amacıyla tahsil edilen*" bir mali yüktür (Terzi, 2023:340). Dahilde işleme rejimi kapsamında telafie edici vergi "*üçüncü ülke menşeli bir eşyanın rejim kapsamında ithal edildikten sonra üretim sürecini müteakip ihraç ürünü olarak ATR Dolaşım Belgesi eşliğinde AB üyesi ülkelere, menşe ispat belgeleri eşliğinde AB üyesi ülkelere, Türkiye'nin Serbest Ticaret Anlaşması imzaladığı ülkelere, Pan-Avrupa Menşe Kümülasyonuna veya Pan-Avrupa-Akdeniz Menşe Kümülasyonuna taraf olan ülkelere ihraç edilmesi halinde, ithal edilen eşya ile ilgili ihracat sırasında beyan usulüne tabi olarak ödenen vergidir*"(Uzun, 2017). Dolayısıyla telafi edici verginin dayanağı Gümrük Kanunu (m.194) ve 1/95 sayılı Ortaklık Konseyi Kararı (m.16) hükümleridir (Gerçek, 2020:308).

Netice itibarıyla gümrük yükümlülüğü, ithalata konu eşya bakımından gümrük vergilerinin ödenmesini gerektiren vergisel ilişkiyi tanımlamaktadır. Gümrük Kanununda düzenlenen gümrük yükümlülüğün doğduğu an, yükümlü/sorumlu kişiler ile uygulanacak vergilendirme unsurları eksik veya hiç ödenmeyen gümrük vergilerine ilişkin gümrük kabahatlerinin ve bunlara uygulanacak idari yaptırımların tespiti bakımından temel bağlantı noktalarını, diğer bir ifadeyle illiyet bağını kurmakta ve gümrük kabahatlerinde fiilin, yükümlünün, eksik veya hiç alınmayan verginin ve buna bağlı idari yaptırımın belirlenmesinin hukuki temelini oluşturmaktadır. Ancak hatalı veya eksik beyan sonucunda gümrük vergilerinin noksan alınması, Gümrük Kanunu (m.234) kapsamında idari yaptırım uygulanmasını gerektirmekle birlikte yaptırımın kapsamı bakımından hangi vergi ve mali yüklerin gümrük vergileri kapsamında olduğu hususu açık ve net değildir.

3.1.4. Gümrük Denetimi

Gümrük denetimi kısaca "*gümrük işlemleri sırasında veya sonrasında eşya, taşıt ve yolcularla ilgili yapılan beyanın, hesapların ve kayıtların ilgili mevzuata uyumunun araştırılması, kontrol edilmesi ve sağlanmasına yönelik gümrük idaresince yapılan işlemler bütünü*" anlamını taşımaktadır (Gültekin, 2019:105). Gümrük denetiminin önemli bir kısmı gümrük beyanını konu almaktadır. Gümrük Kanununda gümrük idarelerinin beyanın doğruluğunu tespiti için "*beyanname ve ekli belgeleri kontrol etme, içeriği bilgilerin doğruluğunu araştırmak için beyan sahibinden ilave belge talep etme; eşyayı muayene etme ve numune alma*"(GK, m.65/1) yetkisine sahip

olduğu ve "*eşyanın muayene edilmesi halinde muayene sonuçlarının; muayene edilmemesi halinde ise beyannamede muhteviyatı bilgilerin esas alınacağı*"(GK, m.65/2) belirtilmiştir. Eşyanın muayenesi beyan kapsamında yerine getirilmesi muhtemel bir işlem oluşturmaktadır. Bununla birlikte Gümrük Kanununda (m.70/1-2) beyan sahibinden kaynaklanan sebeplerle tescil edilmiş beyanname kapsamı eşyanın "*muayenesine başlanamaması veya devam edilememesi*", "*beyan edildiği gümrük rejimine tabi tutulması için verilmesi gereken belgelerin verilmemiş olması*" ve "*ödenmesi veya teminat altına alınması gereken ithalat veya ihracat vergilerinin ödenmemesi veya teminatın verilmemesi*" hallerinde re'sen eşyanın muayene edileceği, "*muayene sonucunda para cezasını veya diğer takipleri gerektiren veya gerektirmeyen durumların tutanağa bağlanması sonrasında eşyanın tasfiye edileceği*" ve "*gümrük antrepolarında bulunan eşya için beyanname verilmesine rağmen gümrük işlemlerinin beyannamenin tescil tarihinden itibaren otuz gün içinde bitirilmemesi*" halinde de eşya ile ilgili olarak aynı işlemlerin yapılacağı ifade edilmiştir.

Beyanın denetimine yönelik işlemler eşyanın gümrüğe sunulmasını takiben yapılabileceği gibi teslimden sonra da yapılabilmektedir. Nitekim Gümrük Kanununa göre gümrük idarelerinin "*beyanname içeriği bilgilerin doğruluğunu tespit etmek amacıyla, eşyanın ithal veya ihraç işlemleri ile sonrasında gerçekleşen ticari işlemlere ilişkin belge ve verileri yerinde kontrolü; mümkünse eşyanın muayenesi ve rejim hükümlerin yanlış veya eksik bilgilere dayanarak uygulandığının tespiti halinde, ceza hükümleri saklı kalmak üzere, beyanı yeni bulgulara göre düzeltme*"(GK, m.73/1-3) yetkisi bulunmaktadır.

Gümrük idareleri beyanın denetimi sırasında çeşitli denetim teknik ve yöntemlerinden yararlanabilmektedir. Gümrük Yönetmeliğine göre bilgisayar sistemi tarafından risk kriterlerine göre ve hat esasında belirlenen bu yöntemler "*kırmızı hat 'eşyanın muayenesi ile birlikte belge kontrolünün de yapıldığı hat', sarı hat 'muayeneye gerek görülmeksizin eşyaya ait beyanname ve eklerinin doğruluğunun ve birbiriyle uygunluğunun kontrol edildiği hat', mavi hat 'onaylanmış kişi statüsüne sahip kişilerin ihracatta yararlandığı, eşyanın çıkış işlemlerinin tamamlanmasından önce belge kontrolüne veya muayeneye tabi tutulmadığı hat' ve yeşil hat 'eşyanın belge kontrolüne veya muayeneye tabi tutulmadığı hat' "*(GY, m.180/2) şeklinde ifade edilmiştir. Ayrıca Gümrük Yönetmeliğinde eşyanın muayenesi "*kapların cins, marka, numara ve adetlerini, eşyanın vergiye esas olan ağırlık ve diğer ölçüleri ile gümrük tarife istatistik pozisyonu, menşe ve kıymetine ilişkin beyanın doğruluğunun tespitini kapsayan ve tam veya kısmi muayene yöntemleriyle gerçekleştirilen*"(GY, m.182) bir denetim usulü olduğu; belge kontrolüyle ilgili olarak "*kontrol ile görevlendirilen memur, beyannamedeki bilgileri ve eklerini inceler; tarife, kıymet, miktar, yasaklayıcı ve kısıtlayıcı önlemler söz konusu ise, buna ilişkin belge kontrollerini de yaptıktan sonra uygun bulursa, bu hususu beyanname üzerinde gösterir ve bilgisayar sisteminde onay verir... beyanname ve ekli belgeler arasında ciddi bir farklılık tespit eder ve muayenenin yapılmasını gerekli görür ise…bu hususu idare amirine bildirir*"(GY, m.183) açıklamalarına yer verilmiştir.

Beyanın denetlenmesi sonucunda beyanın tam ve doğru olduğunun tespiti ve gümrük işlemlerinin eksiksiz olarak tamamlandığının anlaşılması halinde eşya sahibine teslim edilmektedir. Söz konusu teslim Gümrük Kanunu uyarınca "*gümrük beyannamesinde gösterilen vergi tutarı ile gümrük idaresince hesaplanan vergi tutarının eşit olduğu*" ve "*gümrük vergilerinin yükümlüsüne tebliğ edildiği*"(GK, m.197/3) anlamı taşımaktadır. Öte yandan Gümrük Kanununda "*yapılan denetlemeler sonucunda hiç alınmadığı veya noksan alındığı belirlenen gümrük vergilerine ilişkin tebligatın gümrük yükümlülüğünün doğduğu tarihten itibaren üç yıl içinde yapılacağı*"(GK, m.197/2) ve "*hiç alınmadığı veya noksan alındığı belirlenen gümrük vergileri ile işlemleri daha sonra yapılmak üzere teslim edilen eşyaya ilişkin gümrük vergilerinin, yükümlüye tebliğ edildiği tarihten itibaren onbeş gün içinde ödenmesinin zorunlu olduğu*"(GK, m.198/1) belirtilmiştir. Bu noktada özelikle belirtilmelidir ki Gümrük Kanununda "*gümrük idarelerinin tescilden sonra beyannamedeki bilgileri kontrol ederek veya belli hallerde kontrol etmeksizin eşyayı teslim edeceği; ancak* kısmi *muafiyete tabi geçici ithalat rejimi hariç olmak üzere, beyannamenin tescilinin gümrük yükümlülüğü doğurması halinde gümrük vergileri ödenmedikçe veya teminata bağlanmadıkça ve beyan edilen gümrük rejimi çerçevesinde teminat istenmesi halinde ise teminat alınmadıkça beyanname kapsamı eşyanın teslim edilmeyeceği*"(GK, m.69/3-4) açıkça belirtilmiştir. Gümrük Yönetmeliğinde ise "*muayene sonucunda tespit edilen gümrük tarife istatistik pozisyonu, miktar, kıymet, menşe ve/veya kullanım yeri farklılığı nedeniyle yapılacak tahakkuklarda ve idare tarafından alınacak kararlarda, yürürlükteki kaçakçılıkla mücadele mevzuatı, dış ticaret mevzuatı ve diğer mevzuat ile ticaret politikası önlemlerine ilişkin hükümlerin de göz önünde bulundurulacağı*"(GY, 192/3) ifade edilmiştir.

Netice itibariyle gümrük yükümlüğünün tam, doğru ve zamanında tespiti hususu eşyanın tabi olduğu vergi, tarife, kıymet, miktar ve menşe unsurlarının doğru beyan edilmesine ve denetlenmesine bağlıdır. Bu bağlamda beyanın denetiminin gümrük kabahatlerinin ortaya çıkarılması ve yaptırıma bağlanması açısından gümrük idaresini harekete geçiren temel nedeni oluşturmaktadır. Dolayısıyla gümrük mevzuatında gümrük yükümlülüğü, gümrük

denetimi ve gümrük kabahatleri arasında yükümlülüğün yerine getirilip getirilmediğinin belirlenmesi ve aykırılıkların tespit edilerek yaptırıma bağlanması için doğrudan bir hukuki ilişki kurulmuştur.

4. HÜKÜMDE TANIMLANAN KABAHATLERE İLİŞKİN DEĞERLENDİRMELER

Gümrük Kanununun 234 üncü maddesinde tanımlanan aykırılıklar esas itibariyle gümrük beyanının doğru ve gerçek durumu yansıtmamasından kaynaklanmaktadır. Beyana aykırılık tipleri ise "*tarife/menşe*", "*kıymet*" ve "*vergilendirmeye esas fiziki ölçülere*" ilişkindir. Zira Gümrük Kanununda eşyanın gümrük tarifesi, gümrük kıymeti ve satış biriminin beyanı ile denetim sonucuna göre tespit edilen vergi farklılıkları için anılan hüküm uyarınca para cezaları uygulanacağı öngörülmüştür (Kızıler, 2023:216).

4.1. Gümrük Tarifesi ve Tarife Unsurları Bakımından Beyana Aykırılıklar

Genel olarak vergi tarifesi "*vergi tutarının hesaplanabilmesi için matraha uygulanması gereken ölçü veya ölçüler bütünü*" olarak tanımlanmaktadır (Gerçek, 2020:268). Arapça kökenli olan ve bildirge kavramına karşılık gelen (Şahin, 2019:66) tarife kavramı, gümrük vergilerini ya da bu vergilerin yer aldığı listeleri/cetvelleri ifade etmek amacıyla ve sıklıkla birbiri yerine kullanılmaktadır. Nitekim gümrük tarifesi "*ithalata konu eşyanın menşeine bağlı olarak değişen oranlarda uygulanan vergi*" ve "*gümrük vergilerine tabi eşyanın isimlerine ve matrahlarına göre vergi oran ve hadlerini gösteren ve uluslararası ticarete konu olan yabancı menşeli eşyanın belirli ölçülere göre rakamlarla/nümerik olarak sınıflandırıldığı liste*" anlamı taşımaktadır (Gültekin, 2021:52). Diğer bir ifadeyle gümrük tarifesi "*gümrük vergisine tabi eşyanın isim ve matrahına göre vergi oran ve hadlerini gösteren listelere*" denilmektedir (Beyribey, 2023:84). Gümrük Yönetmeliğinde (m.32) gümrük tarife istatistik pozisyonu (GTİP) "*Türk Gümrük Tarife Cetvelinde, on iki rakamdan oluşan pozisyonu*", Türk Gümrük Tarife Cetveli "*eşyanın cins ve niteliklerine göre sistematik bir şekilde numaralandırılarak sınıflandırıldığı ve Gümrük Giriş Tarife Cetveli Hakkında Kanunda yer alan gümrük vergisi oranlarının gösterildiği Cumhurbaşkanınca (değişmeden önce Bakanlar Kurulunca) kabul edilen cetveli*" ve tercihli tarife "*iki ya da daha çok ülkenin yaptıkları ticaret anlaşması uyarınca, aralarındaki ticarette karşılıklı olarak ya da bir ülkenin belli ülke ya da toprak parçaları menşeli eşyaya tek taraflı olarak daha düşük tarife uygulaması*" olarak tanımlanmıştır. Bu bağlamda gümrük tarifesini oluşturan unsurlar eşyanın tanımı, GTİP'i, tarife cetvelindeki oranlar, tarım ürünlerine özgü ithalat vergileri, Türkiye'nin anlaşmalara dayalı veya tek taraflı olarak uyguladığı tercihli tarifeler, bazı eşya için şartlı olarak uygulanan indirim veya muafiyetlerdir (Yerci, 2025:745).

Gümrük Kanununda "*gümrük vergilerinin, gümrük yükümlülüğünün başladığı tarihte yürürlükte olan gümrük tarifesine göre hesaplanacağı*" ve "*eşya ticaretine ilişkin özel hükümlerle belirlenmiş diğer önlemler, gerektiği takdirde, söz konusu eşyanın tarife pozisyonuna göre uygulanacağı"*(GK, m.15/1-2) ve biçimsel anlamda gümrük tarifesinin "*Cumhurbaşkanınca kabul edilen Türk Gümrük Tarife Cetvelini*", "*Türk Gümrük Tarife Cetveline dayanan veya bu cetvele alt açılımlar ekleyen ve eşya ticaretine ilişkin tarife önlemlerinin uygulanması için tespit edilen diğer cetvelleri*", "*Türk Gümrük Tarifesinin kapsadığı eşyaya uygulanacak gümrük vergi oranlarını, tarım politikası veya tarım ürünlerinin işlenmesi sonucu elde edilen bazı ürünlere uygulanan özel düzenlemeler çerçevesinde alınan ithalat vergilerini*", "*Türkiye'nin bazı ülkeler veya ülke grupları ile yaptığı tercihli bir tarife uygulaması gerektiren anlaşmalarda yer alan tercihli tarife uygulamalarını*", "*Türkiye tarafından tek taraflı olarak bazı ülkeler, ülke grupları veya toprak parçaları için tanınan tercihli tarife uygulamalarını*", "*ithalat vergilerinde, bazı eşyaya şartlı olarak uygulanacak muafiyet veya indirim uygulamalarını*" ve "*bunların dışında kalan diğer tarife uygulamalarına ilişkin düzenlemeleri*"(GK, m.15/3) kapsadığı ifade edilmiştir.

Gümrük vergisinin kanuni oranları ve verginin hesaplanmasında esas alınması gereken vergilendirme ölçütleri Gümrük Giriş Tarife Cetveli Hakkında Kanuna ekli listede yer almaktadır. Ancak tarife cetvellerindeki oranlarının uygulaması bulunmamakta; tarife cetveli esas fonksiyonunu, eşyanın tarife cetvelindeki yerinin, dolayısıyla GTİP'inin belirlenmesinde görmektedir. Uygulamadaki gümrük vergisi oranları ve ek mali yükümlülükler ise Cumhurbaşkanı Kararı eki İthalat Rejimi Kararında ve benzeri kararlarda yer almaktadır (Gültekin, 2021:56-57).

Beyan sahibinin eşyanın GTİP'ini doğru beyan etmesi gümrük vergilerinin hesaplanması, ticaret politikası önlemlerinin uygulanması ve eşya özelinde tanımlanan diğer yükümlülüklerin yerine getirilmesi bakımından önem arz etmektedir. Ancak GTİP beyanının zorunluluğu noktasında gümrük idaresi ile yargı organları arasında görüş birliği yoktur. Zira yargı kararlarında GTİP beyanı bakımından beyan sahibinin bir sorumluluğu olmadığı, tespitin gümrük idaresince yapılması gerektiği ve dolayısıyla bu eksiklik bağlamında ceza kararı alınamayacağı vurgulanmaktadır. Gümrük idaresi ise GTİP'in doğru beyanının ve beyannamede yer alması hususunun gümrük mevzuatının beyana ilişkin düzenlemeleri kapsamında zorunlu olduğu görüşündedir. Esasında eşyanın GTİP'in

tespiti (tarife cetvelindeki yerinin belirlenmesi) ile tespit edilmiş olan GTİP'in beyanı iki farklı durumdur. Bu bağlamda GTİP'in tespiti ve beyanının denetlenmesi gümrük idaresinin görev ve sorumluluğundadır. Nitekim Cumhurbaşkanlığı Teşkilatı Hakkında Kararnamede "*Türk Gümrük Tarife Cetvelini, eşyanın menşeini, gümrük kıymetini, gümrük rejim ve formalitelerini taraf olunan anlaşmalara ve uluslararası uygulamalara uygun olarak düzenlemek ve uygulanmasını sağlamak*"(CBTK, m.441/1.f; m.447/1.c) Ticaret Bakanlığının; Taşra Teşkilatı Hakkında Yönetmelikte "*eşyanın tabi tutulduğu gümrük rejimine göre gümrük beyannamesinde yer alan bütün bilgilerin doğruluğunu kontrol ederek eşyanın ilgili rejime geçişini sağlamak*"(TBTTY, m.21/1.i) gümrük müdürlüklerinin ve "*Türk Gümrük Tarife Cetvelinin uygulanması bakımından, eşyanın gümrük tarife istatistik pozisyonunun belirlenmesine yönelik teknik özeliklerini ve niteliklerini laboratuvar tahlili ile tayin etmek*"(m.26/1.a) laboratuvar müdürlüklerinin görevleri arasında sayılmıştır. Mülga Taşra Teşkilatı Çalışma Yönetmeliğinde "*…gümrükçe onaylanmış bir işlem veya kullanıma tabi tutulacak eşyanın muayene ve kontrolünü yapmak, Gümrük Tarife İstatistik Pozisyonunu tespit etmek, gümrük vergileri ile gümrük idarelerince tahsil edilmesi gereken vergi, fon ve diğer mali yükümlülüklerin tahakkukunu yapmak, muafiyet ve istisna hükümlerini uygulamak, tasfiyelik hale gelen eşyanın Gümrük Tarife İstatistik Pozisyonunu tespit etmek ve Tespit ve Tahakkuk Belgesini düzenlemek..*" muayene memurlarının görevleri arasında sayılmıştır (Gültekin, 2019:120-121). Öte yandan Gümrük Kanunu (m.9) uyarınca gümrük idaresinden bağlayıcı tarife bilgi talep ve 11 Seri No'lu Gümrük Genel Tebliği (GGT, Seri No:11) çerçevesinde tarife bilgisi (eşyanın Türk Gümrük Tarife Cetvelinde sınıflandırılmasına ilişkin kişinin yazılı talebi üzerine Gümrük ve Dış Ticaret Bölge Müdürükleri tarafından verilen tarife sınıflandırma görüşü) talep edebilmektedir. Bu bağlamda bağlayıcı tarife bilgisi, tarife bilgisi, kaçak eşyanın tespiti ve tasfiye halinde gümrük idaresinin ve gümrük personelinin GTİP belirleme görevi olmakla birlikte beyannamede yer alması amacıyla GTİP tespiti/beyanı noktasında görevi bulunmamaktadır. Özellikle muayene memurlarının beyan sahibi adına hareket ederek beyannamede GTİP beyan etmesi mümkün değildir. Söz konusu hareket ücretsiz de olsa özel iş hükmünde olacaktır ki dahilde alınan vergiler açısından usul hükümlerinin yer aldığı Vergi Usul Kanununda (VUK, m.6; m.363; TCK, m.257) kötüye kullanma potansiyeli olan bu tür fiiller suç olarak tanımlanmıştır.

GTİP'in yanlış beyanı, oranların tarife unsuru olması sebebiyle, gümrük vergisi oranının da yanlış beyanı anlamı taşımakta; gümrük vergilerinin gümrük idaresince tahakkuk ettirileceği yönündeki hükümden de beyan sahibinde bu sorumluluğun olmadığı sonucu çıkmamakta aksine Gümrük Kanunu (m.58/1; m.60/1) uyarınca eşyanın gerçek niteliğini ve özelliklerini temsil eden GTİP gösterilerek beyan edileceği açıktır. Gümrük Yönetmeliğinde (14 no'lu ek) gümrük beyannamesinin şekline, içeriğine ve kullanımına ilişkin talimat içermektedir. BİLGE sistemi de beyan sahibinin GTİP bilgisini girmesini zorunlu kılmaktadır. GTİP bilgisi risk analizi için ve katma değer vergisi ile özel tüketim vergisi açısından da GTİP bilgisi zorunluluk taşımaktadır. Bu açıdan yargı kararlarında yer alan gümrük vergilerinin yükümlülüğün başladığı tarihte yürürlükte olan gümrük tarifesine göre hesaplanacağı hükmünden gümrük tarifesini oluşturan unsurları gümrük müdürlükleri ve onun görevlileri tarafından belirleneceği yorumuna ulaşılması kanuna uygun düşmemektedir (Yerci, 2025:749-755).

Son tahlilde Gümrük Kanununda (m.4) kişilerin gümrük mevzuatına uygun hareket etmek, gümrük vergilerini ödemek veya teminata bağlamak ile mevzuatın zorunlu kıldığı diğer maddi ve şekli yükümlülükleri yerine getirmek durumunda olduğu açıkça ifade edilmiştir. Gümrük idaresinin sorumluluğu ise bu işlemlerin tam ve zamanında yerine getirilmesini denetlemek/sağlamak şeklindedir. Gümrük mevzuatının beyana ilişkin yukarıda açıklanan düzenlemeleri de GTİP beyanının beyan sahibine ait bir yükümlülük olduğunu göstermektedir.

GTİP ile bağlantılı aykırılıklar beyannamede buna ilişkin bir bilgiye yer verilmemiş olması ya da verilmiş olan bilginin gereceği yansıtmaması şeklindedir. Doğru olmayan GTİP bilgisi, esasında başka bir eşyanın beyanı sonucunu doğurmaktadır ve eşya bazında bu bilgiye tanımlı gümrük, dış ticaret ve ilgili bütün mevzuatın yanlış uygulanmasına yol açacağı açıktır. Söz konusu aykırılığın gümrük idaresince hesaplanan ithalat vergileri tutarına göre %5'i aşan tutarda vergi farkı oluşması halinde Gümrük Kanunu (m.234/1.a) ancak vergi kaybı oluşturmaması veya %5'in altında vergi farkı oluşması halinde Gümrük Yönetmeliği (GY, 82 No'lu Ek 11 nci sıra) gümrük kabahati oluşmaktadır. Öte yandan doğru olmayan GTİP beyanı Kaçakçılıkla Mücadele Kanunu (KMK, m.3/1-2) kapsamında da gümrük idaresince hukuki değerlendirmeye tabi tutulacaktır.

Gümrük tarifesiyle ilgili ikinci husus ithalat vergileri kapsamında giren vergilerin oranlarında aykırılık tespit edilmesidir. Gümrük vergisi oranları ile ek mali yükümlülükler tarife cetvelinin tercihli tarife uygulamalarına bağlı olarak çok kolonlu yapısı nedeniyle farklılaşabilmektedir. Zira tercihli tarife uygulamaları menşe (eşyanın tercihli menşe kapsamında olduğunu gösteren menşe ispat belgesi eşliğinde) ve serbest dolaşım (Avrupa Birliği ile Türkiye arasındaki ticarete konu eşya için A.TR dolaşım belgesi eşliğinde) olmak üzere iki şekilde gerçekleşmekte ve beyanname ekinde ibraz edilen menşe ispat belgesindeki ya da A.TR belgesindeki aykırılıklar Gümrük Kanunu

(GK m.234/1.a) kapsamına girmektedir (Yerci, 2025:756). Öte yandan sahte menşe ispat belgesi veya A.TR dolaşım belgesi ibrazı kaçakçılık suçu kapsamında ayrıca değerlendirilecektir.

Vergi teorisi bağlamında vergi oranları da tarife unsuru olmakla birlikte katma değer vergisi, özel tüketim vergisi gibi diğer mali yüklere ilişkin oranların beyannamede farklı yer almasının gümrük kabahati oluşturup oluşturmadığı hususu da üzerinde görüş birliği sağlanmamış konular arasında yer aldığı görülmektedir (Ercan, 2016:108-109; Demirtaş, 2020; Gültekin, 2021:63-64; Yerci, 2025:940). Gümrük idaresi katma değer vergisi özelinde vergi oranlarına ilişkin aykırılıkların Gümrük Kanunu (m.234) bakımından durumu hakkında 2008/21 sayılı Genelgede "*katma değer vergisi oranının yanlış beyan edilmesi nedeniyle ortaya çıkacak vergi farkları ithalatta matrahı değiştirmediğinden Gümrük Kanunu (m.234) kapsamına girmediğini; ancak Gümrük Kanunu (m.241/1) çerçevesinde işlem yapılacağını*"; 2013/39 sayılı Genelgede ise "*katma değer vergisinin ithalat vergileri tanımı içinde yer alması ve Gümrük Tarifesini oluşturan unsurlar arasında gümrük vergilerine ilişkin oranların da sayılmış olması dolayısıyla Gümrük Kanunu (m.234) uyarınca işlem yapılacağını*" ifade etmiştir. Ancak gümrük idaresince katma değer vergisi oranlarında veya özel tüketim vergisi hesabında esas alınan içeriğin veya muafiyet uygulamalarının gümrük beyanında hatalı yer verilmesi tarife unsurunda aykırılık değerlendirilerek Gümrük Kanunu (GK, m.234/1.a) çerçevesinde yaptırıma tabi tutulsa da yargı kararında katma değer vergisi farkının gümrük tarifesini oluşturan unsurlardan sayılmaması nedeniyle bu uygulama hukuka aykırı kabul edilmektedir (Kaya, 2026:323-324).

Gümrük kabahatine nitelik kazandıran hususun netice (vergi) kaybı olduğu dikkate alındığında, ithalat vergileri kapsamında değerlendirilen herhangi bir verginin ve mali yükün oranında/tutarında oluşacak aykırılığın vergi kaybına neden olacağı; bunun da eşik değeri aşması halinde madde hükmü kapsamına gireceği; eşik değerin altındaki farklılıkların veya fark oluşmasa bile beyanname düzenleme kuralına aykırılığı usulsüzlük oluşturacağı kabul edilmelidir. Katma değer vergisi örneğinde ise verginin kanuni oranı tektir (%10) (KDVK, m.28); dolayısıyla Katma Değer Vergisi Kanununda oran farklılığına ilişkin bir düzenlemenin olmaması doğaldır. Öte yandan Vergi Usul Kanununa tabi olmayan (VUK, m.2) ve Katma Değer Vergisi Kanununda "*hiç alınmamış veya eksik alınmış katma değer vergileri hakkında Gümrük Kanunundaki esaslara göre işlem yapılacağı*"(KDVK, m.48) açıkça ifade edilen katma değer vergisinin oranlarına ilişkin aykırılıkların Gümrük Kanunu (GK, m.234) çerçevesinde yaptırıma tabi tutulması hukuka aykırılık oluşturmayacaktır.

4.2. Vergilendirmeye Esas Fiziki Ölçüler Bakımından Beyana Aykırılıklar

Gümrük Kanununda"*1. Gümrük Tarifesinde ağırlık esasına göre vergiye tabi eşyada, vergiye esas ağırlıklar ile bazı pozisyon ve alt pozisyonların kapsamının belirlenmesine esas alınan ağırlıklar; a) Brüt ağırlığa atıfta bulunulan hallerde, eşyanın kendi ağırlığı ile tüm ambalaj maddeleri ve kapların ağırlıkları toplamı, b) Net ağırlığa veya sadece ağırlığa atıfta bulunulan hallerde, eşyanın kendi ağırlığı, olarak değerlendirilir. 2. Brüt ağırlığı üzerinden vergiye tabi eşya ambalajsız geldiği takdirde, söz konusu eşya bulunduğu haldeki ağırlığı üzerinden vergiye tabi tutulur*"(m.32) ifadeleri yer almaktadır. Bu bakımdan gümrük vergilerinde genel olarak *ad valorem* matrah geçerli olmakla birlikte bazı eşya türleri bakımından spesifik matrah kabul edilebilmektedir. Spesifik matraha esas söz konusu ölçüler ise Gümrük Giriş Tarife Cetvelinin 3 no'lu sütununda "*ölçü birimi*" şeklinde belirtilmekte ve ilgili birimler/kısaltmalar açıklama sayfalarında yer almaktadır. Gümrük Kanununda (GK, m.234/1.a) spesifik ölçüler üzerinden vergiye tabi eşyanın spesifik ölçüsünün (sayı baş, ağırlık, hacim gibi) beyana aykırılık taşıması halinde oluşan vergi farkına para cezası öngörülmektedir (Yerci, 2025:768). Diğer bir ifadeyle vergilemeye esas sayı, baş, ağırlık gibi ölçülere ilişkin beyana aykırılıklar da tarife cetveline dayanmakta ve tarife uygulamasını etkilediğinden idari yaptırımların dayanağı oluşturmaktadırlar (Beyribey, 2023:371).

4.3. Gümrük Kıymeti ve Gümrük Kıymeti Bakımından Beyana Aykırılıklar

Farklı olabilmekle birlikte ithalatta vergi matrahını oluşturan unsurların en önemlisi gümrük kıymetidir. DTÖ Kıymet Anlaşmasında gümrük kıymeti "ithal eşyasının, üzerinden adalarım gümrük vergileri tarh edilecek kıymeti"(m.15/1.a) olarak tanımlanmıştır (Uzunöner, 2025:38). Diğer bir ifadeyle değer esasına göre gümrük vergisi matrahı uluslararası terminolojide maliyet, sigorta ve navlundan oluşan CIF bedel ile ifade edilmekte ve bu değer satıcıya fiilen ödenen veya ödenecek tutardan oluşmaktadır (Gerçek, 2020:264).

Gümrük Kanununda eşyanın gümrük kıymeti "*gümrük tarifesinin ve eşya ticaretine ilişkin belirli konularda getirilen tarife dışı düzenlemelerin uygulanması amacıyla (Kanunda yer alan hükümler çerçevesinde) belirlenen kıymet*"(GK, m.23) ve ithal eşyasının gümrük kıymeti "*eşyanın satış bedelidir; satış bedeli ise Türkiye'ye ihraç amacıyla yapılan satışta 27 ve 28 inci maddelere göre gerekli düzeltmelerin de yapıldığı, fiilen ödenen veya*

ödenecek fiyattır"(GK, m.24/1) şeklinde tanımlanmıştır. Gümrük Yönetmeliğinde ise ithal eşyasının gümrük kıymetinin "ithal eşyası üzerinden advalorem sisteme göre gümrük vergisinin hesaplanmasına esas teşkil edecek eşya kıymetini"(GY, m.43/1.f) ve gümrük kıymetinin ise "*gümrük tarifesinin ve eşya ticaretine ilişkin belirli konularda getirilen tarife dışı düzenlemelerin uygulanması amacıyla 45 ila 50 nci maddelerde yer alan yöntemlerin sırasıyla uygulanması yoluyla tayin ve tespit olunan kıymeti*"(GY, m.44/1) ifade ettiği belirtilmiştir. Ticaret Bakanlığı tarafından gümrük kıymeti hakkında yayımlanan 2012/29 sayılı Genelgede gümrük kıymetinin doğruluğunun tespitine ilişkin gümrük idarelerince yerine getirilecek işlemlere açıklık getirilmiştir.

Gümrük kıymetinin beyanı açısından İthal Eşyasına Ait Kıymet Bildirim Formu ile fatura iki önemli belge niteliği taşımaktadır. Gümrük Yönetmeliğinde İthal Eşyasına Ait Kıymet Bildirim Formu "*Gümrük Tarifeleri ve Ticaret Genel Anlaşmasının VII nci Maddesinin Uygulanmasına Dair Anlaşma hükümleri çerçevesinde belirlenen ithal eşyasına ait gümrük kıymetinin unsurlarını içeren ve ek-16'da yer alan belge*"(GY, m.120/1) şeklinde ifade edilmiştir ve beyannameye eklenmek zorunda olan belgeler arasında yer almaktadır.

Dış ticaret işlemleri açısından en önemli belgeler arasında yer alan fatura satılan bir malın türü, özelikleri, miktar, birim fiyatı, toplam satış fiyatı, GTİP'i ve benzeri bilgiler ile satıcının ve alıcının adı, adresi, teslim şekli, ödeme şekli, sipariş veya sözleşme tarihi, düzenlenme tarihi ve sıra numarası gibi bilgileri içeren ve satıcı tarafından alıcıya teslim edilmek üzere hazırlanan bir belgedir (Pelit, 2023:286). Vergi Usul Kanununda fatura "*satılan emtia veya yapılan iş karşılığında müşterinin borçlandığı meblağı göstermek üzere emtiayı satan veya işi yapan tüccar tarafından müşteriye verilen ticari vesika*"(VUK, m.229) olarak tanımlanmış ve faturanın "*düzenlenme tarihi seri ve sıra numarası, düzenleyenin adı, ticaret unvanı, iş adresi, bağlı olduğu vergi dairesi ve hesap numarası, müşterinin adı, ticaret unvanı, adresi, varsa vergi dairesi ve hesap numarası, malın veya işin nev'i, miktarı, fiyatı ve tutarı, satılan malların teslim tarihi ve irsaliye numarası*"(VUK, m.30) gibi bilgileri içermesi gerektiği belirtilmiştir. İthalatta faturanın yabancı ülkelerde düzenlenmiş olması nedeniyle iç hukukta aranan şartları taşıması beklenemez. Bununla Gümrük Yönetmeliğinde fatura "*kesin satışlarda, satıcı ve diğer hallerde gönderici tarafından mahallinde düzenlenmiş ve başlıca; düzenleme yeri, tarihi ve sayısı, kesin satışlarda satıcı firmanın, diğer hallerde ise satıcı veya eşyayı gönderen firmanın adı ve adresi, eşyayı satın alanın veya kesin satış dışındaki hallerde gönderilenin adı ve adresi, ödeme şartları (peşin veya vadeli gibi), satış bedeli ve teslim şartı (CIF, FOB veya diğer bir bedel gibi), eşyanın tanımı ve satış birimine (kilo, metre, adet, düzine gibi) göre miktarı, eşyanın birim fiyatı (bir metre, bir kilo ve bir adedinin fiyatı gibi), eşyanın bulunduğu kapların cins ve nev'i, marka ve numarası ve adedi, eşyanın teslim ve bedelinin ödeme yeri, eşyanın gönderilme şekli bilgilerini içeren bir belge*"(GY, m.115/1) ve ayrıntılı fatura "*kıymetleri üzerinden vergiye tabi olup da birden ziyade kap içinde gelen ve aynı zamanda çeşitli cins ve kıymette olan eşyadan, her kapta aynı cins ve kıymette ne miktar eşya bulunduğunu gösteren ve faturaya uygun bir şekilde, satıcı veya gönderici tarafından mahallinde düzenlenmiş bir belge*"(GY, m.116/1) olarak tanımlanmıştır. Bu bağlamda fatura gümrük kıymetinin ve eşya miktarının beyanı ve tespiti açısından son derece önemli bir ispat belgesi niteliği taşımaktadır ve fatura muhteviyatı bilgiler gümrük beyannamesinde yer alan vergilendirme unsurlarının dayanağını oluşturmaktadır. Ticaret Bakanlığı tarafından fatura hakkında yayımlanan 2014/18 sayılı Genelgede "*ithalatta faturanın beyannameye eklenmesi zorunlu olduğu ancak yurtdışında düzenlenen faturalarda Yönetmelikte (GY, m.115) yer alan bilgilerin bulunmasının yeterli olması nedeniye imza veya kaşe gibi ulusal mevzuatın gerektirdiği unsurların aranmasına gerek olmadığı, ayrıca gümrük mevzuatında ibraz edilecek faturanın şekil nitelikleri (ticari/commercial, konsolosluk/consular, onaylı/legalized, gümrük/customs vb.) belirtilmediğinden içerik olarak gerekli unsurları taşıyan faturaların kabul edileceği; ithalatta gümrük idaresine ibrazı gereken faturanın yurt içinde düzenlenmiş olması halinde ise Vergi Usul Kanununa uygun faturaların kabul edileceği*" ifade edilmiştir

Ticari fatura (commercial invoce), mal ithalatı veya ihracatı sırasında alıcılar ve satıcılar arasında düzenlenmesi zorunlu olan ve gümrük işlemleri sırasında kullanılan temel belgedir (Speedshift, 2021). Normal faturaya göre daha ayrıntılı bilgi içeren ticari fatura neyin alınıp satıldığının temel bir beyanı niteliğindedir ve fon/iadelerin serbest bırakılması ile sigorta taleplerinde kullanılan belgedir. Gümrük beyannamesine dayanak oluşturan ticari faturanın, uluslararası satış sözleşmesinin konusu olan eşya ile siparişin eşleştirilmesi ve eşyanın varış ülkesine ulaştığında vergilerin ve mali yükümlülüklerin doğru hesaplanması açısından önemli bir fonksiyonu olması sebebiyle gerçek durumu yansıtması gerekmektedir. Bu nedenle eşyanın ayrıntılı/ticari tanımı, palet veya koli/kutu içerisindeki eşya miktarı, her bir ürünün ağırlığı, her bir kolinin ağırlığı, toplam gönderi/sevkiyat ağırlığı, Harmonize Sistem Kodu (GTİP veya tarife alt pozisyonu), menşe ülke bilgisi ile gönderiye ilişkin sigorta ve taşıma ücretlerini de içeren toplam değeri ticari faturada belirtilmelidir. Öte yandan ticari faturalar ticari fatura ibaresi, fatura numarası, fatura tarihi, alıcı-satıcı detayı, ilgili evrak varsa numara ve tarih bilgileri, ödeme yöntemi, para birimi ve varsa indirimler veya ek ücretler, teslim şekli, ambalaj üzerindeki herhangi bir tanımlayıcı işaret ve numaralar, taşıma araçları ve güzergahı, varsa ek ücret ve maliyetler, ek dil sürümleri ve yine gerekli hallerde

sertifikasyon bilgisi içerecek şekilde düzenlenmektedir (UK Government, 2026). UCP-500'ün (Uniform Customs and Practice for Documentary Credits/Tek Tip Gümrük ve Uygulama Kuralları) 37 inci maddesinde ticari faturada düzenlendiği tarih, mal veya hizmetin cinsi, malların birim fiyatı, miktarı, toplam tutarı, ağırlığı ve ebatı, malların ambalajlanma şekli ile varsa seri numaraları, alıcının ve satıcının ismi, unvanı ve adresi, ödeme ve teslim şekli ile sevkiyatın şekli, menşe ülke bilgisi ile düzenleyenin imzası ile mallara ilişkin referans gümrük tarife istatistik pozisyonu bilgisinin yer alması gerektiği ifade edilmiştir (Epackchina, 2011). Amerika Birleşik Devletleri uygulamasında GTİP bilgisini ihtiva eden ticari faturadaki değerin amaçlanan perakende satış fiyatı değil ABD'li alıcının ödediği fiyat olması ve satış komisyonları, yardımlar, telif hakları, üretim maliyetleri ve paketleme maliyetlerini içermesi gerekmektedir. Bunların faturada bulunmaması noksan değer beyanı kabul edilerek cezalandırma nedeni sayılabilmektedir (Bang, 2026).

Tablo 1: Örnek Bir Ticari Faturanın Vergilendirmeyle İlişkili Unsurları

Eşyanın Tanımı (*Description of Goods*)	**Miktarı (*Quantity*)**	**Birim Ağırlığı (*Item Weight-kg*)**	**Birim Kıymeti (*Item Value*)**	**HS Kodu (*HS Code*)**	**Menşe Ülke (*Country of Origin*)**	**Toplam Koli Ağırlığı (*Total Box Weight-kg*)**	**Toplam Kıymeti (*Total Value*)**
Şampuan	10	1	5	34022090	Birleşik Krallık	10	50
Spor Ayakkabı	10	0,5	10	64021900	Birleşik Krallık	5	100
Taşıt Motoru	1	100	500	87084020	İsveç	100	500
Bilgisayar	1	5	250	84714100	Çin	5	250
Plastik Aparat	20	2	600	39151000	Birleşik Krallık	40	1200
Gönderideki Paket Sayısı: 5			Kıymeti			Toplam Gönderi	2.100,00
						Navlun	300,00
						Sigorta	30,00
						TOPLAM	**2.430,00**

Kaynak: Speedshift. (2021).

Yabancı hukukda ticari faturalar bakımından GTİP/tarife alt pozisyonu bilgisi istenmekle birlikte iç hukukta Gümrük Kanununda ve Gümrük Yönetmeliğinde ticari fatura hakkında bir belirleme yapılmadığı gibi faturada yer alması gereken bilgiler arasında GTİP/tarife alt pozisyonu bilgisi sayılmamıştır. Oysa Türkiye yapılan ithalat başka bir ülkenin ihracı olduğundan ilgili ülkede düzenlenen faturada ve/veya gümrük beyannamesinde GTİP/tarife alt pozisyonu bilgisinin bulunması mümkündür. GTİP ihtilaflarının önüne geçilmesi bakımından bu durum referans kabul edilmelidir. Öte yandan fatura içeriği ithalata konu eşyanın satış birimine göre miktarı ve toplam satış bedeli bakımından da veri niteliği taşımaktadır.

Gümrük mevzuatında gümrük kıymetinin beyanı ve hesaplanması konusunda özellik arz eden düzenlemeler bulunmaktadır. Örneğin Gümrük Yönetmeliğinde yer alan İstisnai kıymetle beyan, veri ya da komut yüklü bilgi taşıyıcılarının gümrük kıymeti, alıcı ile satıcı arasındaki ilişkinin belirlenmesi ile royalti ve lisans ücretleri (GY, m.53-56) bu düzenlemeler arasındadır. Ayrıca muafiyet/istisna uygulamaları bakımından eşyanın değer esas alınmaktadır. Nitekim Gümrük Kanununda "*değeri 150 Euro'yu geçmeyen eşya*" ile "*değeri 430 Euro'yu geçmemek üzere yolcuların beraberindeki hediyelik eşya*"(GK, m.167/4; m.167/6.a); Gümrük Kanununun Bazı Maddelerinin Uygulanması Hakkında Kararda "Türkiye Gümrük Bölgesindeki bir kişiye posta ya da hızlı kargo taşımacılığı yoluyla gelen, bedeli gönderi başına toplam 150 Avro'yu geçmeyen kişisel kullanıma mahsus kitap veya benzeri basılı yayın"(BKK, m.45/1) ile "*yolcu beraberi toplam gerçek kıymeti 430 (15 yaşından küçük yolcular için 150) Avro'yu geçmeyen eşya için hediyelik eşya limiti*"(BKK, m.61/1), tek ve maktu vergiye tabi "*kıymeti 1500 Avro'yu geçmeyen kitap veya benzeri basılı yayın*", "*bir tüzel kişiye gelen ve kıymeti 22 Avro'yu geçmeyen eşya*", "*kıymeti 1.500 Avro'yu geçmeyen kişisel eşya*"(BKK, m.62) belirlemeleri söz konusudur. Sınır Ticaretinin Düzenlenmesine İlişkin Kararda "*esnaf veya tacir ya da mağaza kiralayan tarafından ilgili gümrük kapısı veya Sınır Ticaret Merkezinden 30 gün içerisinde en fazla 75.000 ABD Doları karşılığı Türk Lirası değerinde eşya ithal edilebilir*"(CBK, m.9/1) belirlemesi yapılmıştır. Ticaret Bakanlığı tarafından posta ve hızlı kargo taşımacılığı hakkında yayımlanan 2022/9 sayılı Genelgede ise "*Posta veya hızlı kargo taşımacılığı yoluyla gelen eşyanın kıymeti, ibraz edilen faturaya, satış fişine veya eşya bedelinin ödendiğine ilişkin belgeye göre belirlenir. Bu tür belge ibraz edilememesi veya ibraz edilen belgede kayıtlı kıymetin düşük bulunması halinde, eşyanın kıymeti gümrük müdürlüğünce belirlenir*"(Genelge, 2022/9) ifadelerine yer verilmiştir.

Netice itibariyle gümrük vergisinin ve matrahına girdiği diğer mali yükümlülüklerin doğru hesaplanması için gümrük kıymetinin tam ve doğru beyan edilmesi önem arz etmektedir. Zira gümrük kıymetine ilişkin beyandan kaynaklanan aykırılıkların söz konusu mali yükümlülüklerin noksan hesaplanmasıyla sonuçlanacağı ve gümrük idari düzenini ve tahakkuk düzenini bozacağı açıktır. Bu nedenle Gümrük Kanununda (GK, m.234/1.b-c) gümrük

kıymeti beyanından kaynaklanan aykırıklar gümrük kabahati olarak tanımlanmış ve karşılığında idari para cezası öngörülmüştür. Gümrük Kanununda, tarife ihlallerinin aksine, kıymet beyanına ilişkin aykırılıklardan ve maddi hesap hatasından kaynaklanan noksan kıymet farkı için her hangi bir eşik değer belirlenmemiştir.

4.4. Eşyanın Miktarı Bakımından Beyana Aykırılıklar

Gümrük beyanının ve buna bağlı ithalat vergilerine ilişkin hesaplamaların gerçek miktar üzerinden yapılması gerekmektedir. Ancak çeşitli nedenlerle beyan konusu eşyanın miktarında farklılıklar oluşması muhtemeldir. Söz konusu farklılıklar gümrük idaresince özet beyan veya gümrük beyanının denetlenmesi aşamalarında veya eşyanın tesliminden sonra yapılan denetim faaliyetleri sırasında tespit edilebilmektedir. Eşyaya gümrükçe onaylanmış bir işlem veya kullanım şekli belirlenmediği, diğer bir ifadeyle eşyanın henüz bir gümrük rejimine tabi tutulmadığı özet beyan aşamasında tespit edilen ve kap adedi üzerinden tespit edilen miktar farklılıkları ile eşya miktarının gümrük idaresince tespit edilmediği ve rejim beyanının belgelerinde kayıtlı miktarlara göre yapıldığı hallerde tespit edilen miktar farklılıkları özet beyan eksiklik veya fazlalığı olarak Gümrük Kanunu (GK, m.237) kapsamında yaptırıma tabi tutulmaktadır. Gümrük beyanın ilgili rejimlere giriş veya eşyanın teslimi sonrasında yapılan denetimde tespit edilen miktar farklılıkları ise söz konusu farklılığın niteliğine göre Gümrük Kanunu (GK, m.234) veya Kaçakçılıkla Mücadele Kanunu (KMK, m.3) kapsamında değerlendirilmektedir.

Beyan aşamasında miktar farklılıkları beyanname kapsamı eşya ile aynı türdeki eşya bakımından olabileceği gibi başka bir tür eşya (*tarife alt pozisyonu değişen, değişmemesi durumunda ise her türlü vergi ile ek mali yükümlülüğün advalorem usulde oran veya spesifik usulde miktarına ve/veya ticaret politikası önlemine ilişkin faydalanılacak hak ve menfaatlerde farklılık gösteren eşya*) bakımından olabilmektedir. Beyana göre aynı eşya türüne ilişkin miktar farkı Gümrük Kanunu (GK, m.63) ve Gümrük Yönetmeliği (GY, m.121) çerçevesinde beyannamede düzeltme konusu olabilmektedir. Bu aşamada döviz kuru, gümrük vergisi matrahı, katma değer vergisi matrahı gibi beyannamede yer alan hatalı bilgilerin dahi Gümrük Kanunu (GK, m.234) kapsamında yaptırım muhatabı olmaksızın düzeltilebilirken Gümrük Yönetmeliği (GY, m.121/2-3) uyarınca beyanın kontrol türü kırmızı hat olarak belirlenmiş eşyaya ilişkin beyannamede yer alan bilgilerin yanlış olduğunun tespit edilmesinden önce düzeltme talebinde bulunulması Gümrük Kanunu (GK, m.234/3) kapsamında "kendiliğinden bildirim" kabul edilerek düzeltilebilmektedir (Kumcuoğlu, 2017). Nitekim Ticaret Bakanlığınca yayımlanan 2010/24 sayılı Genelgede "Gümrük Yönetmeliği (GY, m.121/2-3) uyarınca yapılacak beyannamede düzeltme taleplerinde vergi kaybına neden olan işlemin değil beyanda yapılan bir hatanın gümrük idaresine bildirimi söz konusu olduğundan herhangi bir cezai müeyyide uygulanmaması gerektiği"(Genelge, 2010/24) açıklamasına yer verilmiştir. Beyana göre "*farklı bir eşyanın beyanı*" sonucunu doğuran miktar farklılığı, yani beyana göre fazla eşya çıkmasıyla ilgili gümrük mevzuatında açık bir düzenleme mevcut olmamakla beraber Gümrük Kanunu (GK, m.234/3) kapsamında "*kendiliğinden bildirim*" başvurusu yapılabileceği kabul edilmektedir. İthalat işlemleri tamamlandıktan sonra, aynı cins eşyanın beyan edilen miktardan fazla çıkması "*başka bir eşyanın beyanı*" sonucunu doğurmadığından, beyannamede düzeltme yapılabilmektedir (Kumcuoğlu, 2017). Gümrük Yönetmeliğinde "*miktar farklılığı nedeniyle yapılacak tahakkuklarda ve alınacak kararlarda, yürürlükteki kaçakçılıkla mücadele mevzuatı, dış ticaret mevzuatı ve diğer mevzuat ile ticaret politikası önlemlerine ilişkin hükümlerin de göz önünde bulundurulması gerektiği*"(GY, m.193/3) ifade edilmiştir. Bu bağlamda beyan harici farklı eşyanın beyanname kapsamı eşyaya oranla sayısı, değeri, farklı eşyanın kıymeti, gümrük idaresini aldatmaya yönelik hileli davranışla yapılması gibi durumlarında değerlendirilmesi yerinde olacaktır.

Gümrük beyanında eşyanın birim miktarı açısından aykırılık tespit edilmesi halinde yaptırım uygulanıp uygulanamayacağı; uygulanacaksa ne tür (adli/idari) yaptırımın uygulanacağı konusunda teoride ve yargı kararlarında bir görüş birliği bulunmamaktadır. Bununla birlikte Gümrük Kanununda özet beyan ve gümrük beyanına ilişkin işlem ve aşamalar ayrı kurallarla düzenlenmiş olması sebebiyle bunlara aykırılıkların da kendi kuralları bağlamında değerlendirilmesi gerekmektedir. Nitekim özet beyan aşamasında yapılan denetimde kap adedi üzerinden aykırılıkların tespiti halinde özet beyan takibatının neticesine göre idari yaptırım uygulanması mümkündür. Gümrük beyanı aşamasında ise miktar aykırılıklarına, gümrük rejimine girişin kayıt yoluyla yapıldığı haller haricinde (GK m.71/c; GK, m.237/5) özet beyan takibatının yapılması ve buna göre yaptırım uygulanması mümkün değildir. Bu durumda satış birimine göre miktar hatası neticesinde miktar farkının toplam miktarın %5'i aşıp aşmadığına bakılması ve ayrıca beyan harici tespit edilen eşyanın cinsine bakılması gerekecek; Gümrük Kanunu (GK, m.234/1.c) maddesinde ifade edilen "*satış birimine göre miktar itibarıyla %5'i geçmeyen bir fark"* kapsamında idari yaptırım uygulanacaktır. Beyanname harici farklı tür eşya tespit edilmesi halinde ise kastın/hilenin varlığı ile fahiş kıymet ya da ithalat yasaklamaları/kısıtlamaları ve izin gereklilikleri gözetilerek idari yaptırım kararı alınması ve durumun ayrıca Gümrük Yönetmeliği (GY, m.579) uyarınca Cumhuriyet Savcılığına intikal ettirilmesi gerekmektedir.

4.5. Netice Unsuru Bakımından Değerlendirmeler

Gümrü Kanunu (GK, m.234) kapsamında düzenlenen gümrük kabahatlerinde temel belirleyici unsur ithalat vergilerinde vergi farkı şeklinde ortaya çıkan neticedir. Ancak burada da aranması gereken husus, verginin fiilen Devlet bütçesine intikal etmemesi anlamında gerçekleşmiş bir mali zarar değil; kanunun öngördüğü şekilde beyan edilen veya hesaplanan ithalat vergileri ile kanunen alınması gereken vergiler arasında bir farkın bulunmasıdır. Vergi farkının teminat altında bulunması, bu farkın mevcut olmadığı anlamına gelmemektedir. Tartışma özellikle şartlı muafiyet rejimlerine ilişkin gümrük kabahatleri bakımından ve kabahatin oluşumu için fiili bir vergi kaybının meydana gelmesinin gerekip gerekmediği noktasında ortaya çıkmaktadır. Gümrük Kanununda (GK, m.69/3) beyannamenin tescilinin bir gümrük yükümlülüğü doğurması halinde, gümrük vergileri ödenmedikçe veya teminata bağlanmadıkça eşyanın teslim edilemeyeceği ve (GK, m.81/2) şartlı muafiyet rejimlerine konu eşya bakımından "tahakkuk edebilecek her türlü gümrük vergilerine karşılık" teminat verilmesi öngörülmektedir. Düzenlemelerden doğmuş ve vergisel boyutu tespit edilmiş bir gümrük yükümlülüğünün fiili ödeme yerine teminat yoluyla da güvence altına alınabildiği sonucuna ulaşılmaktadır. Örneğin Ticaret Bakanlığı tarafından tahsilat işlemleri hakkında yayımlanan Gümrük Genel Tebliğinde "*şartlı muafiyet rejimlerine girişte veya nihai kullanım izni kapsamında tahakkuku yapılan ve teminata bağlanan gümrük vergilerine ilişkin olarak, ilgili rejim hükümlerinin ihlali halinde alacak aslına ilişkin ayrıca tahakkuk yapılmayacağı*"(GGT, Seri No:2, m.4/3) belirtilmiştir. Bu düzenleme, şartlı muafiyet rejimlerinde vergisel yükümlülüğün rejime giriş aşamasında hesaplanıp teminat altına alınabildiğini ve rejim ihlalinin gerçekleşmesi halinde ise yeni bir vergi alacağının yaratılmasından ziyade mevcut gümrük alacağının tahsiline gidildiğini göstermektedir. Bu bakımdan şartlı muafiyet rejimlerine ilişkin gümrük kabahatleri bakımından "netice" unsurunu fiilen ve nihai olarak bir vergi kaybının oluşması şeklinde tanımlamak isabetli olmayacaktır. Belirtilmelidir ki Gümrük Kanunu (GK, m.234) bağlamında "potansiyel vergi kaybı" kavramından hareket edilmesi de kanunilik ve tipiklik ilkeleri bakımından sorunlu bir alana işaret etmektedir. Bunun yerine, ilgili rejim kapsamında doğmuş veya rejim ihlalinin gerçekleşmesiyle tahsil edilebilir hale gelen ve hukuken güvence altına alınmış bir gümrük alacağından söz edilmesi ve fiili vergi kaybı ile varsayımsal bir vergi riski arasındaki ayrımın korunması mümkün olacaktır. Telafi edici vergi uygulaması da (GK, m.194) bu yaklaşımı desteklemektedir. Zira anılan düzenlemede gümrük yükümlülüğünün doğması ile kapsamına giren verginin fiilen ödenmesinin aynı hukuki aşamaya karşılık gelmediği açıkça ifade edilmektedir. Dolayısıyla şartlı muafiyet rejimlerine ilişkin yaptırım bakımından aranacak netice, verginin mutlaka fiilen ve nihai olarak Hazineye intikal etmemesi şeklinde anlaşılmamalıdır. Son tahlilde Kabahatler Kanununun "*kabahat, failin icrai veya ihmali davranışı gerçekleştirdiği zaman işlenmiş sayılır; neticenin oluştuğu zaman, bu bakımdan dikkate alınmaz*"(KK, m.5/2) hükmü dikkate alındığında gümrük kabahatleri bakımından kurucu unsurun beyana aykırılık biçimindeki hareket olduğu; vergi kaybı biçimindeki neticenin gerçekleşme zamanının ise ikinci planda kaldığı görülmektedir. Gümrük Kanununda yer alan "kendiliğinden bildirim"(GK m.234/3, m.235/6) uygulamalarının etkin pişmanlık olarak nitelendirilmesinde yatan gerekçe de kabahatin işlenmiş kabul edildiği andır.

Gümrük Kanununda (GK, m.234) düzenlenen gümrük kabahatlerine ilişkin netice unsuru bakımından esas sorunlu konu "ithalat vergileri" kapsamı bakımından ortaya çıkmaktadır. Zira Gümrük Kanununda (GK, m.234) tanımlanan gümrük kabahati bakımında vergi farkı biçimindeki neticeyi veriler değil; gümrük yükümlülüğünü belirleyen vergilendirme unsurları sebebiyet verebilmektedir. Bu kapsamda vergi oranı, matrah ve gümrük tarifesinin uygulanmasına ilişkin unsurların, somut olayda alınması gereken ithalat vergisinin miktarını belirlediği ölçüde değerlendirilmesi mümkündür. Öte yandan hangi vergilerin ve mali yükümlülüklerin bu kapsamda değerlendireceği konusunda görüş birliği de bulunmamaktadır. Buna ilişkin kanunilik, belirlilik ve ölçülülük ilkeleri gözetilerek, cezalandırmanın amacına ulaşılabilmesi ve gümrük düzeninin korunması bağlamında bir şekilde gümrük idaresiyle ve gümrük işlemleriyle ilişkili vergilerin ve diğer mali yükümlülüklerin Gümrük Kanunu (m.234) kapsamında değerlendirilmesinin yerinde olacağı düşünülmektedir.

5. HÜKÜMDE DÜZENLENEN YAPTIRIM REJİMİNE İLİŞKİN DEĞERLENDİRMELER

Gümrük Kanununda (GK, m.234) tanımlanan gümrük kabahatleri karşılığında nispi ve maktu idari para cezası öngörülmüştür. Genel olarak "Vergi Kaybına Neden Olan İşlemlere Uygulanacak Cezalar" başlığı atında düzenlenen aykırılıkların bazıları için vergi aslına (alacağına) bağlı, bazılarına ise vergi aslından bağımsız olarak idari para cezası öngörülmektedir. Bu açıdan Gümrük Kanunu m.234/1.a-c deki aykırılıklar gümrük vergileri alacağına bağlı olan idari para cezalarıdır (Yerci, 2025:726-728). Nispi idari para cezaları vergi farkı üzerinden hesaplanmakta ve usulsüzlükler için öngörülen maktu idari para cezası tutarının (2026 yılı için 1495,00 TL) altında olmaması gerekmektedir. Örneğin sonradan kontrol esnasında tedarikçi beyanının bulunmadığı ve bu nedenle ilave gümrük vergisi bakımından gelir eksikliğini tespit edilmesi üzerine vergi farkının %5'i geçmesi halinde

Gümrük Kanunu (GK, m.234/1.a) hükmü, geçmemesi halinde Gümrük Kanunu (GK. m.234/1.c) hükmü ve ilave gümrük vergisi aynı zamanda katma değer vergisinin matrahına dahil olduğundan, %5 eşik değere bakılmaksızın kıymet eksikliğine bağlı olarak Gümrük Kanunu (GK, m.234/1-b) uygulanması gerekecektir. Söz konusu eksikliğin beyan sahibi tarafından gümrük idaresince tespit edilmeden önce kendiliğinde bildirilmesi halinde ise Gümrük Kanunu (GK, m.234/3) uyarınca hesaplanan cezanın %10'u oranında ceza uygulanacak; her durumda uygulanan ceza tutarı Gümrük Kanunu (GK, m.234/6) uyarınca usulsüzlükler için öngörülen para cezası tutarının altında olmayacaktır (Durmuş, 2023). Genel Yönetim kapsamındaki kamu idarelerine Gümrük Kanunu (GK, m.234/4) uyarınca usulsüzlükler için öngörülen maktu idari para cezası uygulanmaktadır. Vergi kaybına neden olan bir aykırılığın aynı zamanda usulsüzlük oluşturması halinde sadece vergi kaybına ilişkin aykırılık için öngörülen idari para cezası ile usulsüzlük için öngörülen para cezası tutarı karşılaştırılarak ağır olan ceza uygulanacak; vergi kaybına neden olan aykırılığa ilişkin para cezası tutarının usulsüzlük için öngörülen tutardan az olması halinde ise usulsüzlük para cezası uygulanacaktır. Cezalandırma adaletine uygun düşen ilk durum Kabahatler Kanunu (KK, m.15/1) ve Gümrük Kanunu (GK, m.241/1) hükümlerinin de doğal sonucudur.

Gümrük Kanunu (GK, m.234) çerçevesinde idari yaptırım kararı alınırken vergi türlerine ilişkin para cezalarının birbirleri ile mahsup edilmesi veya toplulaştırılarak tahakkuk ettirilmesi mümkün değildir. Dolayısıyla vergi türleri bağlamında cezalarda birleşme kabul edilmemiştir. Gümrük idaresi bu yaklaşımın gerekçesini "*vergi türleri ve bunlara bağlı cezanın hukuki dayanağının ve matrahlarının farklı olması*" ve "*itiraz ve uzlaşma şeklindeki idari başvuru yollarının vergi türleri bazında ayrı işlemesi*" şeklinde ifade etmiştir (Deloitte, 2017). Benzer şekilde idari para cezalarının beyanın her bir kalem ve vergi türleri için ayrı hesaplanması yükümlülerin eksik ödedikleri (cüz'i) vergi tutarlarına göre aşırı idari para cezalarıyla muhatap olmalarına neden olmaktadır (Dondar & Barlas, 2025).

Gümrük Yönetmeliğinin 82 No'lu ekinde yer alan ve maktu idari para cezası uygulanacak usulsüzlüklerden "*beyanname iptali (yükümlünün hatasından kaynaklanması)*", "*beyannameye eklenmesi gereken belgelerin süresi içerisinde ibraz edilmemesi*", "*navlun faturası ve/veya sigorta poliçesinin mevcudiyetine rağmen ibraz edilmemesi*", "*ceza gerektiren başkaca bir durum bulunmaması kaydıyla, Ek-14'te ihtiyari olduğu belirtilen alanlar hariç olmak üzere Gümrük Beyannamesinin Ek-14'e uygun olarak doldurulmaması*", "*gümrük beyannamesinin 'istatistiki kıymet' kutusuna toplam fatura bedelinin ABD Doları cinsinden yazılmaması*", "*EUR.1, Form A, A.TR belgelerinin sonradan kontrol sonucunda mevcut olduklarının ancak beyanname ekinde olmadıklarının tespiti*", "*tam beyanlı yaygın basitleştirilmiş usul kapsamında yürütülen işlemler hariç olmak üzere, beyanın kontrolü sonucunda Kanunun 234 üncü maddesinde bahsi geçen aykırılıkların vergi farkı yaratmaması veya %5'i aşmayan vergi farkı yaratması*", "*A.TR, EUR.1/EUR.MED, fatura beyanı/EUR.MED fatura beyanı ve Form A belgelerinin ilgili düzenlemede yer alan hükümlere uygun düzenlenmemesi*" ve "*ceza gerektiren başka bir durum bulunmaması ve mahiyeti ayrı olmak kaydıyla, gümrük beyannamesinde düzetme yapılması*" niteliği gereği Gümrük Kanunundaki (m.234) aykırılıklarla ilişkili usulsüzlüklerdir.

Gümrük vergileri bakımından kıymet ve kıymetin tespiti bakımından ise ilişkili kişiler arasındaki ticari işlemler önem arz etmektedir. Gümrük Kanununda "*alıcı ve satıcı arasında bir ilişki bulunmaması; ilişkinin varlığı durumunda ise satış bedelinin gümrük kıymeti olarak kabul edilebilir nitelikte olması*"(GK, m.24/1.d) gerektiği belirtilmiş ve "*vergi kaybı doğurmamasına karşın birbirleriyle ilişkisi bulunan kişiler arasında bir satış işlemi olması ve bu ilişkinin beyan edilmemesi*"(GK, m.241/3.b) usulsüzlük olarak tanımlanmıştır. İlişkili kişiler arasındaki ithalatın değerlendirmesi satış fiyatının gümrük idaresince şüpheli bulunması halinde yapılabilmekte; mevcut ilişkinin satış fiyatının etkilemediğini hususunun ispatı ise ithalatçıya/beyan sahibinde düşmektedir. Bu bakımdan emsal kıymetlere çok yakın olduğu ispatlanan satış bedeli gümrük kıymetinin tespitine esas alınmaktadır (Uzunöner, 2025:233). Gümrük idaresinin satış bedelini kabul etmediği hallerde ise alternatif kıymet tespit yöntemlerine geçilmekte ve neticesine göre kıymet noksanlığına ilişkin yaptırım uygulanmaktadır.

Gümrük Yönetmeliğinde miktar noksanlığına bağlı kıymet farklılıkları için "*noksanlığın eşyanın telef veya kaybından veya noksan gönderildiğinin sabit olmasından veya çalınmasından ileri geldiğinin anlaşıldığı hallerde, bu noksanlığı karşılayan kıymet, beyan edilen esas kıymetten düşülerek kalan kıymet vergi matrahına esas tutulur; muayene sonucunda bulunan eksiklik veya fazlalığın eşyanın tabiatı icabı ek-11'de bulunan oranlarda olduğunun anlaşılması halinde, işlemler gümrük idaresince tespit edilen miktar üzerinden yapılır ve ceza uygulanmaz*"(GY, m.192) ve "*miktar noksanlığına ilişkin para cezalarının takdirinde eşyanın tabiatından veya hava etkilerinden doğan farklar yükümlünün lehine olarak dikkate alınır*"(GY, m.582/2) düzenlemeleri çerçevesinde kast veya taksirden söz edilemeyeceği gözetilerek bir nevi cezasızlık durumu oluşturulmuştur. Öte yandan Gümrük Kanununda "*eşyanın doğal özellikleri veya beklenmeyen haller yahut mücbir sebep nedeniyle telef veya kaybı hallerinde*" (GK, m.208/d) gümrük yükümlülüğünün sona erdiği belirtilmektedir. Ancak cezasızlık durumu kendiliğinden uygulama bulmamakta; muhataplarının mahkeme, Cumhuriyet Savcılığı veya en büyük mülki idare amirince verilecek belgelerle yapacağı bir ispat faaliyetini gerektirmektedir. Zira ispat faaliyeti, aykırılığın kast

veya taksire dayanıp dayanmadığının tespiti ve kabulü bakımından zorunludur. Gümrük mevzuatında kısmen de uygulama bulan ve dinlenilme hakkının kullanılması anlamı taşıyan bu durum, idari yaptırım kararı öncesinde muhatabına açıklama yapmasına, türlü bilgi ve belge sunmasına, kendisini savunmasına ve daha da önemlisi gümrük idaresiyle işbirliği içinde hareket etmesine imkan tanınması bakımından da önemlidir (Gültekin, 2025:218-219). Kişiler ile gümrük idaresi arasındaki işbirliği sürecinin olumlu sonuçlanması halinde bu kişilere yaptırım uygulanmaması hukuk devletinin de bir gereğidir. Öte yandan Gümrük Yönetmeliğinin "*ceza uygulamasında, eşyanın, gümrük tarife istatistik pozisyonu konusunda yeterli bilgi bulunmadığı takdirde eşyanın girdiği tarife pozisyonundaki en düşük vergi oranı esas alınır*"(GY, m.582/1) hükmü de yaptırım muhatabı lehine yorumlanabilecek bir düzenleme niteliği taşımaktadır.

Gümrük mevzuatında yolcu işlemlerine ilişkin yaptırım düzenlemeleri özellik arz eden konular arasındadır. Zira yolcuların Türkiye'ye girişte beraberinde getirdikleri eşyaya yazılı bir beyanname olmasa da olağan usulde beyan yapılmış ve sonuçlanmış gibi hüküm doğuran başka bir tasarruf yoluyla gerçekleştirmektedirler. Söz konusu beyanları çerçevesinde beraberindeki eşyaya serbest dolaşıma giriş, geçici ithalat veya transit rejimi kapsamında; gümrük muafiyeti/istinası uygulaması, tek ve maktu vergi ile TRT Bandrol ücreti tahsilatı ile teminata yönelik gümrük işlemlerini gerektirmektedir. Ancak beyanlarına aykırılık tespit edilmesi halinde yolcular yaptırımla muhatap olmaktadır. Yaptırımların dayanağını ise Gümrük Kanununun "*yolcuların, gümrük mevzuatına göre kişisel ve hediyelik eşya kapsamı dışında olup beyanlarına aykırı olarak üzerlerinde, eşyası arasında veya taşıma araçlarında çıkan ya da başkasına ait olduğu halde kendi eşyasıymış gibi gösterdikleri eşyanın gümrük vergileri iki kat olarak alınır ve eşya sahibine teslim edilir. Gümrük vergileri ödenmediği takdirde, eşya gümrüğe terk edilmiş sayılır*"(GK, m.235/3) ve Kaçakçılıkla Mücadele Kanununun "*Yolcuların, beyanlarına aykırı olarak üzerlerinde, eşyası arasında veya taşıma araçlarında çıkan eşyanın ticari mahiyette veya ithali veya ihracının yasak olması halinde 3 üncü madde hükümleri uygulanır*"(KMK, m.6/4; m.3) hükümleridir. Ayrıca yolcu beyanındaki aykırılıklar bakımından Gümrük Kanununun diğer hükümleri (GK, m.234/1; m.235/1) bağlamında da hukuki değerlendirme yapılması gerekmektedir. Ticaret Bakanlığı tarafından yayımlanan 2014/2 sayılı Genelgede bu husus "*yolcu yeşil hattan geçtikten sonra gümrük personelince yapılan kontrolde, yolcunun beyanına aykırı olarak muafiyet kapsamı dışında eşyası olduğu saptanırsa, gümrük idaresince yapılan değerlendirme sonucunda eşyanın ticari miktar ve mahiyette olduğuna kanaat getirilmesi veya eşyanın ithalinin yasak olması hallerinde Kaçakçılıkla Mücadele Kanunu (m.6/4); eşyanın ticari miktar ve mahiyette olmadığına kanaat getirilmesi halinde Gümrük Kanunu (m.235/3) çerçevesinde; yolcuların ticari mahiyetteki eşyayı doğrudan beyan etmeleri halinde ise ithalat rejimi hükümleri çerçevesinde işlem yapılması; bu beyana aykırılık hallerinin ise Gümrük Kanununun 235/1 inci maddesi* [göndermenin m.234/1 olması gerektiği düşünülmektedir] *kapsamında değerlendirilmesi; eşyanın ithali kanunla yasaklanmışsa ilgili kanuna göre ve genel düzenleyici idari işlemlerle yasaklanmışsa Gümrük Kanunu (m.235/1) çerçevesinde işlem yapılması*" şeklinde açıklamıştır. Yolcuların "limit fazlası" eşyaları dolayısıyla usulsüzlük cezasıyla muhatap olmaları ise Gümrük Yönetmeliğinde Değişiklik Yapılmasına Dair Yönetmeliğin (RG, 2011) "*Aynı Yönetmeliğin Ek-82'sinin 2, 11, 21 ve 32 numaralı satırları aşağıdaki şekilde değiştirilmiş, 7 numaralı satırı yürürlükten kaldırılmış ve aynı eke aşağıdaki satırlar eklenmiştir.* [41- Yolcu beraberi eşya muafiyetinin uygulanmasında limit fazlası eşya getirilmesi]"(m.17) hükmüyle başlamış ancak Gümrük Yönetmeliğinde Değişiklik Yapılmasına Dair Yönetmeliğin (RG, 2023) "*Aynı Yönetmeliğin EK 82'sinde yer alan tablonun 41 numaralı satırı yürürlükten kaldırılmış*"(m.15) hükmüyle sona ermiştir.

Gümrük Kanunundaki "*…aykırılıkların gümrük idaresince tespit edilmesinden önce beyan sahibince bildirilmesi durumunda söz konusu cezalar yüzde on nispetinde uygulanır*"(GK, m.234/3) hükmü çerçevesinde bir nevi etkin pişmanlık olarak değerlendirilebilecek kendiliğinden bildirim kurumu gümrük kabahatleri alanında uygulama alanı kazanmış; ne var ki uygulama muhatapları için bir cezasızlık durumu oluşturmamıştır. Ancak bir Danıştay kararında "*mükelleflerin kendi serbest iradeleri ile bildirecekleri noksanlıklar dolayısıyla cezaya muhatap olmamaları* ve *noksanlıkları kendiliklerinden bildirmeleri konusunda mükelleflerin özendirilmesi*" hususları vurgulanmıştır (Çoban, 2022). Kendiliğinden bildirim başvuruları ise olay bazında, her olayın kendi koşulları ve gelişimi göz önünde bulundurularak Gümrük ve Dış Ticaret Bölge Müdürlüklerince değerlendirilmektedir. Bu değerlendirmede gümrük veri tabanlarından/sistemlerinden yararlanılarak başvuruların süreklilik arz etme durumuna ile aynı konudaki aykırılığa ilişkin son 6 ay içerisinde başvuru yapan firma için bir tespit yapılıp yapılmadığı gibi hususlar araştırılmaktadır (KTG Eğitim, 2024).

İştirak kurumu bağlamında Gümrük Kanununun "*ithalatta gümrük yükümlülüğünde yükümlü, beyan sahibidir. Dolaylı temsil durumunda, hesabına gümrük beyanında bulunulan kişi de yükümlüdür. Dolaylı temsilde, temsilcinin yükümlülüğü, beyanda kullanılan verilerin yanlış olduğunu bildiği veya mesleği icabı ve mutat olarak bilmesi gerektiği durumlarla sınırlıdır*"(GK, m.181/2) hükmü dayanak oluşturmaktadır. Öte yandan 2 Seri No'lu Gümrük Genel Tebliğinde dolaylı temsilcinin bu durumlarının tespitinde "*gümrük beyannamelerinin beyanın*

hazırlanmasına esas alınan belge ve bilgilere uygun olmaması", "*gümrük beyannamesi eki belgeler arasında çelişki bulunması halinde gümrük müşavirinin elindeki imkanlarla bu hususu araştırmamış olması*", "*gümrük beyannamesine eklenen belgelerin sahte, yanlış veya hatalı olduğunun ayrıca bir araştırmaya gerek duyulmaksızın anlaşılabilecek olması*", "*gümrük beyannamesine eklenen belgelerin ulusal ve uluslararası mevzuatın ön gördüğü formlara veya şartlara uygun olmaması*", "*beyanname kapsamı eşyanın cins, nevi ve niteliğinin herhangi bir tahlil veya detaylı bir incelemeye gerek kalmaksızın yapılacak fiziki incelemeyle veya beyanname eki belgelerde yer alan bilgilerden anlaşılabilmesine karşın, tarife yönüyle yapılan beyanın gümrük vergilerini ödememe veya noksan ödeme veya vergi dışı önlemlere tabi olmama sonucunu doğuracak nitelikte olması*" ve "*vergi kaybına neden olan işleme ilişkin sorumlulukları ortaya konulmak şartıyla haklarında Gümrük Kanunu, Kaçakçılıkla Mücadele Kanunu ve ceza koyan ilgili diğer kanunlar kapsamında takibatta bulunulması talebiyle fezleke, rapor veya iddianame düzenlenmiş olması*" hallerinin varlığı araştırılacağı ve "*bu hallerden herhangi biri mevcut ise dolaylı temsile yetkili kişiler müştereken ve müteselsilen sorumlu olacağı*"(GTT, Seri No:2, m.6) ve ayrıca Tebliğde "iştirak hükümlerinin uygulanabilmesi için, para cezasına konu kabahat filinin kasıtla yani bilerek ve istenilerek işlenmiş olması gerektiği"(GTT, Seri No:2, m.8) ifadelerine yer verilmiştir.

Vergi kaybına neden olan aykırılıkların Kaçakçılıkla Mücadele Kanunu kapsamında değerlendirilmesi de hukuki bir zorunluluktur. Nitekim Gümrük Kanununda "*Kanun hükümlerine aykırı olarak; Türkiye Gümrük Bölgesine getirildiği veya gümrük kontrolüne tabi tutulmadığı saptanan eşyaya, Kaçakçılıkla Mücadele Kanunu ile ilgili diğer kanun hükümlerinin uygulanacağı*"(GK, m.54) ve Gümrük Yönetmeliğinde "*bir fiilin hem Kanunun hem de kaçakçılıkla mücadele veya diğer ceza koyan kanunların kapsamına girebilecek olması durumunda, idare amiri durumu inceleyerek olay dolayısıyla, aynı zamanda diğer kanunlara göre işlem yapılıp yapılmayacağını tespit edeceği*" ve "*soruşturma veya kovuşturma sonucunda Kanunda tayin edilen cezalardan daha ağır bir para cezasına karar verildiği veya fiilin suç teşkil ettiğine ve suçtan dolayı yaptırım uygulanmasına karar verildiği takdirde, kararın kesinleşmesi ve hükmolunan paranın tahsili şartıyla Kanuna göre verilmiş olan cezanın kaldırılacağı ve alınmış olan paranın geri verileceği*"(GY, m.579/1-2) ifade edilmiştir. Bu bakımdan gümrük kabahatleri ile kaçakçılık suçları arasında birleşme kabul edilmemiştir. Söz konusu yaklaşım *ne bis in idem* ilkesine de uygun düşmektedir. Kaçakçılıkla Mücadele Kanununda "*eşyayı, gümrük işlemlerine tabi tutmaksızın ülkeye eşya sokmak*"(KMK, m.3/1) ve "*eşyayı, aldatıcı işlem ve davranışlarla gümrük vergileri kısmen veya tamamen ödenmeksizin ülkeye eşya sokmak*"(KMK, m.3/2) kaçakçılık suçu olarak tanımlanmış ve "*Kanunda tanımlanan suçların belgede sahtecilik yapılarak işlenmesi halinde, ayrıca bu suçtan dolayı da cezaya hükmolunur*"(KMK, m.4/5) hükmüyle Türk Ceza Kanununun belgede sahtecilik suçunu düzenleyen kurallara (TCK, m.204-212) gönderme yapılmıştır. Öte yandan kaçakçılık suçlarına ilişkin yaptırım rejiminde eşyanın türü ve gümrüklenmiş değeri (fahiş değer, hafif değer ve pek hafif değer) belirleyicidir. Bununla birlikte Kanunda gümrüklenmiş değer eşiğine ilişkin bir tespit yapılmamış ve hukuki belirlilik sağlanmamıştır (Tam, 2025). Bu açıdan eşyanın suç tarihindeki gümrüklenmiş değerinin fahiş, hafif ve pek hafif olmasına göre ceza tayin edilmesi zorunluluğu bulunduğundan gümrüklenmiş değerin bilirkişi marifetiyle tespiti gerekmektedir (Şen & Maviş; 2021). Öte yandan gümrüklenmiş değerin fahiş, hafif veya pek hafif sayılacağı parasal sınırlar ise Yargıtay tarafından yıllara göre ve ilkesel olarak belirlenmektedir (Ayboğa, 2026). Sayılan olumsuzluklara rağmen eşit değer uygulaması vergi kaybına bağlı yaptırımların cezalandırmada etkinliğin, caydırıcılığın, orantılılığın/ ölçülülüğün tesisi bakımından örnek oluşturma potansiyeli taşımaktadır. Bu açıdan Gümrük Kanunda ithalat vergileri farkına ilişkin %5 oranı neticeli gümrük kabahati veya usulsüzlük türünde gümrük kabahatine bağlı olarak idari yaptırım uygulanabilmesi için eşik değeri/ölçütü ortaya koymaktadır

Gümrük mevzuatında gümrük beyannamelerinin iptalinin ve düzeltilmesinin yaptırım rejimi üzerinde etkileri olabilmektedir. Gümrük Kanununda gümrük idarelerince "*başka bir eşyanın beyanı sonucunu doğurmaması kaydıyla, beyan sahibinin talebi üzerine beyannamede yer alan bir veya daha fazla bilginin düzeltilmesine izin verileceği ancak beyan sahibine eşyanın muayene edileceğinin bildirilmesinden, söz konusu bilgilerin yanlış olduğunun tespit edilmesinden ve belirli hallerde eşyanın teslim edilmesinden sonra düzeltme yapılmasına izin verilmeyeceği*"(GK, m.63), "*gümrük idarelerinin beyan sahibinin talebi ve eşyanın yanlışlıkla beyanname konusu gümrük rejimine tabi tutulmasına veya beyan edildiği rejime tabi tutulmasının özel nedenlerle artık mümkün olmadığına ilişkin kanıtlayıcı belgeleri ibraz etmesi halinde, tescil edilmiş bir beyannameyi iptal ederek, gerektiğinde yeni bir rejim beyanında bulunulmasına izin verebileceği ancak gümrük idarelerince beyan sahibine eşyanın muayene edileceğinin bildirilmiş olduğu hallerde, muayenenin sonucu alınmadan beyannamenin iptaline ilişkin talebin kabul edilmeyeceği*", "*beyannamenin tescilinden sonra eşyanın niteliklerinde meydana gelen değişiklikler veya bozulmalar nedeniyle ithalat vergilerinden indirim yapılmayacağı; ancak ilk madde olarak kullanılabilen eşyanın bu türde beyan edilmesine izin verileceği*", "*Yönetmelikle belirlenen haller dışında, eşyanın teslimi sonrasında beyannamelerin iptal edilemeyeceği*" ve "*beyannamenin iptalinin yürürlükteki cezai hükümlerin uygulanmasına engel oluşturmayacağı*"(GK, m.64/1-4) belirtilmiştir. Gümrük Yönetmeliği uyarınca

"*beyanın kontrolü sonucunda fark tespiti halinde, sistemde gerekli düzeltmeler yapılarak idare amirince beyan sahibine tebliğ edilmesi*"(GY, 193/1) gerekmektedir. Ticaret Bakanlığı tarafından geri verme/kaldırma işlemi sonrasında beyannamede düzeltme yapılması halinde usulsüzlük cezası uygulanmaması hakkında yayımlanan 2019/36 sayılı Genelgede "*beyanname bilgilerinin ve istatistiki verilerin doğruluğunun sağlanması amacıyla düzeltme işlemi yapıldığından yükümlüye atfedilecek bir usul ihlali söz konusu olmadığı ve Gümrük Kanunu (GK, m.241/1) kapsamında usulsüzlük cezası uygulanmaması gerektiği*"(Genelge, 2019/36) ifade edilmiştir.

Aşağıdaki tabloda çalışmanın özeti olması bağlamında Gümrük Kanununda (m.234) düzenlenen kabahat fiilleri ve yaptırım rejimi yer almaktadır.

Tablo 2: Gümrük Kanununda (m.234) Düzenlenen Kabahatler, İlişkili Diğer Kabahatler ve Yaptırım Rejimi

Dayanak	Gümrük Rejimi	Aykırılık Şekli/Yaptırım Koşulu	İdari Para Cezası Matrahı/Oranı/Tutarı
GK, m.234/1-a	**Serbest Dolaşıma Giriş & Geçici İthalat (Kısmi Muafiyet)**	Tarife/miktar-ağırlık vs. aykırılığı / Vergi farkı > %5	Vergi farkının **3 katı**
GK, m.234/1-b	Serbest Dolaşıma Giriş & **Geçici İthalat (Kısmi Muafiyet)**	Noksan gümrük kıymeti beyanı	Vergi farkının **3 katı**
GK, m.234/1-c	Serbest Dolaşıma Giriş & **Geçici İthalat (Kısmi Muafiyet)**	Miktar farkı ≤ %5 veya maddi hesap hatası	Vergi farkının **yarısı**
GK, m.234/2	Dahilde İşleme & Gümrük Kontrolü Altında İşleme & **Geçici İthalat (Tam** Muafiyet)	GK, m.234/1a-c'deki aykırılıklar	Vergi farkının **yarısı**
GK, m.234/3	Kendiliğinden Bildirim (Etkin Pişmanlık)	Tespit öncesi aykırılıkların bildirimi	Hesaplanan idari para cezasının **%10'u**
GY, 82 No'lu Ek	GK. m.234'deki gümrük rejimleri	Vergi farkı olmayan veya oluşan farkın %5'i aşmadığı aykırılıklar	GK. m.241/1'de idari para cezası
GK, m.234/4	Genel yönetim kapsamındaki kamu idarelerine uygulanacak yaptırımlar		GK. m.241/1'de idari para cezası
GK, m.234/5	DİR-Telafi Edici Vergi (m.194/1)	Verginin ödenmemesi / eksik ödenmesi-idarece tespit	Verginin 1/4'ü (ayrıca faiz)
		Vergilerin hiç ödenmemesi / eksik ödenmesi-tespit öncesi bildirim	İdari Para Cezası uygulanmaz (faiz tahsil edilir)
GK, m.234/6	Asgari Ceza Tutarı	GK, m.234/1-3	GK. m.241/1'de idari para cezası
GY, m.192/1-3	Bütün gümrük rejimleri	Kıymet noksanlığının eşyanın telef-kaybından, eksik gönderilmesinden ve çalınmasından kaynaklandığının tespiti halinde, noksan kıymet beyan edilen kıymetten düşülerek kalan kıymet matraha esas alınır	Gümrük işlemleri tespit edilen miktar üzerinden yapılır ve idari yaptırım uygulanmaz
		Miktar farklılığının eşyanın tabiatı icabı GY ek-11'deki oranlarda olması	
		Gümrük tarife istatistik pozisyonu, miktar ve kıymet farklılığı nedeniyle yapılacak tahakkuklarda ve idari kararlarda; kaçakçılıkla mücadele, dış ticaret ve diğer mevzuatın dikkate alınması	KMK m.3'te ve ilgili kanunlarda öngörüle idari ve/veya adli yaptırımlar
GY, 82 No'lu Ek	Beyannamenin İptali (Yükümlünün Hatasına İstinaden)		GK. m.241/1'de idari para cezası
GY, 82 No'lu Ek	Beyannamede düzeltme (Gümrük Kanunu/Gümrük Yönetmeliği hükümleri)		GK. m.241/1'de idari para cezası

Kaynak: Yazar tarafından derlenmiştir.

6. SONUÇ

Hukuk alanında kural koyma, denetleme, yaptırıma tabi tutma ve yaptırımları yerine getirme ekseninde Gümrük Kanunu bünyesinde birçok düzenlemeyi barındırmaktadır. Söz konusu düzenlemelerin önemi yalnızca gümrük vergileri olarak sınıflandırılan kamu alacağının güvence altına alınmasıyla sınırlı olmayıp, gümrük işlemlerinin düzenli ve güvenilir biçimde yürütülmesine, kanun dışı eşya hareketinin engellenmesi ve gümrük uyumu gösteren kişilerin hak ve menfaatlerinin korunmasına kadar uzanmaktadır. Bu öneme rağmen iyi tasarlanmamış, sistematikten uzak ve muğlak kurallar topluluğuna dayanan gümrük kabahatlerinin ise bizatihi kendisinin sorun kaynağı olacağı açıktır. Gümrük Kanununda (GK, m.234) düzenlenen ve temelde beyana aykırılık hallerinden kaynaklanan gümrük kabahatlerinin bu açıdan değerlendirilmesinde fayda bulunmaktadır.

Gümrük Kanununda (GK, m.234) ithalat vergileri farkı üzerinden yaptırım öngörülmesi karşısında, bu vergilerin kapsamının açık biçimde ortaya konulması hukuki belirlilik bakımından sorunlu görülmektedir. Hükmün Gümrük Kanunu sistematiği içerisinde birbirinden farklı kapsam ve işlevlerle ilişkili olması, hangi mali yüklerin yaptırım kapsamına gireceğinin ayrıca belirlenmesini gerektirmektedir. Özellikle idari para cezasının miktarının vergi

farkına bağlı olarak belirlendiği hallerde, yaptırıma esas olan mali yüklerin kapsamının yalnızca teknik bir vergilendirme meselesi olmaktan çıkarmaktadır. Bu nedenle ithalat vergileri kavramının kapsamının açıkça ortaya konulması, idarenin uygulamasında ve yargısal denetimde ortaya çıkabilecek yorum farklılıklarının azaltılmasına katkı sağlayacaktır.

Gümrük Kanunu (GK, m.234) hükmünün gümrük işlemleriyle ilişkili vergiler ve diğer mali yüklere yönelik aykırılıklara yaptırımın uygulanabilmesi için gerekli temel hukuki çerçeveyi ortaya koyması noktasında hukuki değerlendirmeye ihtiyaç bulunmaktadır. Zira Kabahatler Kanunu (KK, m.4/1) çerçevesinde anılan hükmün niteliği taşıdığını söylemek mümkündür. Bununla birlikte, maddenin teknik unsurlarının gümrük mevzuatının başka hüküm ve düzenlemeleriyle ilişkili olduğu da bir gerçektir. Örneğin gümrük beyanına ilişkin hükümlerin kanun, yönetmelik, tebliğ, genelge biçimindeki mevzuat metinlerinde dağınık biçimde yer alması, yükümlülerin hangi davranışlarının hangi hukuki sonuçları doğuracağını öngörmelerini güçleştirebilmektedir. Bu noktada hükmün bölünerek ve sadeleştirilerek yeniden dizayn edilmesi ve kanunilik ilkesinin gözetilmesini sağlayacak ilave düzenlemelerle sistematik hale getirilmesi idare, kişiler ve yargı organları arasındaki yorum farklılıklarının giderilmesi bağlamında yerinde olacaktır.

Son bir husus da Gümrük Kanununda (GK, m.234) yer alan ve etkin pişmanlık niteliği taşıyan kendiliğinden bildirim başvurusunun idari yaptırıma bağlanması konusudur. Her ne kadar etkin pişmanlık kurumu kabahatler alanında yağın bir düzenleme konusu olmasa da zarar potansiyelinin önüne geçilmesi, mevcut zararın giderilmesi, uyuşmazlıkların önüne geçerek gümrük idaresinin ve sonrasında yargı organlarının iş yükünün azalması, yaptırım ekonomisi ve gönüllü uyumu teşvik etmesi bakımından cezasızlık sebebi olarak kabul edilmesi adalete ve hakkaniyete uygun olacaktır.

KAYNAKÇA

1-Kitap/Makale/Tebliğ/Kurum Yayını

Ayboğa, Ç. (2026). “Kaçakçılık Suçu ve Cezası 2026-5607 Sayılı Kanun Madde 3”, https://ayboga.av.tr/kacakcilik-sucu-ve-cezasi/

Bang, P.S. (2026). “Commercial Invoice: What It Is, What Goes In It, and How to Get It Right”, May 15, 2026, https://www.dripcapital.com (Erişim Tarihi: 2.9.2026).

Beyribey, K. (2023). Gümrük Vergileri, Uygulamaları ve Kabahatleri. Ankara: Yetkin.

Çoban, K. (2022). “Gümrük Kanunu’nun 234/3. Maddesinin Yerine 234/1. Maddesinin -(Yanlış)- Uygulanması”, https://cobangumrukdenetim.com (Erişim Tarihi: 5.9.2026).

Deloitte. (2017). “Gümrük Kanunu 234/1 Maddesi Uygulaması Hk.”, https://www.verginet.net (Erişim Tarihi: 5.9.2026).

Demirtaş, H. (2020). “KDV Matrah Farkı (Gümrük Kanunu’nun 234. Maddesindeki Cezai Müeyyide Açısından)”. https://www.igmd.org.tr (Erişim Tarihi: 5.9.2026).

Dondar, F. Z., & Barlas, Ş. (2025). “Ne Kadar Kalem O Kadar Ceza mı?”, https://www.gsghukuk.com (Erişim Tarihi: 5.9.2026).

Durmuş, C. (2023). “Vergi Kaybına Neden Olan İşlemlere Uygulanacak Cezalar ve Örneklemeleri Gümrük Kanunu 234. Madde ”, https://candurmus.com.tr (Erişim Tarihi: 3.9.2026).

Epackchina. (2011). “Uniform Customs and Practice for Documentary Credits (UCPDC 500)”, http://www.epackchina.com (Erişim Tarihi: 5.9.2026).

Ercan, T. (2016). Türk Hukukunda Gümrük Kabahatleri. İstanbul: On İki Levha.

Ercan, T. (2019). Gümrük Hukuku. Bursa: Ekin.

Gerçek, A. (2020). Dış Ticaret İşlemleri ve Vergilendirilmesi. Bursa: Ekin.

Gültekin, R. (2019). Gümrük Kabahatleri (Hukuki Analiz, Sorunlar ve Çözüm Önerileri). Ankara: Gazi.

Gültekin, R. (2021). Gümrük Tarifesi ve Dış Ticarete İlişkin Mali Yükümlülükleri Ortak Bir Gümrük Tarifesine Göre Hesaplama Olasılığı. Vergi Sorunları Dergisi, 391, 50-69.

Gültekin, R. (2022). Gümrük Vergilerinde Kapsam Sorunu, Vergi Raporu Dergisi, 278, 46-81.

Gültekin, R. (2023). Gümrük Mevzuatında İspat Rejimi, Balkan and Near Eastern Journal of Social Sciences, 9(4), 105-118.

Gültekin, R. (2025). “Türk Gümrük Mevzuatında Dinlenilme Hakkı”, (içinde 199-231), Maliye Alanında Uluslararası Derleme, Araştırma ve Çalışmalar, Ed.: Gülsün İşseveroğlu, Ankara: Serüven.

Karakoç, Y. (2022). “Gümrük Ceza Hukukuna İlişkin Genel Bilgiler” (içinde 1-22), Gümrük Ceza Hukuku-Makaleler, Ed.: Yusuf Karakoç, Ankara: Yetkin.

Kaya, M. (2026). Dış Ticaretin Vergilendirilmesi: Gümrük Yükümlülüğünün Tespiti, İhtilafları, İhtilaflarında Yargı Yorumu ve Değerlendirilmesi. Ankara: Yetkin.

Kızıler, N. (2023). Dış Ticaret ve Gümrük Anlaşmazlıkları Cezalar ve Çözüm Yollarının Yapısal Eşitlik Modeli ile Analizi. Bursa: Ekin.

KTG Eğitim. (2024). “Pişmanlıkla Beyan Müessesesi (Gümrük Kanunu; 234/3)”, https://www.ktgegitim.com (Erişim Tarihi: 5.9.2026).

Kumcuoğlu, A.Ç. (2017). "İthalatta Miktar Farklılıklarına İlişkin Düzenlemeler", Vergide Gündem, https://www.vergidegundem.com (Erişim Tarihi: 5.9.2026).

Pelit, İ. (2023). "Uluslararası Ticarette Kullanılan Belgeler" (içinde 275-298), İktisadi ve İdari Bilimler Modern Değerlendirmeler ve Araştırmalar, Ed.: Derya Kelgökmen İlic, Lyon: Livre de Lyon.

Selen, U. (2020). Gümrük İşlemleri ve Vergilendirilmesi. 10. Baskı, Bursa: Ekin.

Speedshift. (2021). "Commercial Invoice Guide", https://www.speedshift.co.uk (Erişim Tarihi: 2.9.2026).

Şahin, M. (2019). Gümrük Vergileri. Ankara: Gazi.

Şen, E., & Maviş, M. (2021). "Gümrüklenmiş Eşya Değerinin Cezaya Tesiri", https://sen.av.tr (Erişim Tarihi: 5.9.2026).

Tam, M. (2025). "Kaçakçılıkla Mücadele Kanunundaki Belirsizlikler", https://www.hukukihaber.net (Erişim Tarihi: 5.9.2026).

TDK. (2026). "Güncel Türkçe Sözlük", https://sozluk.gov.tr/ (Erişim Tarihi: 1.5.2026).

Terzi, G. (2023). Verginin Yasallığı İlkesi Işığında Dış Ticaret Konu Vergiler ve Diğer Mali Yükümlülükler. İstanbul: On İki Levha.

UK Government. (2026). "How to Create an Export Invoice", https://www.business.gov.uk (Erişim Tarihi: 2.9.2026).

Uyanık, M. (2021). Dış Ticaretten Alınan Mali Yükümlülüklerde İdarenin Düzenleyici İşlem Yapma Yetkisi. Ankara: Adalet.

Uzun, F. (2017). "10 Soruda Gümrükte Telafi Edici Vergi (TEV) Uygulaması", https://nazaligundem (Erişim Tarihi: 3.9.2026).

Uzunöner, M. (2025). Vergi Hukukunda İthalata Konu Eşyanın Gümrük Kıymeti. On İki Levha.

WCO, (2024). "Glossary of International Customs Terms", https://www.wcoomd.org (Erişim Tarihi: 3.9.2026)

Yerci, C. (Tarihsiz). "Gümrük Kanunu'nun 234'üncü Maddesi ve İthalatta Alınan KDV'de Ceza Uygulaması" https://dengeakademi.com (Erişim Tarihi: 3.9.2026).

Yerci, C. (2005). Gümrük Mevzuatı Dahil İthalatta KDV. Ankara: Yaklaşım.

Yerci, C. (2025). Gümrük Hukuku ve Davaları. 5. Baskı, Ankara: Seçkin.

Yiğit, U. (2026). "Gümrük Kanununun 234. Maddesinin Birinci Fıkrası Uyarınca Tanzim Edilen İdari Para Cezaları", https://uyigit.com (Erişim Tarihi: 3.9.2026).

2- Mevzuat Bilgi Sistemi, Resmi Gazete ve Ticaret Bakanlığı Mevzuat Arşivi:

(BKK, 2009), 29.9.2009 tarihli ve 2009/15481 sayılı Bakanla Kurulu Kararı eki 4458 Sayılı Gümrük Kanununun Bazı Maddelerinin Uygulanması Hakkında Karar, (RG; 7.10.2009, 27369).

(CBK, 2021). 02.12.2021 tarihli ve 4874 sayılı Cumhurbaşkanı Kararı eki Sınır Ticaretinin Düzenlenmesine İlişkin Karar, (RG; 3.12.2021, 31678).

(CBTK), Cumhurbaşkanlığı Teşkilatı Hakkında 1 Sayılı Cumhurbaşkanlığı Kararnamesi, (RG; 10.7.2018, 30474).

(Genelge, 2003/6), 17.4.2003 tarihli ve 2003/6 sayılı Ticaret Bakanlığı (Gümrükler Genel Müdürlüğü) Genelgesi.

(Genelge, 2008/21), 11.8.2008 tarihli ve 2008/21 sayılı Ticaret Bakanlığı (Gümrükler Genel Müdürlüğü) Genelgesi (mülga).

(Genelge, 2010/24), 17.6.2010 tarihli ve 2010/24 sayılı Ticaret Bakanlığı (Gümrükler Genel Müdürlüğü) Genelgesi.

(Genelge, 2012/29), 13.8.2012 tarihli ve 2012/29 sayılı Ticaret Bakanlığı (Gümrükler Genel Müdürlüğü) Genelgesi.

(Genelge, 2013/39), 16.8.2013 tarihli ve 2013/39 sayılı Ticaret Bakanlığı (Gümrükler Genel Müdürlüğü) Genelgesi.

(Genelge, 2014/2), 16.1.2014 tarihli ve 2014/2 sayılı Ticaret Bakanlığı (Gümrükler Genel Müdürlüğü) Genelgesi.

(Genelge, 2014/48), 18.7.2014 tarihli ve 2014/18 sayılı Ticaret Bakanlığı (Gümrükler Genel Müdürlüğü) Genelgesi.

(Genelge, 2019/36), 19.9.2019tarihli ve 2019/36 sayılı Ticaret Bakanlığı (Gümrükler Genel Müdürlüğü) Genelgesi.

(Genelge, 2022/9), 22.4.2022 tarihli ve 2022/09 sayılı Ticaret Bakanlığı (Gümrükler Genel Müdürlüğü) Genelgesi.

(GGT, Seri No:2) 2 Seri No'lu Gümrük Genel Tebliği (Tahsilat İşlemleri), (RG; 21.1.2014, 28889).

(GGT, Seri No:11), 11 Seri No'lu Gümrük Genel Tebliği (Tarife), (RG; 7.11.2008, 27047).

(GGT, Seri No: 217), 217 Seri No'lu Gümrük Genel Tebliği (Gümrük İşlemleri), (RG; 17.12.2025-33110).

(GGTCK), 14.5.1964 tarihli ve 474 sayılı Gümrük Giriş Tarife Cetveli Hakkında Kanun, (RG; 25.5.1964, 11711).

(GK), 27.10.1999 tarihli ve 4458 sayılı Gümrük Kanunu, (RG; 4.11.199, 23866).

(GY), Gümrük Yönetmeliği, (RG; 7.10.2009, 27369).

(GUY), Gümrük Uzlaşma Yönetmeliği, (RG; 27.8.2011, 28038).

(İHRÖK), 14.6.1989 tarihli ve 3577 sayılı İthalatta Haksız Rekabetin Önlenmesi Hakkında Kanun, (RG; 1.7.1989, 20212).

(İİGVK), 31.12.2020 tarihli ve 3351 sayılı Cumhurbaşkanı Kararı eki İthalatta İlave Gümrük Vergisi Uygulanmasına İlişkin Karar, (RG; 31.12.2020,31351).

(İRK), 31.12.2020 tarihli ve 3350 sayılı Cumhurbaşkanı Kararı eki İthalat Rejimi Kararı, (RG; 31.12.2020,31351).

(KDVK), 25.10.1984 tarihli ve 3065 sayılı Katma Değer Vergisi Kanunu, (RG; 2.11.1984, 18563).

(KK), 30.3.2005 tarihli 5326 sayılı Kabahatler Kanunu, (RG; 31.3.2005-25772).

(KMK), 21.3.2007 tarihli ve 5607 sayılı Kaçakçılıkla Mücadele Kanunu, (RG; 31.3.2007, 26479).

(RG, 2011), Gümrük Yönetmeliğinde Değişiklik Yapılmasına Dair Yönetmelik, (RG; 30.04.2011, 27920).

(RG, 2023), Gümrük Yönetmeliğinde Değişiklik Yapılmasına Dair Yönetmelik, (RG; 03.01.2023, 32062).

(SDTK, 2021), 2 Aralık 2021 tarihli ve 4874 sayılı Cumhurbaşkanı Kararı Eki Sınır Ticaretinin Düzenlenmesi Hakkında Karar, (RG; 3.12.2021, 31878).

(TBTTY), Ticaret Bakanlığı Taşra Teşkilatı Hakkında Yönetmelik, (RG; 11.1.2022, 31716).
(TCK), 26.9.2004 tarihli ve 5327 sayılı Türk Ceza Kanunu, (RG; 12.10.2004, 5237).
(VUK), 4.1.1961 tarihli ve 213 sayılı Vergi Usul Kanunu, (RG; 10-12.1.1961, 10703-10705),
T.C. Cumhurbaşkanlığı Mevzuat Bilgi Sistemi; https://www.mevzuat.gov.tr (Erişim Tarihi: 1.9.2026).
T.C. Cumhurbaşkanlığı Resmi Gazete Arşivi; https://www.resmigazete.gov.tr (Erişim Tarihi: 1.9.2026).
T.C. Ticaret Bakanlığı Mevzuat Arşivi; https://ticaret.gov.tr (Erişim Tarihi: 1.9.2026).

Türkiye'de Aktüeryal Denge ve Mali Risklerin Yönetim Stratejileri

Doç.Dr. Raşit Gültekin[1] **Öğr.Gör.Dr. Derya Dinçer Gültekin[2]**

[1] Trakya Üniversitesi, İktisadi ve İdari Bilimler Fakültesi, Maliye Bölümü, rasitgultekin@trakya.edu.tr, ORCID: https://orcid.org/0000-0001-8390-327X

[2] Trakya Üniversitesi, Uzunköprü Meslek Yüksekokulu, Yönetim ve Organizasyon Bölümü, deryadincer@trakya.edu.tr ORCID: https://orcid.org/0000-0001-9648-7244

Özet: Aktüeryal denge kavramı genel olarak sosyal güvenlik sisteminin ya da bir emeklilik veya sigorta sisteminin uzun vadeli mali yükümlülükleri ile gelecekteki gelirlerini dengede tutabilmesini ifade etmektedir. Aktüeryal dengenin gözetilmesi sosyal güvenlik sistemlerinin sürdürülebilirliği ve dolayısıyla kamu bütçelerine ilave mali yük doğurmaması bakımından önemli kabul edildiğinden bu dengeyi bozacak özellikle mali risklerin bir yönetim stratejisi içerisinde dikkate alınması gerekmektedir. Bu bağlamda Türkiye özelinde çalışan/emekli dengesinin bozulması, enflasyon ve işsizlik gibi nedenlerle prim gelirlerinde oluşacak düşüş, ölüm-maluliyet ve emeklilik yaşına ilişkin gerçekçi olmayan tahminlere yönelik takip edilecek yönetim stratejilerinin doküman ve literatür taraması yoluyla incelenmesi çalışmanın konusunu oluşturmaktadır. Çalışma neticesinde ulaşılan bulgular Türkiye'de sosyal güvenlik sistemi ve aktüeryal denge bakımından gelirlerin giderleri karşılamama riskinin güçlendiğini ve bu nedenle istihdamda kalma süresi, uzun dönemli bakım sigortası, orta vadeli program çerçevesinde yol haritasının belirlenmesi yanında kayıt dışı istihdamla mücadele, yükümlülerin sosyal güvenlik kesintilerini ödeme durumlarının daha sıkı denetime tabi tutulması ve bireysel/tamamlayıcı emeklilik sistemleriyle kamu sosyal güvenlik sisteminin finansal açıdan desteklenmesi yoluna gidildiğini göstermektedir.

Anahtar Kelimeler: Sosyal Güvenlik Sistemi, Aktüeryal Denge, Parafiskal Gelirler.

Actuarial Balance and Management Strategies for Financial Risks in Türkiye

Abstract: The concept of actuarial balance generally refers to the ability of a social security system or a pension or insurance system to maintain an equilibrium between its long-term financial obligations and its future revenues. Since maintaining actuarial balance is considered crucial for the sustainability of social security systems and for preventing additional financial burdens on public budgets, it is essential to address, within a management strategy, the risks (particularly financial ones) that could disrupt this balance. In this context, the study examines, through a review of documents and literature, the management strategies adopted to address issues specific to Turkey, such as the deterioration of the worker-to-retiree ratio, declines in premium revenues caused by factors like inflation and unemployment, and unrealistic projections regarding mortality, disability, and retirement ages. The findings indicate a growing risk that revenues will fail to cover expenditures within Turkey's social security system. Consequently, measures are being taken to extend the duration of employment and implement long-term care insurance; establish a roadmap within the framework of the Medium-Term Program (OVP); combat informal employment; subject the payment of social security contributions by liable parties to stricter oversight; and financially support the public social security system through individual and supplementary pension schemes.

Keywords: Social Security System, Actuarial Balance, Para-fiscal Revenues.

1. GİRİŞ

Sosyal güvenlik sistemi, bireylerin yaşamları boyunca karşılaşabilecekleri sosyal risklere karşı korunmasını sağlayan ve toplumsal refahın artırılmasında önemli rol oynayan temel kamu hizmetlerinden biridir. Türkiye'de sosyal güvenlik sisteminin yürütülmesinden sorumlu olan Sosyal Güvenlik Kurumu (SGK), emeklilik, sağlık hizmetleri ve çeşitli sosyal sigorta ödemeleri aracılığıyla geniş bir nüfus kesimine hizmet sunmaktadır. Kurumun bu hizmetleri etkin, verimli ve sürdürülebilir biçimde yerine getirebilmesi, yalnızca mali kaynaklarının yeterliliğine değil, aynı zamanda stratejik yönetim anlayışı doğrultusunda kaynaklarını planlama, kullanma ve değerlendirme kapasitesine de bağlıdır.

Aktüeryal denge sosyal güvenlik sisteminin uzun vadeli gelir ve giderlerinin sürdürülebilirliğini ifade etmekte ve stratejik yönetimin temel değerlendirme alanlarından birini oluşturmaktadır. SGK açısından aktüeryal dengenin korunması, prim gelirleri ile emekli aylıkları, sağlık harcamaları ve diğer sosyal güvenlik ödemeleri arasındaki ilişkinin uzun vadeli projeksiyonlarla analiz edilmesini gerektirmektedir. Stratejik yönetim yaklaşımı, demografik değişimler, aktif-pasif sigortalı oranı, istihdam düzeyi ve ücret artışları gibi faktörlerin sistematik biçimde izlenmesine ve olası finansal risklere karşı önlem geliştirilmesine olanak sağlamaktadır. Dolayısıyla SGK açısından stratejik yönetim, gelir ve gider dengesinin korunmasının yanı sıra sosyal güvenlik hizmetlerinin kalitesinin artırılması, finansal risklerin önceden belirlenmesi ve kurumsal kapasitenin geliştirilmesi bakımından önem taşımaktadır.

Bu bağlamda çalışmada stratejik yönetim yaklaşımı çerçevesinde Türkiye'nin sosyal güvenlik sistemi inceleyerek aktüeryal dengenin sağlanması ve sürdürülebilirliğini bağlamında mali risklerin ortaya konulması ve buna ilişkin yaklaşımın incelenmesi amaçlanmıştır. Bu doğrultuda teorik ve uygulama yönüyle kamu kaynaklı stratejik yönetim belgeleri üzerinden aktüeryal dengeye ilişkin yaklaşım temel parametreler ve istatistiki veriler üzerinden ele alınacaktır.

2. SOSYAL GÜVENLİK VE AKTÜERYAL DENGENİN GENEL ÇERÇEVESİ

2.1. Sosyal Güvenlikle İlişkili Temel Kavramlar

Türk Dil Kurumu (TDK), Güncel Türkçe Sözlükte "**sosyal güvenlik**" kavramı "*iş kazası, hastalık, malullük, yaşlılık, ölüm, işsizlik vb. durumlar karşısında gelir ve sağlık güvencesi sağlama görevini yerine getiren uygulamalar bütünü*" olarak tanımlanmıştır (TDK, 2026). Bir başka tanıma göre sosyal güvenlik "*insanların gelirlerine bakılmaksızın toplum huzurunu ve refahını bozan sosyal tehlikelerin verdiği zararlardan 'insan hakkı' ve esas itibariyle de 'devlet görevi' olarak primli ya da primsiz sistemlerin kullanılması, kişilerin sosyal tehlikelerin zararlarından kurtarılma güvencesi*" anlamı taşımaktadır (SGK, 2026d). Başka bir tanıma göre "*mesleki, fizyolojik ve sosyo-ekonomik riskten ötürü geliri veya kazancı sürekli veya geçici olarak kesilmiş kimselerin geçinme ve yaşama ihtiyaçlarını karşılayan bir sistemdir*" şeklinde de tanımlanabilen sosyal güvenlik en geniş anlamıyla Birleşmiş Milletler İnsan Hakları Evrensel Beyannamesinde "*herkesin hastalık, analık, işsizlik, yaşlılık ve ölüm gibi insan iradesi dışında meydana gelen risklere karşı güven içerisinde olması gereğinin yanı sıra; beslenme, ve barınma gibi her türlü ihtiyacının karşılanması*" olarak ifade edilmiştir (Ayhan, 2012:43). Yine başka bir göre sosyal güvenlik "*birey ve aileleri işsizlik, yaşlılık, emeklilik, hastalık ya da ölümden kaynaklanan statü ve gelir kayıplarına karşı korumayı ve sosyal hizmetler yoluyla bunların refah düzeylerini yükseltmeyi amaçlayan kamu programıdır*"(Özok, 2004:31).

Kişilere yaşamları boyunca gerekli olan sosyal güvenlik insanlık tarihi kadar eski bir konudur (Gümüş, vd., 2014:67) ve mevzuat, yöntem ve uygulama boyutlarıyla bütünlük oluşturan bir sistemdir. Sosyal güvenlik sistemi sadece kişisel değil aynı zamanda toplumsal krizleri önleme işlevi olan dayanışma mekanizmasıdır (Esen, 2024:63). Dolayısıyla sosyal güvenlik kavramının neyi ifade ettiğini anlayabilmek için kapsamıyla ilişkilendirilebilecek başka kavramların da göz önünde bulundurulması gerekmektedir. Bunlardan ilki "**sosyal devlet**" kavramıdır. Sosyal devlet "*halkın asgari hayat standartlarının altına düşmeden yaşamlarını idame ettirebilmesi, sosyal ve ekonomik haklar çerçevesinde desteklenmesi"* olarak tanımlanmaktadır (Artuç ve Canbay, 2024:492). Diğer bir ifadeyle sosyal devlet "*bireylere asgari gelir güvencesi veren, onları toplumsal risklere karşı koruyan, sosyal güvenlik olanağı sağlayan ve yurttaşların tümüne eğitim, sağlık, barınma gibi hizmetler*" sunan bir anlayışı ifade etmektedir (Karaca ve Çam, 2019:72). Bu bakımdan sosyal devlet sosyal güvenlik boyutunu da içeren ve bireylerin asgari gelire sahip olma, toplumsal risklere karşı korunma ve temel hizmetlerden yararlanma konusunda sorumluluğu devlete yükleyen bir Anayasal devlet niteliğidir. Zira 1982 tarihli Anayasada Türkiye Cumhuriyetinin "*sosyal bir hukuk Devleti*"(m.2) niteliğine sahip olduğu ve "*herkes, sosyal güvenlik hakkına sahiptir. Devlet, bu güvenliği sağlayacak gerekli tedbirleri alır ve teşkilatı kurar*"(m.60) denmek suretiyle devletin sorumluluğu vurgulanmıştır (AnY, 1982). Öte yandan sosyal güvenlik sadece vatandaşlara özgü bir hak olmayıp İçişleri Bakanlığınca mülteci, ikincil koruma veya şartlı mülteci statüsü sahibi veya vatansız olarak tanınan kişilerin uluslararası anlaşmalar ve Türk hukukunda öngörülen şartlar çerçevesinde sosyal güvenlik hakkından yararlanması mümkündür (Tiritoğlu Ersoy, 2019:468-469).

Sosyal güvenliğin en önemli birleşeni ve finansman düzeni sigorta sistemidir. Sigorta kavramı TDK Güncel Türkçe Sözlükte "*bir şeyin veya bir kimsenin herhangi bir yönden ileride karşılaşabileceği zararı gidermek için önceden ödenen prim karşılığında bu işle uğraşan kuruluşla yapılan iki taraflı bağlantı sözleşmesi*", "*bu tür sözleşmeleri yapan şirket*" olarak tanımlanmıştır (TDK, 2026). Kapsamlı bir tanımla sigorta "*kanun ve mukavele ile saptanan belirli bir riskin ya da aynı derecede tehdidi altında bulunan çok sayıdaki benzer olayların para birimi ile ölçülmesi ve istatistiki olarak kavranması mümkün hasarlarını birlikte karşılamak üzere bir araya getirilmesiyle meydana gelen bir organizasyon*" anlamına gelmektedir(Ayhan, 2012:45). Sosyal sigorta özel hukuktan ziyade kamu hukuku kurallarına tabi olarak yürütülmektedir. Ülkemizdeki sosyal güvenlik sistemi de sosyal sigorta tekniğine dayanan bir yapıya sahiptir (Karaman, 2014:875). Nitekim "*sosyal sigortalar ile genel sağlık sigortası bakımından kişileri güvence altına almak; bu sigortalardan yararlanacak kişileri ve sağlanacak hakları, bu haklardan yararlanma şartları ile finansman ve karşılanma yöntemlerini belirlemek; sosyal sigortaların ve genel sağlık sigortasının işleyişi ile ilgili usul ve esasları düzenlemek*"(m.1) amacıyla çıkarılan Sosyal Sigortalar ve Genel Sağlık Sigortası Kanununda sosyal sigortaların "*kısa ve uzun vadeli sigorta kollarını*"(m.3/3), kısa vadeli iş kollarının "*iş*

kazası ve meslek hastalığı, hastalık ve analık sigortası kollarını"(m.3/4), uzun vadeli sigorta kollarının "*malullük, yaşlılık ve ölüm sigortası kollarını*"(m.3/5) ve sigortalının "*kısa ve/veya uzun vadeli sigorta kolları bakımından adına prim ödenmesi gereken veya kendi adına prim ödemesi gereken kişiyi*"(m.3/6) ve genel sağlık sigortasının da "*kişilerin öncelikle sağlıklarının korunmasını, sağlık riskleri ile karşılaşmaları halinde ise oluşan harcamaların finansmanını sağlayan sigortayı*"(m.3/8) ifade ettiği belirtilmiş ve kanunda bu ve benzeri hususları kapsayan konulara ilişkin ayrıntılı düzenlemelere yer verilmiştir.

Sigortanın ortaya çıkış nedenleri arasında yer alan "**risk**" sigorta işletmelerinde politikaların belirlenmesinde önemli bir göstergedir (Asunakutlu, 2001). Birçok tanımı olan risk "*gelecekte karşılaşabilecek olan ve amaçların gerçekleştirilmesini engelleyebilecek tehditler/olumsuzluklar veya amaçlara ulaşmayı kolaylaştırabilecek fırsatlar*"(Akçay, 2016:26) anlamına gelmektedir. Riskin kurumsal amaç ve hedeflere ulaşılması için tanımlanması kadar bir yönetim sistemine dayandırılması da gerekmektedir. Bu bağlamda **risk yönetimi** "*kurumun amaçlarını gerçekleştirmek üzere makul bir güvence sağlamak amacıyla potansiyel olay ve durumları belirleme, değerlendirme, yönetme ve kontrol etme sürecini*" ifade etmektedir (Madendere, 2005:8; Bozkurt, 2010:19). Sigortacılık alanında risk yönetimi/yöneticisi geniş açıdan "*kar ve zarar riskini üzerine alan bir müteşebbis*", dar açıdan *"bir sigortacı*" ve orta bakış açısından "*kişi ve kurumların finansal pozisyonlarının ne kadar risk taşıdığının belirlenmesi (ölçümü) ve bu ölçütün kabul edilebilir bir risk seviyesine çekilmesi işlevlerini gören bir modern yönetim tekniği*" şeklinde algılanabilmektedir (Özer, 2010:17-18). TDK Güncel Sözlükte "*kurum veya işletmelerin çalışmalarını gerçekleştirirken oluşabilecek risklerin önceden dikkatli ve ayrıntılı bir biçimde tanımlanıp değerlendirilmesi, riskleri ortadan kaldıracak veya en aza indirecek önlemlerin alınması süreci*"(TDK, 2026) olarak tanımlanan kavram Gümrük Kanununda "*riskin sistematik olarak tanımlanması ve riskin en aza indirilmesi için gerekli olan tüm önlemlerin uygulanması amacıyla ulusal ve uluslararası kaynak ve stratejilere dayanılarak veri ve bilgi toplanmasını, risk analizi ve değerlendirilmesini, alınacak önlemlerin belirlenmesini ve uygulanmasını, bu sürecin işleyiş ve sonuçlarının düzenli olarak izlenmesi ve gözden geçirilmesi*"(GK, m.3/25) şeklinde tanımlanmıştır.

Sosyal güvenlik sistemi devletin kişilere esasında kamu hizmeti sunulmasını sürecini kapsamaktadır ve bu hizmetin sunulması için de kaynağa/finansmana ihtiyaç duyulmaktadır. Bu noktada **sosyal güvenlik sisteminin finansma**nı kavramıyla "*kişilere verilecek sosyal güvenlik hizmetleri için fon kaynakları yaratıp, bunları etkin, doğru ve verimli bir şekilde yönetmek ve sosyal güvenlik sisteminin sürdürülebilirliğini sağlamak*" ifade edilmektedir (Öçal ve Boyacıoğlu, 2018:919). Ülkemizde Sosyal Sigortalar ve Genel Sağlık Sigortası Kanununda sigorta kollarına ilişkin hizmetlerin prim esasına dayandırıldığı dikkate alındığında sosyal sigorta sisteminin finansmanının alınan primlerle sağlandığı, aktif sigortalılardan alınan primlerin tüm sigortalıların ödemelerini karşılamak üzere kullanıldığı ve dolayısıyla teoride "*dağıtım yöntemi*" olarak adlandırılan ve nesiller arası paylaşım esasına dayanan bir finansman tekniğinin uygulandığı görülmektedir (SGK, 2026d).

Sosyal sigorta sisteminin en önemli ölçütü, sürdürülebilirliğin sağlanması noktasında **aktüeryal denge**dir. Bu önem Yargıtay 10. Hukuk Dairesi (3.11.2011 tarih, E:2011/4060, K:2011/15309) kararında da "*Devletin sosyal olması, aktüeryal denge ile sosyal devlet ilkesi arasında uyum olmasını, sosyal güvenlikten kaynaklanan yüklerin gerektiğinde Devlet tarafından karşılanmasını zorunlu kılmaktadır. Ancak sosyal güvenlik sisteminin sağlıklı olarak çalışması için aktüeryal dengelerin korunması zorunludur*" açıkça vurgulanmıştır. Aktüeryal denge kavramının "*çalışan aktif nüfusun çalışmayan pasif nüfusu karşılama oranını veren ve sosyal güvenlik sisteminin sürdürülebilirliğini ortaya koyan*; *etkin bir sosyal güvenlik sisteminde en az 4 olması gereken ve bunun altındaki değerlerin sosyal güvenlik sistemi için sinyal kabul edildiği bir ölçüttür*"(Bulut, 2019a:165), *"sigorta şirketlerine riskler karşılığında ödenen primler toplamı ile hasar vb. risklerin gerçekleşmesi durumunda ortaya çıkan sigortalılara yapılacak ödeme miktarı arasındaki dengedir (ilişki) ve aktif sigortalı sayısının pasif sigortalıya bölünmesi* yoluyla bulunur"(Çinar, Bölüm-1; Çinar, Bölüm-2), "*sosyal güvenlik sistemindeki gelir oranı ile maliyet oranı arasındaki farkı ifade eden ve bir pasif sigortalının kaç adet aktif sigortalı tarafından finanse edildiğinin göstergesi olan aktif/pasif oranı*"(Mıynat Taşdemir, 2025:90), "*sigorta şirketlerinin kendilerine devredilen riskler için oluşturulan sigorta ürünleri ve bu ürünler karşılığında alınan primler ile tazminat ödemelerini karşılaması*" ve "*hem toplanan gelir hem de fazla rezervler kullanılarak giderlerin karşılanabilme yeteneği"*(Tuna, 2009; Yaşarlar ve Bayraktar, 2019:141-142) şeklinde tanımlanması mümkündür. Aktüeryal denge "**aktif sigortalı**" ve "**pasif sigortalı**" olmak üzere iki alt kavramı kapsamaktadır. Bunlardan aktif çalışan/sigortalı "*kısa ve/veya uzun vadeli sigorta kolları bakımından adına prim ödenmesi gereken veya kendi adına prim ödemesi gereken; SGK kayıtlarına göre Kurumdan herhangi bir aylık ve/veya gelir almayan ve sigortalı olarak çalışan kişileri*"(SGK, 2013:2) ve pasif sigortalı "*Kurum kayıtlarına göre Kurumdan aylık ve/veya gelir alan kişileri*"(SGK, 2013:50) ifade etmektedir.

Öte yandan aktüeryal denge bakımından "**aktüeryal değerleme**", "**aktüeryal projeksiyon**" ve "**aktüeryal model**" şeklinde üç kavram üzerinde de durulmaktadır. Bunlardan aktüeryal değerleme "*bir sigorta sisteminin finansal*

yapısının, gelecekte bu yapıyı etkileyecek değişkenlere ve olası müdahalelere ilişkin varsayımlar ışığında uzun vadeli olarak değerlendirilmesidir" ve toplanan verilerden ve oluşturulan varsayımlardan uzun vadeli tahminlere ulaşılabilmesi için makroekonomik değişkenler, nüfus, işgücü ve istihdam, sosyal güvenlik mevzuatı, aktif sigortalı, pasif sigortalı ve bağımlılar, prim gelirleri, sigorta giderleri, diğer gelir ve giderler ve fon büyüklüğü gibi unsurlar çerçevesinde aktüeryal projeksiyon yapılması gerekmektedir. Aktüeryal model ise "*aktüeryal projeksiyon aşamasında, birbiriyle karmaşık şekilde etkileşen alanların ilişkilerinin, uygun bir basitlik düzeyine indirgenerek farklı varsayımlar altında geleceğe dönük tahminlerin ve değerlendirmelerin yapılabilmesini sağlayan araç*" anlamı taşımaktadır (Erdem, 2017:15-16).

Sosyal güvenlik sistemleri ekonomik, sosyal ve mali boyutları dolayısıyla "**stratejik yönetim**" ve "**stratejik planlama**" konusu bir uygulama alanı oluşturmaktadır. TDK Güncel Türkçe Sözlükte "*önceden belirlenen bir amaca ulaşmak için tutulan yol*", "*bir ulusun veya uluslar topluluğunun, barış ve savaşta benimsenen politikalara en fazla desteği vermek amacıyla politik, ekonomik, psikolojik ve askeri güçleri bir arada kullanma bilimi ve sanatı*" (TDK, 2026) şeklinde tanımlanan **strateji** kavramı esasında "*arzulanan ve istenilen sonuçlara ulaşmak için tasarlanan bir plan*"(Gürcan, 2022:335) niteliği taşımaktadır. Bir örgütle ilişkilendirilen **yönetim** kavramı ise "*başkaları aracılığıyla işyerine veya örgütteki madde ve insan kaynaklarının örgüt amaçlarını gerçekleştirecek şekilde bir araya getirilme ve harekete geçirilme süreci*"(Bayrak, 1991:37) anlamına gelmektedir. Bu bağlamda stratejik yönetim "*bir kurumun başarı sağlama ve sürdürme amacıyla hedef belirlemesini ve tüm birimlerinin operasyonlarını, kaynak ve kabiliyetlerini belirlenen hedefleri gerçekleştirmeye yönelik bütüncül bir bakışla yönetmesini*"(Barca, 2022) ifade etmektedir. Kamu Mali Yönetimi ve Kontrol Kanununda (KMYKK) stratejik planlamanın "*kamu idarelerinin orta ve uzun vadeli amaçlarını, temel ilke ve politikalarını, hedef ve önceliklerini, performans ölçütlerini, bunlara ulaşmak için izlenecek yöntemler ile kaynak dağılımlarını içeren planı*"(m.3/n) ifade ettiği, kamu idarelerinin "*kalkınma planları, Cumhurbaşkanı tarafından belirlenen politikalar, programlar, ilgili mevzuat ve benimsedikleri temel ilkeler çerçevesinde geleceğe ilişkin misyon ve vizyonlarını oluşturmak, stratejik amaçlar ve ölçülebilir hedefler saptamak, performanslarını önceden belirlenmiş olan göstergeler doğrultusunda ölçmek ve bu sürecin izleme ve değerlendirmesini yapmak amacıyla katılımcı yöntemlerle"* stratejik plan ve "*program bütçeye uygun olarak yürütecekleri faaliyetler ile bunların kaynak ihtiyacını, amaç, hedef ve performans göstergelerini içeren bir performans programı*"(m.9) ve "*üst yöneticiler ve bütçeyle ödenek tahsis edilen harcama yetkililerince, hesap verme sorumluluğu çerçevesinde her yıl faaliyet raporu hazırlanacağı…sosyal güvenlik kurumlarının bir malî yıldaki faaliyet sonuçları, Cumhurbaşkanlığı tarafından hazırlanacak genel faaliyet raporunda gösterileceği…*"(m.41) ifade edilmiştir.

Teoride kamu gelirleri içinde sosyal güvenlik kurumlarının gelirleri **parafiskal gelirler** olarak sınıflandırılmaktadır. Parafiskal gelir kavramı "*sosyo-ekonomik alanda devlet müdahaleciliğinin genişlemesi dolayısıyla artan kamu harcamalarının bir bölümün karşılamak suretiyle, belirli amaçların gerçekleştirilmesi için kurulan, kamu veya yarı-kamu niteliğinde olan ekonomik, sosyal veya mesleki kuruluşlara; bu amaçlarının finansmanına tahsis edilmek üzere, kamu otoritelerince gelir toplama yetkisinin verilmesiyle ortaya çıkan ve bütçe dışı bir kamu geliri*" olarak tanımlanmaktadır (Herekman, 1972:5; Sayar, 1975:248; Akdoğan, 2009:107). Bu bağlamda özel düzenlemelerle kurulmuş olan Sosyal Güvenlik Kurumu (ve kaldırılarak bu Kuruma devredilen Emekli Sandığı, Bağ-Kur ve Sosyal Sigortalar Kurumu) sosyal parafiskal kurum ve bu Kurumun gelirleri de parafiskal gelirdir (Akdoğan, 2009:426). Parafiskal gelirlerin özellikleri ise "kamu hukukuna dayanırlar", "genel bütçe dışındadırlar", "tahsili/ödenmesi zorunludur; ödenmemesi halinde yaptırım söz konusudur", "yükümlülerine faydaları vardır", "gelirin hangi amaçla ve nerelere harcanacağı önceden düzenlenmiştir" ve "işveren açısından özel bir karşılığı olmadığından vergi benzeri bir niteliği vardır" şeklindedir (Egeli, 2013:13; 22).

Aktüeryal denge en kısa ve yalın haliyle, *"sigorta şirketlerine riskler karşılığında ödenen primler toplamı ile hasar vb. risklerin gerçekleşmesi durumunda ortaya çıkan sigortalılara yapılacak ödeme miktarı arasındaki denge (ilişki)"* şeklinde ifade edilebilmektedir. Keza, sosyal güvenlik sistemlerine yönelik politik müdahalelerin ve sosyal güvenlik krizlerinin temelinde aktüeryal dengenin sağlanamamasının ve aktüeryal denge esaslarına aykırı politikaların temel oluşturduğu görülmektedir. Aktüeryal denge etkin ve sürdürülebilir bir sosyal güvenlik sisteminin oluşturulabilmesinde kilit bir rol üstlenmektedir. Sosyal güvenlik sistemlerinde aktüeryal denge; **aktif sigortalı sayısının pasif sigortalıya bölünmesi** ile bulunur. Etkin ve sürdürülebilir bir sosyal güvenlik sistemi yüksek gelirli kitleden düşük gelirliye ve genç nesilden yaşlı nesile transfer sağlanmasıyla mümkün olup, bu transferin belirlenmesinde ve gerçekleştirilmesinde de aktüeryal dengenin sağlanması çok önem arz etmektedir. Aktüeryal dengenin sürdürülebilir bir durumda olduğu yapılarda kurumlara bağlı olarak aktif sigortalı/pasif sigortalı oranı, bir anlamda **bir emekliyi kaç çalışanın finanse ettiğini** göstermesi bakımından önemlidir. Gelişmiş ülkeler bazında uluslararası standart dörttür. Sinyal düzeyinde kabul edilen en düşük oranın iki olması hedeflenir. İkinin altına düşmesi, sosyal güvenlik sisteminin finansman sorunu yaşadığı veya yaşayacağı öngörülür.

2.2. Aktüeryal Dengeyle İlişkili Risk Alanları

Sosyal güvenlik sistemlerinde gelirlerin giderleri karşılamama riski ve hazinden yapılan mali aktarımların artış eğilimi ve finansmana yönelik revizyon ihtiyacı sıklıkla vurgulanan konular arasındadır. Sosyal güvenlik sisteminin finansmanı konusu esasında gelişmiş ve gelişme yolundaki ülkeler açısından sorunludur. Nitekim gelişmiş ülkelerde nüfusun yaşlanması (emekli sayısının artması ve çalışan sayısının azalması, prim gelirleri ile emeklilik giderleri arasındaki dengenin bozulması), sağlık ve emeklilik harcamalarının artması (yaşam süresinin uzaması, teknolojik gelişmeler ve sağlık hizmetlerine yönelik talebin yükselmesi), işsizlik ve verimlilik kaybı (işsizlik sigortası ödemelerinin artması ve çalışan nüfusun yaş ortalamasının yükselmesi), aktüeryal dengenin bozulması (gelirlerin giderleri karşılayamaması, sistemin finansman açığını büyüterek kamu bütçesi üzerindeki baskıyı artırması), finansman sürdürülebilirliği (artan harcamalar nedeniyle emeklilik yaşının yükseltilmesi, sosyal yardımların sınırlandırılması ve bireysel emeklilik gibi alternatif finansman yöntemlerine yönelme ihtiyacı) ve gelişmekte olan ülkelerde kayıt dışı istihdam (çalışanların kayıt altına alınamaması nedeniyle sigorta prim gelirlerini azaltarak sistemin finansman kapasitesinin düşmesi), yüksek enflasyon (sosyal güvenlik harcamalarında artış ve uzun vadeli finansal planlama yapılmasının güçleşmesi), yüksek işsizlik oranları (prim ödeyen çalışan sayısının düşük aksine işsizlikle mücadele ve sosyal koruma harcamalarının yüksek olması), aktif-pasif dengesizliği (sisteme prim ödeyenlerin sayısının yetersiz kalması nedeniyle emekli ve diğer hak sahiplerine yapılan ödemelerin finansmanını zorlaşması), kamu bütçesine bağımlılık (sosyal güvenlik açıklarının bütçe transferleriyle karşılanması nedeniyle kamu maliyesi üzerinde ek yük oluşturması) ve prim artışlarının olumsuz etkisi (primlerin yükseltilmesinin işveren ve çalışan maliyetlerini artırarak kayıt dışı istihdama yönelimi güçlendirmesi ve gelir kaybını derinleştirmesi) sosyal güvenlik sistemlerinde öne çıkan mali riskleri oluşturmaktadır (Gümüş, vd., 2014:71-74). Türkiye özelinde sosyal güvenlik sisteminin mali durumu değerlendirildiğinde genel olarak açık pozisyonda olduğu görülmektedir. Bu durum gelir kaynaklı (prim oranlarının yüksekliği, gelir düzeyindeki düşüklükler, prim tahsilatında yaşanan sorunlar, yanlış finansman yöntemlerinin uygulanması, işgücüne katılım oranının düşüklüğü, kayıt dışılık, prim afları), gider kaynaklı (sağlık sektöründeki ihmaller, yanlış finansman yöntemlerinin uygulanması, demografik yapıdaki değişim), yapısal (aktif/pasif sigortalı oranının düşüklüğü, işgücüne katılım oranını düşüklüğü, fonların etkili ve verimli kullanılmaması, norm ve standart birliğinin olmaması, denetim yetersizliği) ve politik/sosyal nedenlerden (sosyal güvenlik ahlakının yoksunluğu, prim afları, kurumun politik müdahalelere maruz kalması, kayıt dışılık, kurumun özerkliğinin olmaması, erken emeklilik uygulamaları, demografik yapıdaki değişim) kaynaklanmaktadır (Yurdadoğ vd. 2019:658). Diğer bir ifadeyle prim gelirlerinin sosyal güvenlik harcamalarının altında kalmasının nedenleri aktif/pasif oranının düşüklüğü, kayıt dışı istihdam oranının yüksekliği, sosyal güvenlik ahlakı ve bilincindeki eksiklikler, yeniden yapılandırma uygulamaları, tahsilat aksaklıkları ve harcamalarda nitelik ve nicelik olarak meydana gelen artışlardır (Bulut, 2019b: 89; Mıynat Taşdemir, 2025:77). Bu bakımdan "*istihdam, prim tahsilatı ve uygulama kapasitesi, emekli maaşları, emeklilik ve çalışma arasında denge, toplum bilinci, sosyal güvenlik eğitimi, personel memnuniyeti, kurumsal verimlilik, koruyucu sağlık hizmetleri, uzun vadeli bakım* sigortası, denetim, teşvikler ve mali kaynakların verimli dağıtımı, yapay zeka tabanlı veri modeli, sağlıkta verimlilik-etkinlik" şeklinde sayılabilecek konular reformların odağında yer almaktadır (Esen, 2024-58-63). Esasında yaşlanma da sosyal güvenlik sistemlerinin kaldıramayacağı bir yük olarak görülmekte ve sosyal güvenlik reformları için temel gerekçeyi oluşturmaktadır (Gökbayrak, 2010:151).

Sosyal güvenlik sisteminin sürdürülebilirliği olarak ifade edilebilecek konu esasında aktüeryal dengenin, diğer bir ifadeyle, aktif/pasif sigortalı (çalışan/emekli) oranının korunmasıyla ilişkilendirilmektedir. Zira aktüeryal dengenin sağlanamaması primle finanse edilen sistem üzerinde olumsuz mali etkiler oluşmakta; tahsil edilen prim gelirlerin giderleri finanse edememesine ve açıkların büyümesine ve ilave hazine desteğine yol açmaktadır. Ancak bu dengenin sağlanması için prim artışına gidilmesi kayıt dışılık, tahsilatın azalması ve uyumlu yükümlülerin daha fazla sosyal güvenlik yüküyle karşılaşmasıyla ödemelerini aksatmaları riski içermektedir. Bu noktada gelişmiş ülkelerdeki ödül ve yaptırım sistemlerinin Türkiye'de de uygulanması ve borç takip/tahsilat işlemlerinin bilgi teknolojileri ve yapay zeka destekli uygulamalarla serileştirilmesi üzerinde durulmalıdır (Esen, 2024:58-59). Yine aktüeryal dengenin sağlanması ve sürdürülebilirliği adında erken emekliliğe yönelik politikalardan vazgeçilmesi, dağıtım yönteminde etkinliğin artırılması, sosyal güvenlik aflarının kaldırılarak bu alanda oluşabilecek ahlaki zafiyetin önüne geçilmesi ve toplumda sosyal yardımlaşma bilincinin yerleşmesine yönelik politika adımlarının atılması önem arz etmektedir (Mıynat Taşdemir, 2025:89-93).

Türkiye nispeten genç bir nüfusa sahiptir ancak yeterli istihdamın sağlanamaması aktüreyal dengenin bozulması riskini barındırmaktadır. Öte yandan Türkiye'nin yaşlanan nüfusu, sosyal güvenlik sisteminin gelecekteki en büyük zorluklarından biri olması ve demografik fırsat penceresini kapatması muhtemeldir. Bu durumla ilişkili olarak kayıt dışılık ve kayıt dışı istihdam da sosyal güvenlik sistemi açısından mali risk oluşturan sorunlu konular arasındadır. Zira özellikle tarım sektöründe yoğunlaşan kayıt dışı istihdam sosyal güvenlik sistemi açısından en büyük maliyet

unsurudur (Esen, 2024:59). Türkiye İstatistik Kurumu (TÜİK) kayıt dışı istihdamı "*aktif nüfusa dahil olan veya piyasada bizzat görev alan ancak herhangi bir uzun veya kısa vadeli sigorta kollarına dahil olmaksızın çalışan kişilerin oluşturduğu istihdam türü*" olarak tanımladığından kayıt dışı istihdam edilenler sigortasız şekilde çalışma hayatında yer alan kişilerdir (TÜİK, 2021; Çelik, 2024:1426). Kayıt dışı istihdam işsizliği, uzun çalışma saatlerini, düşük ücretleri ve çalışma gün sayılarının olandan düşük gösterilmesini ya da işveren kaynaklı kayıt dışı istihdamı meşrulaştıran bir faktör olarak sosyal adalet açısından da istenen bir durum değildir (Yurt ve Şişman, 2024:63). Türkiye'de ücret üzerindeki vergi ve sosyal güvenlik kesintileri yükü işgücü maliyetindeki artışa bağlı olarak istihdamı azaltıcı ve kayıt dışılığı artırıcı etki oluşturabildiğinden yüksek oranlardaki kayıt dışılık (%30-%40), sosyal güvenlik sisteminin prim gelirlerinden mahrum kalmasına da neden olabilmektedir (Yanici, Erdal, 2019:234). Bütün bu olumsuzluklar bireyler ve sosyal güvenlik sistemi için mali sorun oluşturduğundan, istihdama ilişkin aktivasyon politikaları çerçevesinde işgücüne katılımın artırılması, bağımlılık oranının düşürülmesi, emekliler ile kadınların istihdama katılımının artırılması önem arz etmektedir (Esen, 2024:58).

Sosyal güvenlik sistemlerinin aktüeryal dengesi bakımından ülke ekonomisinin içinde bulunduğu durum da etkili olabilmektedir. Özellikle ülkemizde son yıllarda artış eğilimi içerisine giren enflasyon kişilerin satın alma gücünü düşürürken ödenen primlerin reel değerini aşındırmaktadır. Enflasyonun doğru tahmin edilememesi uzun dönemli aktüeryal hesaplama sonuçlarında sapma doğuracaktır. Nitekim emeklilik maaşlarının hesaplama yöntemi sosyal güvenlik sisteminin sürdürülebilirliğini doğrudan etkilemektedir (Esen, 2024:60). Aynı şekilde aktüeryal hesaplamalara veri oluşturan çalışma hayatına başlama, ölüm, maluliyet ve emeklilik yaşları gibi demografik değişkenlere yönelik tahminlerin fiili durumu yansıtması önem arz etmektedir. Örneğin emeklilik yaşı ve sosyal transferler ekonomik kriz dönemlerinde ilk müdahale alanı olarak görülmektedir (Bulut, 2019a:164).

Sosyal güvenlik sistemi kapsamında yürütülecek denetim faaliyetlerin bir kısmı da prime esas kazancın sosyal Güvenlik Kurumuna doğru beyan edilip edilmediğinin tespitidir. Türkiye'de çalışanların büyük bir kısmı kazançlarını alt sınırdan (brüt asgari ücret) veya yakın değerlerden beyan etmektedir ki bunun önünde hukuki bir engel yoktur. Ancak kayıt dışı istihdam ve eksik ücret beyanı sosyal güvenlik sistemi açısından prim gelir kaybı oluşturduğundan meslek grupları itibariyle prime esas kazanç tutarlarının belirlenmesi yerinde olacaktır. Nitekim kayıt dışı istihdamdan ve ücretleri eksik bildirilenlerden elde edilecek ilave gelirle sosyal Güvenlik Kurumunun bütçe açığının kapatılması bile mümkün olacaktır (Esen, 2024:59).

Aktüeryal denge açısından prim borcu afları veya yeniden yapılandırmalar da üzerinde hassasiyetle durulması gereken konular arasındadır. Zira daha önceden ödenmemiş primlerin belirli şartlar altında ve tutarlarda sisteme kazandırılması mümkünse de bu tür uygulamalar af beklentisine bağlı olarak uyumlu yükümlüleri olumsuz etkileyebilmektedir. Bununla bağlantılı olarak denetim konusu üzerinde ayrıca durulmalıdır. Yükümlülerin saha denetimleri, çapraz denetimler ve elektronik yazılımlar üzerinden denetimi, sosyal güvenlik sistemine ilişkin maddi ve şekli yükümlülüklere uyumun sağlanmasına, uyumsuzluklarının giderilmesine ve denetime tabi olmama ihtimalinden kaynaklanan riskin giderilmesine katkı sağlayacaktır. Nitekim ihbar/bilgilendirme hatları ile sahada yürütülen aktif denetimler önemli birer araç konumundadırlar (Çelik, 2024:1430). Öte yandan Türkiye'deki makroekonomik durumu ve bütçe disipline duyulan ihtiyaç istenilen sonuçları üretmeyen ve özellikle işsizliği azaltmayan etkisiz mali teşviklerin kaldırılmasını gerektirmektedir (Esen, 2024:61). Bu nedenle ideal olan sosyal güvenlik sisteminin bir bütün olarak mali ve idari disiplin içerisinde yönetilmesidir.

Sosyal güvenlik sistemi toplumsal refahı artıracak uygulama ve yeni sosyal koruma modellerinin gündeme geldiği bir alandır. Örneğin yaşlılara yönelik uzun dönemli bakım sigortası üzerinde çalışılmaktadır. Ancak tür modeller ilave finansman gerektirdiğinden hukuki ve mali açıdan iyi uyarlanamayan modellerin sistemi olumsuz etkileme riski göz önünde bulundurulmalıdır (Kara, 2023:143). Ülkemiz prime dayalı kamu sosyal güvenlik sisteminin fonlamaya dayalı özel sistemlerle hafifletilmesi yoluna gidildiği bir süreç içindir. Zira katılımın bireylerin özgür iradesine bırakıldığı bireysel emeklilik sistemi (BES) bunlardan biridir (Işık vd., 2019:26-27). Yine Orta Vadeli Programda ifade edilen Otomatik Katılım Sistemi (OKS) ile Tamamlayıcı Emeklilik Sistemi (TES) de bu kapsamda değerlendirilebilecek uygulamalar arasındadır. Bu sistemlerin hayata geçmiş/geçecek olması, kamu sistemini desteklemesi ve aktüeryal denge üzerindeki mali baskıyı azaltması bağlamında olumludur ancak bireysel mali yük ve psikolojik baskı doğurması bağlamında mali risk içermektedir.

Türkiye'deki sosyal güvenlik sistemi açısından önemli bir konu da sistemin mali çıktısı olması bağlamında yüksek tutarlara ulaşan sağlık harcamalarıdır. Zira sağlık harcamaları emekli maaş ödemelerinden sonra ikinci büyük harcama kalemidir (Gümüş, vd., 2014:92). Bu bağlamda bir politika ve uygulama alanında sağlık hizmetlerinde gereksiz tüketim sorununun çözülmesi, akılcı ilaç ve sevk zincirinin kullanımı, yerli sağlık ürünü üretiminin ve tüketiminin teşvik edilmesi ve sağlık hizmetleri alanında etkinlik/verimlilik analizi esasında finansman modelinin kurularak sağlıkta rasyonel mali yönetimin sağlanması öne çıkmaktadır (Esen, 2024:61).

Genel olarak sosyal güvenlik sistemlerinde finansal sürdürülebilirliği sağlamak için vergi artışı, prim artışı, katkı payı artışı, borçlanma ve yatırım getirileri gibi farklı finansal araçlara değişik yoğunlukta başvurulabilmektedir (Alan, 2023:76). Türkiye'de de sosyal güvenlik sisteminin mali açıdan sorunu olmadığını söylemek oldukça güçtür. Bu noktada merkezi bütçeden sosyal güvenlik sistemine bütçe transferi yapılması yoluna gidilmektedir. Ancak uygulama geçici olmayıp yıllar içerisinde artış eğilimi göstermiştir (Bolukçu; 2020:27; Mıynat Taşdemir, 2025:81). . Merkezi yönetim bütçesinden 2008-2025 yıllarını kapsayan dönemde SGK'ya aktarılan toplam tutar 2,6 trilyon TL'yi bulmuştur (Analiz, 2026). Öte yandan sisteme yapılan bütçe transferleri kamu bütçe açıklarını ve kamu kesimi borçlanma gereğini arttırarak kamu maliyesini olumsuz etkilemektedir (Yurdadoğ vd. 2019:660).

2.3. Sosyal Güvenlik Sisteminin Mali Yönetimi ve Teorik Yönleri

Sosyal güvenlik sistemleri, Bismarck/işçi sigortası (bütün çalışanların sosyal risklere karşı korunduğu; çalışanların ve işverenlerin eşit tutarda ödediği ve ayrıca devlet katkı sağlanan zorunlu prim sistemi), Beveridge/halk sigortası (halkın tümünün sosyal güvenlik sistemine dahil olması amacıyla prim ödediği ve devletin de vergi gelirleri ile sistemin finansmanına katkı sağladığı sistem), karma sistem (işçi ve halk sigortalarının birlikte uygulandığı sistem), devletçe bakım (sosyal güvenlik harcamalarının devletin sorumluluğunda ve devlet bütçesinden bu amaçla ayrılan vergilerle karşılandığı sistem), koruyucu fon (devlet güvencesine sahip program kapsamındaki emeklilik fonları tarafından yönetilen ve kamu hesaplarında oluşturulan bireyselleştirilmiş ve risk birikimi içermeyen bir zorunlu tasarruf programı) ve özel sigorta sistemi (kamu sosyal sigorta kurumlarının yerine özel sigorta/emeklilik şirketlerinin ikame edildiği ve kamusal dağıtım sistemi yerine bireysel hesaplara dayalı emeklilik fonlarının işletildiği sistem) olmak üzere farklı modellerden oluşmaktadır. Bu sistemlerin finansmanı, işçi ve işveren primleri ile devletin vergi gelirleri ve bütçe katkıları aracılığıyla sağlanmaktadır. Sosyal güvenlik sistemlerinde kapitalizasyon/fon biriktirme (piyasa cari faiz esas alınarak bugünkü gelirin belirli ileride bir tarihte ulaşacağı kapitalize değeri hesaplamaya yönelik aktüeryal hesaplar yoluyla sosyal risklerden kaynaklanacak ödemelere yönelik fon oluşturulduğu ve toplanan primlerin ise o dönem içinde dağıtılmayarak piyasa koşulları içerinde değerlendirildiği yöntem) ve dağıtım/yılı yılına finansman (aktif sigortalıların primlerinin gelir-gider dengesini sağlamak amacıyla fon oluşturulmaksızın aynı dönemdeki harcamalara aktarıldığı sistem) olmak üzere iki temel finansman yöntemi uygulanmaktadır. Kapitilizasyon yönteminde çalışanlar ön plandadır; devlet denetleyicidir ve uzun vadede denge sağlanması amacı öne çıkmaktadır. Dağıtım yöntemi ise nesiller arası dayanışmaya ve gelir transferine dayanmaktadır ve kısa vadede denge sağlama amacı olduğundan yedek fon bulunmaz. Bu esasa göre bireyler çalıştıkları süre boyunca zorunlu olarak yaşlılık sigortası primlerini öderler ve emekliliğe hak kazanırlar. Günümüzde birçok ülkenin sosyal güvenlik sistemi dağıtım esası ile finanse edilmektedir. Ancak yöntemlerin karma uygulanması yaygınlaşmaya başlamıştır. Türkiye'de başlangıçta öngörülen kapitalizasyon yöntemi zamanla yerini dağıtım yöntemine bırakmıştır. Dağıtım sisteminin sürdürülebilirliği, özellikle yaşlı bağımlılık oranı, prim gelirleri ve sosyal güvenlik harcamaları arasındaki dengeye bağlıdır. Sistemin finansman sorunlarının çözümü için sosyal harcamaların düzenlenmesi, prim oranlarının artırılması, emeklilik yaşının yükseltilmesi, gelirlerin artırılması ve bireysel birikime dayalı modellerin geliştirilmesi gibi çeşitli politikalar önerilmektedir (Sakal, 2003: 134; Egeli, 2013: 44-54; Gümüş, vd., 2014:68-69; Bolukçu, 2020: 25-27). Ayrıca sosyal güvenlik sisteminde mali sürdürülebilirliği ve disiplini sağlayacak mali kural uygulaması değerlendirilmektedir (Yurdadoğ vd. 2019:666).

2.4. Bütçe ve Sosyal Güvenlik Mevzuatı ile Politika, Strateji ve Planlama Belgeleri

Kamu Mali Yönetimi ve Kontrol Kanununda sosyal güvenlik kurumu bütçesinin "*sosyal güvenlik hizmeti sunmak üzere, kanunla veya Cumhurbaşkanlığı kararnamesiyle kurulan ve bu Kanuna ekli (IV) sayılı cetvelde yer alan her bir kamu idaresinin bütçesi*"(m.12/7) olduğu, merkezi yönetim bütçe kanunu teklifine "*sosyal güvenlik kurumlarının bütçe tahminlerinin de ekleneceği*"(m.18/2), "sosyal güvenlik kurumlarının ayrıntılı finansman programlarını hazırlayacağı ve harcamalarını bu programa uygun olarak yapacağı"(m.20/b), "*sosyal güvenlik kurumları bütçelerinin uygulama sonuçlarının kesin hesaba bağlanmasının ilgili kanunlarındaki hükümlere göre yapılacağı*"(m.42/son), "sosyal güvenlik kurumlarına mali istatistiklerin Hazine ve Maliye Bakanlığınca üçer aylık dönemler itibariyle yayımlanacağı"(m.53/2), "*sosyal güvenlik kurumlarının ayrıntılı harcama programları ile finansman programları bütçeleriyle birlikte hazırlanacağı, görüşüleceği ve onaylanacağı*"(m.77/1) belirtilmiş ve Kanuna ekli IV sayılı Cetvelde sosyal güvenlik kurumları olarak "*Sosyal Güvenlik Kurumu ve Türkiye İş Kurumu Genel Müdürlüğü*" sayılmıştır. Kanunda sosyal güvenlik sisteminin sürdürülebilirliği bağlamında uzun dönemli bir mali planlamaya konu edilmesi öngörülmüşse de bu mümkün olmamıştır. Zira Kanununun mülga 14 maddesinde "*Kamu gelirlerinin azalmasına veya kamu giderlerinin artmasına neden olacak ve kamu idarelerini yükümlülük altına sokacak kanun tekliflerinin getireceği malî yük, orta vadeli program ve malî plan çerçevesinde, en az üç*

yıllık dönem için hesaplanır ve tekliflere eklenir. Sosyal güvenliğe yönelik kanun tekliflerinde ise en az yirmi yıllık aktüeryal hesaplara yer verilir" hükmüne yer verilmiş ancak buna çoğu zaman uyulmamıştır (Bulut, 2019:166).

Türkiye Cumhuriyeti Cumhurbaşkanlığı Strateji ve Bütçe Başkanlığı (TCCB) tarafından hazırlanan Bütçe Hazırlama Rehberinde cari transferlerle ilgili olarak "*Sosyal Güvenlik Kurumunun tahsilatını artıracak ve giderlerinde tasarruf ve etkinlik sağlayacak tedbirlere ağırlık verilecek ve bütçeden bu kuruluşa yapılacak transferlerin asgari düzeyde tutulacağı*", "*Sosyal Güvenlik Kurumuna açık finansmanı ödemelerinin ilgili programla ilişkilendirileceği*" ve "*sosyal güvenlik sisteminin etkinliğini ve işlerliğini sağlamak amacıyla kanuni yükümlülüklerin yerine getirilmesi ve sosyal güvenlik sisteminin yaygınlaştırılması amacıyla sosyal güvenlik kurumlarına kendi mevzuatları ile verilen görevler dışında bir görev verilmesi durumunda verilen bu görevin ifası sonucu oluşacak görevlendirme giderleri karşılığında yapılacak ödemeler ile sosyal güvenlik kurumlarından hane halkına yapılan fayda ödemeleri kapsamında yer alan ödemeler sosyal güvenlik kurumlarınca bu program altında değerlendirilecektir. Sosyal Güvenlik Kurumu'nun finansman açığının karşılanmasına ilişkin giderler, Kurumun ay itibarıyla tahsil ettiği malullük, yaşlılık ve ölüm sigortaları ile genel sağlık sigortası priminin dörtte biri oranında Devlet tarafından yapılan katkı ödemeleri, Merkezi yönetim bütçesinden Sosyal Güvenlik Kurumuna; 5454 sayılı Kanun kapsamında olanlar ile 506 sayılı Kanununun geçici 20 inci maddesi kapsamındaki sandıklardan gelir bağlanmış olanlara "ek ödeme" karşılığı yapılan ödemeler, 5434 sayılı Kanun kapsamında emekli ikramiyeleri karşılığı yapılan ödemeler, makam, temsil, görev ve kadrosuzluk tazminatları karşılığı yapılan ödemeler, Kurumca gelir ve aylık ödemesi yapılanlara bayram ikramiyesi ödemeleri ve diğer faturalı ödemeler ile 5510 sayılı Kanun kapsamında ödenecek ek karşılıklar, bu program altında değerlendirilecektir. Sosyal güvenlik kurumuna şehit yakını ve gazilere bağlanan aylık ve diğer ödemeler karşılığı yapılan ödemelere ilişkin yürütülen hizmetler, faaliyetler, iş ve işlemler program kapsamına dahil değildir*" ifadelerine yer verilmiştir (TCCB, 2025a).

4 sayılı Cumhurbaşkanı Kararnamesinde (TCCB, 2018) "*Sosyal Güvenlik Kurumunun merkezi yönetim bütçesinden kendisine ayrılan yıllık sosyal sigortalar, genel sağlık sigortasına ilişkin ayrı ayrı olmak üzere transfer tutarını, üç yıllık transfer projeksiyonunu ve uzun dönemli emeklilik ve genel sağlık sigortası finansman hedeflerini gerçekleştirmekle görevli olduğu*"(m.430), **gelirlerinin** "*sosyal sigorta ve genel sağlık sigortası prim gelirleri, idarî para cezaları, gecikme cezaları, gecikme zamları ve katılım payları, sosyal sigorta ile genel sağlık sigortasına yapılan Devlet katkısı, taşınır ve taşınmaz gelirleri, Kurumca hazırlanan her türlü standart form, manyetik, elektronik veya akıllı kart satışından elde edilecek gelirler ile her türlü data hattı, internet kullanımı ve benzeri kira gelirleri, Kurumun ödeme kapsamındaki listelere girmek veya bu listelerde kalmak veya değişiklik yapmak için yapılan başvurulardan ve sözleşmelerden elde edilen gelirler, merkezi yönetim bütçesinden yapılacak diğer transferler, gerçek veya tüzel kişiler tarafından doğrudan veya vasiyet yoluyla yapılan bağışlar, primlerin ve diğer gelirlerin değerlendirilmesinden elde edilen gelirler, eğitim ve danışmanlık hizmetlerinden elde edilen gelirler ve diğer gelirler*" ve **giderlerinin** "*sosyal sigorta kapsamında sigortalı ve hak sahiplerine ödenecek olan gelir, aylık ve ödenekler, "genel sağlık sigortası kapsamında yapılacak giderler, genel yönetim giderleri, faiz giderleri, eğitim, araştırma, danışmanlık hizmet giderleri ve diğer giderler*"(m.431) olduğu ifade edilmiştir.

Sosyal güvenlik mevzuatı "*kayıtlı olarak çalışanlar için ne düzeyde prim ödeneceği, bu kişilerin hangi koşullarda ne zaman emekli olacakları, bu kişilere ve bu kişilerden ölenlerin hak sahiplerine ne kadar aylık bağlanacağı*" kurallarını kapsamaktadır (Erdem, 2017:33). Türkiye'de sosyal güvenlik mevzuatının merkezinde Sosyal Sigortalar ve Genel Sağlık Sigortası Kanunu yer almaktadır. Kanunda sigortalık (m.4-10), işyerleri ve işverenler (m.11-12), kısa vadeli sigortalılık (m.13-24), uzun vadeli sigortalılık (m.25-42), kısa ve uzun vadeli sigortalılığa ilişkin ortak hükümler (m.53-57), kamu görevlileri (m.43-49), isteğe bağlı sigortalılık (m.50-52), denetim ve kontrol yetkisi (m.59), genel sağlık sigortası (m.60-62), sağlanan sağlık hizmetleri ve diğer haklar (m.63-66), sağlık hizmetlerinden yararlanma şartları ve katılım payı (m.67-71), primlere ilişkin hükümler (m.79-91) ve idari para cezaları (m.102-103) şeklindeki konular ayrıntılı olarak düzenlenmiştir. Sosyal Sigortalar ve Genel Sağlık Sigortası Kanununda Ağustos 2026'da yapılan değişiklikle madde başlığındaki "devlet katkı" ile devlet katkısını düzenleyen hüküm yürürlükten kaldırılmıştır. Değişiklik, kanuna ilişkin Genel Gerekçede "*Hazinede Sosyal güvenlik Kurumu bütçesine yapılan ödeme unsurları sadeleştirilerek bütçe kalemlerinin izlenebilirliği artırılmaktadır*" ve "*Madde 14- 31/5/2006 tarihli ve 5510 sayılı Sosyal Sigortalar ve Genel Sağlık Sigortası Kanununun 81 inci maddesinin başlığı "Prim Oranları" şeklinde değiştirilmiş ve üçüncü fıkrası yürürlükten kaldırılmıştır*" şeklinde ifade edilen maddenin gerekçesi ise "*bilindiği üzere sosyal Güvenlik Kurumu merkezi yönetim bütçesi dışında, 5018 saylı Kamu Mali Yönetimi ve Kontrol Kanununa ekli (IV) sayılı Cetvelde yer alan bir kamu kurumudur. Gelirleri esas itibarıyla sosyal sigorta ve genel sağlık sigortası prim gelirlerinden, giderleri ise emekli aylıkları ile sigortalıların sağlık giderlerinden oluşmaktadır. Kurumun gelirlerinin giderlerini karşılaması esastır. Gelirlerinin giderlerini karşılamaması halinde ortaya çıkan nakit açığının karşılanması iki kalem üzerinden yapılmaktadır. Bu kalemlerden biri Devlet katkısı, diğeri ise açık finansman kalemidir. Maddeyle aynı mahiyetteki bütçeden yapılan*

ödeme unsurları eke indirilerek sadeleştirilmekte, böylelikle bütçe kalemlerinin izlenebilirliğime değerlendirme süreçlerinin etkinliğinin artırılması amaçlanmaktadır" şeklindedir. Bu bakımdan düzenlemeden devlet desteğinin tamamen sonlandığı anlamı çıkmamakta; değişiklik sonrası devlet katkısının açık transferi/finansmanı kapsamında devam edeceği, nakit açıklarının ise merkezi yönetim bütçesinden doğrudan kapatılacağı ve böylece açık finansmanı bütçede tek kalemde yer alacağından gerçek açık daha net anlaşılabilecektir (TBMM, 2026).

Sosyal Güvenlik Kurumu mülga Bütçe Uygulama Yönergesindeki açıklamalardan kurumun bütçe uygulamaları hakkında fikir elde edilmesi mümkündür. Bu bağlamda kurum bütçesi "*mali yıl içindeki gelir ve gider tahminlerini gösteren, gelirlerin toplanmasına ve harcamaların yapılmasına yetki ve izin veren bir Yönetim Kurulu kararıdır*"(m.5/1), "*mali yıl bütçesi, stratejik plan ve Kurum performans programı dikkate alınarak izleyen iki yılın gelir ve gider tahminleri ile birlikte görüşülür ve değerlendirilir*"(m.5/2), "*bütçe; gider, gelir ve finansmanın ekonomik sınıflandırması bölümlerinden oluşur. Gider ve gelir bütçeleri; genel sağlık sigortası, sosyal sigortalar ve genel yönetim bütçesi ayrımına göre hazırlanır ve uygulanır. Gider bütçesi; kurumsal, fonksiyonel, finansman tipi ve ekonomik sınıflandırma olmak üzere dört bölüme ayrılır*"(m.5/4-5), "*Bütçe yılı ve izleyen iki yılın gelir tahmininde, Orta Vadeli Program, Orta Vadeli Mali Plan ve Merkezi Yönetim Bütçe Hazırlama Rehberi ile Yatırım Hazırlama Rehberinde yer alan katsayılar esas alınır*"(m.11/1), "*sosyal güvenlik gelirleri ve benzeri mali yükümlülükler kanunla konulur, değiştirilir ve kaldırılır*"(m.13/1), "*belli bir amaca tahsisli gelirler gelir bütçesinin ilgili bölümünde gösterilir ve bu gelirler amacı dışında harcanamaz.. gider bütçesinin ilgili tertibine tahsis amacı doğrultusunda kullanılmak üzere ödenekleştirilir*"(m.16/1-2), "*bütçe denkliğinin sağlanmasında bütçe gelirleri esas alınır. Gelirlerin giderleri karşılamaması halinde aradaki fark, ilk olarak gider bütçesinde öngörülen tertiplerden indirim yapılması ya da yeni gelir kaynakları bulunması suretiyle giderilmeye çalışılır. Buna rağmen denklik sağlanamamış ise, söz konusu fark hazineden talep edilir*"(m.17/1), "*prim gelirleri, emekli ödemeleri ve sağlık ödemelerine ilişkin gelir-gider tahminleri Aktüerya ve Fon Yönetimi Daire Başkanlığı tarafından hazırlanır. Gelir tahmini belirlenirken yapılan faturalı ödemeler, devlet katkı primi, ilgili kanunlara göre karşılanacak diğer primler, primsiz ödemeler için yapılan giderler ve benzeri durumlarda Kurumun finansman ihtiyacının karşılanması için ilgili diğer kurum ve kuruluşlar nezdinde gerekli girişimlerde bulunmak ve aktüeryal esaslara göre, Kurumun kısa, orta ve uzun vadeli gelir-gider projeksiyonlarını yapmak Aktüerya ve Fon Yönetimi Daire Başkanlığı tarafından gerçekleştirilir*"(m.20/2) ve "*bütçe işlemleri, harcama birimleriyle koordinasyon sağlanarak Başkanlıkça yürürlüğe konulan düzenlemelere göre gerçekleştirilir, kayıtları tutulur ve izlenir. Söz konusu kayıtlar, sistem MOSİP (Mali Otomasyon Sistemi Projesi) üzerinde gerçekleştirilir*"(m.33/1-2) denilmektedir (SGK, 2026e).

Bütçe Hazırlama Rehberinde merkezi yönetim bütçe kanunu teklifi hazırlanırken gözetilecek "*amaç, ilke, politika, hedef, öncelik, temel ekonomik büyüklükler ve ödenek tavanları*" bilgilerinin yer aldığı temel belgeler ismen belirtilmiştir. Bunlardan **kalkınma planı** "*ülkemizin kalkınma vizyonunu gerçekleştirebilmek için belirlenen amaç, ilke, politika ve hedefleri ortaya koymaktadır. Beş yıllık dönemlerde hazırlanmaktadır*", **Cumhurbaşkanlığı yıllık programı** "*ekonomi ve kamu maliyesi alanındaki gelişme ve hedefleri, program dönemindeki hedef ve politikaları içerecek şekilde her yıl hazırlanmaktadır*", **orta vadeli program** "*kalkınma planları, stratejik planlar, genel ekonomik koşulların gerekleri doğrultusunda makro politikaları, ilkeleri, hedef ve gösterge niteliğindeki temel ekonomik büyüklükleri, gelecek üç yıla ilişkin toplam gelir ve gider tahminlerini, bütçe dengesi ve borçlanma durumu ile kamu idarelerinin ödenek teklif tavanlarını belirleyen OVP üç yıllık perspektifle hazırlanmaktadır*", **stratejik plan** "*kamu idarelerinin misyon ve vizyonlarının oluşturulması, stratejik amaç ve ölçülebilir hedeflerin saptanması, önceden belirlenmiş olan göstergeler doğrultusunda performans ölçümü ve bu sürecin izleme ve değerlendirmesinin yapılması amacıyla ilgili idarelerce beş yıllık bir dönem için hazırlanmaktadır*", **performans programı** "*kamu idarelerinin program bütçeye uygun olarak yürüteceği faaliyetler ile bunların kaynak ihtiyacını, amaç, hedef ve performans göstergelerini içermekte ve ilgili idarelerce yıllık olarak hazırlanmaktadır*" ve **bütçe hazırlama rehberi ile yatırım programı hazırlama rehberi** "*bütçe tekliflerinin hazırlanmasına esas olmak üzere kamu idarelerince uyulması gereken genel ilkeleri, nesnel ve ölçülebilir standartları, hesaplama yöntemlerini, bunlara ilişkin olarak kullanılacak cetvel ve tablo örnekleri ile diğer bilgileri içeren Rehberler her yıl hazırlanmaktadır*" ifadelerine yer verilmiştir (TCCB, 2025a: 9). Çalışmanın dördüncü bölümünde yukarıda yer alan politika ve strateji belgelerinde açıklanan sosyal güvenlik konuları ayrıntılı olarak incelenecektir.

3. SOSYAL GÜVENLİK İSTATİSTİKLERİ

Türkiye'de sosyal güvenlik sistemine ilişkin Türkiye İstatistik Kurumu, Sosyal Güvenlik Kurumu, Cumhurbaşkanlığı Strateji Başkanlığı ve Hazine ve Maliye Bakanlığı veri tabanlarında istatistiki verilere yer verilmektedir. Kuramsal gereklilikler gözetilerek hazırlanan istatistikler terminoloji ve içerik birliğine sahip olmasa da Türkiye'de sosyal güvenlik sisteminin durumu ve uygulama sonuçlarının değerlendirilmesi bakımından belirleyicidir.

Tablo 1: Sosyal Güvenlik Kurumu Bütçe Verileri (2020-2025) (Bin TL)

Gösterge/Yıl	2020	2021	2022	2023	2024	2025
Giderler	540.095.510	654.819.630	1.040.117.787	2.232.339.177	3.972.816.384	5.563.325.429
Gelirler	472.626.055	633.206.617	1.000.385.301	2.192.954.640	3.962.466.508	5.599.066.016
Gelir Gider Dengesi	-67.469.455	-21.613.013	-39.732.244	-39.384.537	-10.349.876	35.740.589

Kaynak: SGK, (2026b).

Tablo 1'e göre Sosyal Güvenlik Kurumunun enflasyon etkisinden bağımsız bir şekilde 2025'te 2020 yılına göre giderleri %930 civarında ve gelirleri %1.084 artmış ve gelir/gider dengesi negatiften pozitif görünüme geçmiştir. Söz konusu dönemde gelirlerdeki yıllık artış giderlerdeki yıllık artışın üzerinde gerçekleşmiştir.

Tablo 2: Sosyal Güvenlik Kurumu Bütçesine Devlet Katkıları ve Bütçe Transferleri (2020-2025) (Bin TL)

Gösterge/Yıl	2020	2021	2022	2023	2024	2025
Devlet Katkısı	85.070.028	106.847.991	174.712.112	325.629.773	637.657.417	888.670.391
Bütçe Transferleri	248.846.194	252.083.979	389.030.604	740.560.329	1.442.632.708	1.953.838.685

Kaynak: SGK, (2026c).

Tablo 2'ye göre sosyal güvenlik sistemine yönelik devlet katkısı ve bütçe transferlerinde önemli ölçüde nominal artış yaşandığı görülmektedir. Kuruma 2025'te 2020 yılına göre devlet katkısı %945 oranında, bütçe transferleri ise %685 oranında artmıştır. Devlet katkısındaki artışın bütçe transferlerindeki artıştan daha yüksek olması, bu kalemin sosyal güvenlik finansmanı içerisindeki öneminin de arttığına işaret etmektedir. Söz konusu artışlar, sistemin finansman açığını karşılama kapasitesini güçlendirdiği ancak mali sürdürülebilirliği sağladığı anlamına gelmemekte; parasal tutarların enflasyon, prim gelirleri, emekli aylıkları ve diğer sosyal güvenlik harcamalarıyla birlikte değerlendirilmesi gerekmektedir.

Bütçedeki gelir ve gider kalemlerinin derinliğinin görülmesi amacıyla Hazine ve Maliye Bakanlığı Muhasebat Genel Müdürlüğü (HMB) tarafından Sosyal Güvenlik Kurumları bütçe gerçekleşmelerine ilişkin istatistiklere bakılması yerinde olacaktır.

Tablo 3: Bütçe Gerçekleşmeleri (2020-2025)(Bin TL)

Türleri/Yıllar	2020	2021	2022	2023	2024	2025
Harcamalar-Toplam	**541.486.042**	**655.538.172**	**1.041.319.340**	**2.234.407.611**	**3.959.729.167**	**5.700.112.810**
-Cari Transferler	*536.298.220*	*649.152.190*	*1.031.135.869*	*2.213.237.815*	*3.918.740.911*	*5.644.690.057*
-Personel Giderleri	*3.023.209*	*3.699.943*	*6.040.428*	*13.457.157*	*25.800.265*	*35.270.184*
-Mal/Hizmet Alımı	*1.436.712*	*1.650.801*	*2.793.177*	*5.357.896*	*10.342.277*	*14.174.453*
-SGK Devlet Primi	*511.490*	*633.577*	*1.007.552*	*2.074.792*	*3.511.589*	*4.932.633*
-Sermaye Giderleri	*216.**402***	*401.661*	*342.315*	*279.678*	*1.333.560*	*1.044.981*
-Faiz Giderleri	*9*	*0*	*0*	*273*	*565*	*502*
Gelirler-Toplam	**569.465.377**	**674.382.444**	**1.051.135.765**	**2.309.932.272**	**4.115.580.166**	**5.944.346.979**
-Sosyal Güv. Gelirleri	*341.129.944*	*456.903.203*	*728.000.591*	*1.549.276.581*	*2.864.336.329*	*4.992.967.062*
-Faiz/Pay/Cezalar	*74.688.843*	*93.958.971*	*107.392.347*	*368.352.819*	*606.536.778*	*864.265.211*
-Alınan Bağış Yardım	*153.572.519*	*122.940.230*	*215.251.566*	*391.696.483*	*643.633.933*	*80.223.765*
-Sermaye Gelirleri	*21.170*	*165.002*	*150.572*	*46.364*	*465.141*	*6.341.657*
-Teşebbüs/Mülk Ge.	*52.901*	*415.038*	*340.691*	*560.024*	*607.984*	*549.284*
Bütçe Dengesi	**27.979.335**	**18.844.272**	**9.816.425**	**75.524.661**	**155.850.998**	**244.234.169**

Kaynak: HMB, (2026a).

Tablo 3'e göre enflasyondan etkisinden bağımsız olarak 2025'te 2020 yılına göre toplam harcamalar %953, toplam gelirler ise %944 civarında artmıştır. Harcamalar içerisinde en büyük paya sahip olan cari transferler %953, personel giderleri %1.067, mal ve hizmet alımları %887 oranında artmıştır. Gelirler içerisinde sosyal güvenlik gelirleri %1.368, faiz, pay ve cezalar %1.057 artış göstermiş; alınan bağış ve yardımlar %47,8 oranında azalmıştır. Bütçe dengesi ise fazla pozisyondadır. Gelir ve harcamaların yaklaşık on katına çıkması, sosyal güvenlik sisteminin mali büyüklüğünün belirgin biçimde arttığını göstermektedir. Toplam gelirlerdeki artışın toplam harcamalardaki artışın gerisinde kalması ise mali dengenin nominal büyüklükler üzerinden yorumlanmamasına işaret etmektedir.

Tablo 4: Bütçe Harcamaları (Cari Trasnferler-Ekonomik Kod 4) (2020-2025)(Bin TL)

Türleri/Yıllar	2020	2021	2022	2023	2024	2025
Cari Transferler	**536.298.220**	**649.152.190**	**1.031.135.869**	**2.213.237.815**	**3.918.740.911**	**5.644.690.057**
-Hane Halkına	5.122.623	6.465.260	6.581.187	16.347.812	31.169.228	135.808.030
-Fayda Ödemeleri	530.942.662	642.413.997	1.024.244.264	2.196.077.915	3.886.366.098	5.507.233.460
Malul-Yaşlı-Ölüm Ayl.	*337.541.784*	*400.103.311*	*653.770.714*	*1.284.553.451*	*2.525.347.171*	*3.569.605.476*

Ek Ödemeler	*14.719.084*	*17.552.679*	*28.936.199*	*61.219.402*	*114.015.060*	*160.333.379*
Geçici İşgör. Yardımı	*5.080.774*	*8.000.239*	*10.877.697*	*17.120.054*	*32.346.926*	*44.568.407*
Evlenme Yardımı	*1.695.228*	*275.675*	*362.200*	*678.028*	*1.165.762*	*3.221.490*
Emekli Cenaze Yardımı	*267.452*	*366.146*	*639.867*	*1.037.959*	*2.030.572*	*2.747.144*
Emeklilere Diğer Öde.	*246.508*	*319.458*	*408.450*	*671.131*	*1.189.123*	*1.687.268*
Vatani Hizmet Aylıkları	*266.964*	*366.349*	*430.702*	*659.526*	*1.532.474*	*2.528.932*
Subay Tazminatı	*0*	*0*	*12.178*	*17.589*	*32.074*	*52.573*
Diğer Aylık/Tazminat	*72.650*	*78.026*	*372.237*	*626.049*	*1.113.000*	*1.761.335*
Sosyal Yardım Zammı	*3.290.394*	*3.766.662*	*133.964*	*400.141*	*615.982*	*413.974*
Şehit-Dul-Yetim İk-Öd.	*256.648*	*295.538*	*310.188*	*577.489*	*1.000.260*	*1.334.741*
Yaşlılık Aylığı-2022	*0*	*0*	*140.722*	*210.283*	*362.416*	*403.661*
Emekli İkramiyeleri	*9.385.648*	*10.636.247*	*10.158.218*	*48.557.334*	*52.144.513*	*62.827.038*
Devlet Büyükleri Ay.	*-*	*-*	*182.730*	*523.037*	*967.428*	*1.376.477*
Köy Korucuları/Terör	*-*	*-*	*4.523.040*	*8.558.020*	*13.194.305*	*18.212.933*
Emekli Tedavi Gideri	*83.407.594*	*111.988.016*	*180.784.964*	*358.570.947*	*623.995.629*	*896.756.628*
Emekli İlaç Gideri	*3.749.643*	*4.091.398*	*6.693.423*	*13.689.104*	*26.437.390*	*38.918.191*
Sosy Güv. Olm. Tedavi	*205.005*	*182.136*	*905.296*	*636.475*	*1.378.980*	*1.421.963*
Sosy Güv. Olm. İlaç Gi.	*44.533.722*	*53.842.581*	*83.334.806*	*167.768.766*	*297.904.779*	*426.187.961*
6331 s. Kanundan	*3.768*	*4.987*	*8.523*	*13.840*	*23.485*	*27.422*
İthal İlaç Giderleri	*554.281*	*1.981.442*	*3.630.206*	*2.048.921*	*3.914.424*	*6.670.812*
Emekli Bayram İkra.	*22.123.381*	*24.842.466*	*25.401.223*	*55.312.985*	*83.948.179*	*115.413.242*
Aylık Farkları	*726.911*	*402.873*	*5.327.225*	*92.505.224*	*74.606.238*	*116.879.001*
Doktor Ek Ödeme	*-*	*-*	*75.233*	*286.909*	*1.868.202*	*1.132.844*
1005 s. Kanundan (H)	*-*	*-*	*1.055.391*	*3.900.969*	*7.167.804*	*9.094.934*
Başarılı Sporcu Aylığı	*-*	*-*	*112.076*	*147.533*	*269.344*	*367.857*
100. Yıl İkramiyesi	*-*	*-*	*-*	*65.997.269*	*314.008*	*30.117*

Kaynak: HMB, (2026b).

Tablo 2'ye göre enflasyondan etkisinden bağımsız olarak 2020-2025 döneminde cari transferler içerisinde yer alan maluliyet, yaşlılık ve ölüm aylıkları %958 civarında artmıştır. Bu durum emeklilik ve hak sahipliği ödemelerinin sosyal güvenlik harcamaları içerisindeki ağırlığını koruduğunu göstermektedir. Aynı dönemde emekli tedavi giderlerinin %975 ve emekli ilaç giderlerinin %938 civarında artması sağlık harcamalarının da cari transferlerdeki artışa neden olduğunu göstermektedir. Hane halkına yapılan ödemelerdeki %2.551 ve aylık farklarındaki %15.979 civarındaki artışlar başlangıç değerlerinin düşük olmasından kaynaklanmaktadır. Ayrıca ödemelerin bir kısmının 2020 ve sonrasında yapılan düzenlemelerle ilk kez sosyal güvenlik kurumlarının bütçe harcamalarına yansıtıldığı görülmektedir.

Tablo 5: Bütçe Gelirleri (Sosyal Güvenlik/Alınan Bağış ve Yarımlar)(Ekonomik Kod 4)(2020-2025)(Bin TL)

Türleri/Yıllar	2020	2021	2022	2023	2024	2025
Gelirler-Toplam	**569.465.377**	**674.382.444**	**1.051.135.765**	**2.309.932.272**	**4.115.580.166**	**5.944.346.979**
Sosyal Güv. Gelirleri	**341.129.944**	**456.903.203**	**728.000.591**	**1.549.276.581**	**2.864.336.329**	**4.992.967.062**
Prim Gelirleri	188.906.689	250.496.554	415.027.273	885.722.129	1.576.895.241	2.237.671.197
Malul-Yaşlı-Ölüm Sig.	*188.906.689*	*250.496.554*	*415.027.273*	*885.722.129*	*1.576.895.241*	*2.237.671.197*
Hizmet Akdi İşçi Prim.	*121.813.113*	*174.655.518*	*290.070.371*	*600.085.576*	*1.163.846.490*	*1.712.790.018*
Bağımsız-Çalışmayan	*11.418.730*	*18.557.001*	*22.628.575*	*62.681.289*	*79.257.214*	*98.160.784*
Kamu/Memur	*47.914.634*	*51.658.506*	*90.180.220*	*169.930.214*	*307.304.843*	*401.122.116*
İsteğe Bağlı	*926.661*	*877.815*	*1.230.057*	*2.699.456*	*4.345.079*	*5.268.937*
Tarım sigortası	*-35.054*	*372.696*	*144.215*	*774.736*	*163.937*	*203.064*
İsviçre Prim Geliri	*-1.161*	*-1.801*	*-2.291*	*-1.338*	*-383*	*1.073*
Toptan Alınan Primler	*8.066*	*9.729*	*13.481*	*84.953*	*9.010*	*29.791*
Döviz Karşılığı Prim	*265*	*186*	*324*	*4.961*	*62*	*914*
Topluluk Sigortası	*1.844*	*4.128*	*1.998*	*12.000*	*18.659*	*16.724*
Borçlanma Karşılığı	*6.392.050*	*4.204.386*	*10.410.864*	*48.949.305*	*21.116.034*	*18.967.595*
Fiili Hizmet Zammı	*0*	*0*	*42*	*0*	*11*	*111.169*
Ev Hizmetleri Çalışanı	*324.383*	*436.302*	*472.769*	*711.703*	*1.082.182*	*1.274.467*
Diğer Primler	*143.158*	*-277.912*	*-123.352*	*-210.726*	*-247.898*	*-275.455*
Genel Sağlık Sigorta.	127.678.635	174.350.945	258.824.806	520.435.237	967.951.776	1.362.554.870
İş Kazazı/Meslek Ha.	17.975.961	22.925.712	37.543.786	74.825.914	141.969.856	220.959.083
Diğer	6.934.895	9.129.992	16.604.733	68.293.340	177.519.457	254.058.848

Alınan Bağış Yardım	**153.572.519**	**122.940.230**	**215.251.566**	**391.696.483**	**643.633.933**	**80.223.765**
Yurt Dışından	107	7	1	0	1.002	0
Merkezi Yönetim İd.	153.572.409	122.940.128	215.251.560	391.696.349	643.632.922	80.223.425
Cari	153.512.502	122.902.198	215.224.456	391.545.176	643.438.996	80.002.998
Hazine Yardımı	72.883.974	17.672.783	50.253.746	40.527.775	58.185.155	80.003.000
Devlet Katkısı	80.628.528	105.229.415	164.970.710	351.017.401	585.253.842	-3
Sermaye	59.907	37.930	27.104	151.173	193.925	220.427
Hazine Yardımı	59.907	37.930	27.104	151.173	193.925	220.427
Kurum/Kişi Yardım	0	95	4	60	5	339

Kaynak: HMB, (2026c).

Tablo 5'e göre enflasyondan etkisinden bağımsız olarak 2020-2025 yıllarını kapsayan dönemde özellikle prim gelirleri, genel sağlık sigortası gelirleri, iş kazası ve meslek hastalığı sigortası gelirleri ile merkezi yönetimden sağlanan yardımların değişimi, finansman yapısının değerlendirilmesi açısından önemlidir. Zira bu dönemde prim gelirleri %1.085 civarında ve genel sağlık sigortası gelirleri %967 civarında artış göstermiştir. Prim gelirlerinin sosyal güvenlik gelirleri içindeki payı ise 2020 yılında %55,38 iken 2023 yılında %57,17 ile en yüksek seviyesine ulaşmış, 2025 yılında %44,82'ye gerilemiştir. Benzer şekilde alınan bağış ve yardımlar 2025'te dramatik bir şekilde düşüş göstermiştir. Bu değişimin nedenlerini ortaya koymak için devlet katkıları, genel sağlık sigortası gelirleri, diğer gelirler ve prim tahsilatlarının gelişimi birlikte değerlendirilmelidir.

Türkiye'de sosyal koruma harcamaları ve gelirlerine ilişkin istatistikler Avrupa Bütünleştirilmiş Sosyal Koruma İstatistikleri Sistemi (The European System of Integrated Social Protection Statistics-ESSPROS) çerçevesinde belirlenen standartlar ve sınıflandırmalara göre Türkiye İstatistik Kurumu (TÜİK) tarafından yayınlanmaktadır (Bolukçu, 2020:15). Sosyal koruma ise hane halkı veya bireylerin belirlenmiş risk veya ihtiyaç yüklerini hafifletmek amacıyla kurum ve kuruluşlarca yapılan (anlık karşılıklı veya bireysel olmayan) önlemleri kapsamaktadır. Bu harcamalar sosyal yardımlar, idari harcamalar ve diğer harcamalardan oluşmaktadır. Sistemde şartlı yardımlar "*gelir ve/veya varlıkları belirli bir düzeyin altında olma koşuluna bağlı olarak yararlanıcılara sağlanan sosyal yardımlar*", şartsız yardımlar "*kişinin gelir ve/veya refah düzeyine bakılmaksızın yapılan yardımlar*", sosyal katkılar "*işverenlerce çalışanları adına veya koruma altındaki bireyler tarafından sosyal yardım alma konusundaki hak sahipliklerini güvence altına almak amacıyla yapılan ödemeler*", işveren sosyal katkıları "*işçilerinin ve onların bakmakla yükümlü olduğu kişilerin sosyal yardım alma konusundaki hak sahipliklerini güvence altına almak amacıyla işverenler tarafından yapılan ödemeler*" ve devlet katkıları "*hükümetin kontrolündeki primsiz düzenlemelere yaptığı genel harcamalar ve hükümetin koruması altındaki gruplara yaptığı finansal yardımlar*" şeklinde tanımlanmaktadır (TÜİK, 2025).

Tablo 6: Sosyal Koruma Harcamalarının Yardım Türlerine Göre Dağılımı (2020-2024) (Milyon TL)

Gösterge/Yıl	2020	2021	2022	2023	2024
Sosyal Koruma Harcamaları Toplamı	**668.387**	**805.843**	**1.291.155**	**2.696.611**	**4.964.532**
İdari Masraflar ve Diğer Harcamalar	10.306	13.249	23.160	48.273	88.782
Sosyal Koruma Yardımları Toplamı	**658.081**	**792.594**	**1.267.995**	**2.648.338**	**4.875.751**
Hastalık/Sağlık Bakımı	175.781	248.111	397.020	809.752	1.528.756
Engelli/Malul	21.792	25.292	42.333	77.376	134.506
Emekli/Yaşlı	301.706	355.068	567.453	1.177.476	2.276.594
Dul/Yetim	74.296	90.478	150.219	265.953	501.446
Aile/Çocuk	36.789	40.417	83.903	190.710	309.805
İşsizlik	42.142	26.912	14.412	24.186	48.651
Sosyal Dışlanma (B.Y.S.)	5.575	6.315	12.656	102.885	75.992

Kaynak: TÜİK, (2026, Sosyal Koruma İstatistikleri).

Tablo 6'a göre enflasyondan etkisinden bağımsız olarak 2020-2024 yıllarını kapsayan dönemde toplam sosyal koruma harcamaları %643 civarında ve sosyal koruma yardımları toplamı da %641 civarında artış göstermiş ve toplam harcamaların temel bileşenini oluşturmayı sürdürmüştür. Alt kalemler incelendiğinde, emekli ve yaşlılara yönelik harcamaların %655 civarında, hastalık ve sağlık bakımı harcamalarının ise %770 civarında arttığı görülmektedir. Bu iki kalem, 2024 yılında sosyal koruma yardımlarının en büyük bileşenlerini oluşturmaktadır. Neticede sosyal koruma harcamalarının 2020-2024 döneminde önemli ölçüde büyüdüğü, özellikle emeklilik ve sağlık alanlarının harcama yapısında belirleyici olduğu görülmektedir.

Tablo 7: Sosyal Koruma Gelirlerinin Türlerine Göre Dağılımı (2020-2024) (Milyon TL)

Gösterge/Yıl	2020	2021	2022	2023	2024
Gelir Toplamı	**769.786**	**987.544**	**1.555.329**	**3.221.934**	**5.929.407**

Payı (%)	100	100	100	100	100
Sosyal Katkılar	**401.546**	**546.086**	**801.601**	**1.726.750**	**3.028.785**
Gelir Toplamı İçindeki Payı (%)	52,16	55,30	51,54	53,59	51,08
-İşveren Sosyal Katkısı	*218.553*	*296.079*	*442.172*	*956.571*	*1.745.328*
-Gelir Toplamı İçindeki Payı (%)	*28,39*	*29,98*	*28,43*	*29,69*	*29,44*
-Koruma Kapsamındaki Bireylerin Katkıları	*182.993*	*250.007*	*359.429*	*770.180*	*1.283.457*
-Gelir Toplamı İçindeki Payı (%)	*23,77*	*25,32*	*23,11*	*23,90*	*21,65*
Devlet Katkıları	**304.501**	**371.818**	**642.713**	**1.278.415**	**2.481.378**
-Gelir Toplamı İçindeki Payı (%)	39,56	37,65	41,32	39,68	41,85
Diğer Gelirler	**63.738**	**69.641**	**111.016**	**216.768**	**419.243**
Gelir Toplamı İçindeki Payı (%)	8,28	7,05	7,14	6,73	7,07

Kaynak: TÜİK, (2026, Sosyal Koruma İstatistikleri).

Tablo 7'ye göre enflasyondan etkisinden bağımsız olarak 2020-2024 döneminde sosyal koruma gelirleri %670 civarında artarken devlet katkıları %715 civarında artarak toplam gelirlerden daha hızlı büyümüştür. Bu gelişme, devlet katkılarının toplam gelirler içerisindeki payının %40'tan %42 civarına yükselmesine neden olmuştur. Sosyal katkıların payı ise %52'denn %51'e gerilemiş; bu grubun içinde işveren katkılarının payı artarken koruma kapsamındaki bireylerin katkılarının payı azalmıştır. Dolayısıyla sosyal koruma sisteminin gelir yapısında devlet finansmanının göreli ağırlığı artarken bireysel katkıların göreli ağırlığı azalmıştır. Bu durum, devletin sosyal koruma finansmanındaki rolünün güçlendiğini göstermektedir.

Tablo 8: Toplam Maaş Alan Kişi Sayısı (2020-2024) (Bin Kişi)

Gösterge/Yıl	2020	2021	2022	2023	2024
Genel Toplam	**14.288**	**14.624**	**14.851**	**16.893**	**17.477**
Toplam Engelli/Malul Maaşı Alan	**853**	**854**	**858**	**859**	**851**
-Şartsız	*140*	*139*	*141*	*141*	*142*
-Şartlı	*713*	*715*	*717*	*719*	*710*
Toplam Emekli/Yaşlı Maaşı Alan	**10.035**	**10.253**	**10.403**	**12.414**	**12.935**
-Şartsız	9.209	9.416	9.575	11.602	12.129
-Şartlı	826	837	828	813	806
Toplam Dul/Yetim Maaşı Alan	**3.806**	**3.956**	**4.054**	**4.120**	**4.221**
-Şartsız	3.645	3.804	3.915	3.991	4.103
-Şartlı	161	152	139	129	118

Kaynak: TÜİK, (2026, Sosyal Koruma İstatistikleri), Not: Mükerrer maaş alan kişi sayısından arındırılmış verilerdir.

Tablo 8'e göre 2020-2024 döneminde sosyal koruma kapsamında maaş alanların toplam sayısındaki %22 civarındaki artışın temel belirleyicisi, emekli ve yaşlı maaşı alanların sayısındaki %29 civarındaki yükseliştir. Emekli ve yaşlı maaşı alanların sayısı artarken, bu gruptaki şartsız maaş alanların sayısı %32 artmış, şartlı maaş alanların sayısı ise %2,4 civarında azalmıştır. Dul ve yetim maaşı alanların sayısı %10,9 civarında artarken, engelli ve malul maaşı alanların sayısı dönem boyunca büyük ölçüde sabit kalmıştır. Buna karşılık şartlı dul ve yetim maaşı alanların sayısındaki %27 civarındaki azalış, bu gruptaki yardım dağılımının değiştiğine işaret etmektedir.

Tablo 9: Türkiye'de Atif/Pasif Sigortalı Sayıları ve Aktüeryal Denge

Gösterge/Yıl	2020	2021	2022	2023	2024	2025
a-Toplam Aktif Sigortalı (4a,4b,4c)-Kişi	23.344.547	24.745.149	26.344.234	25.358.022	25.625.750	26.328.559
b-Toplam Aylık/Gelir Alanlar (4a,4b,4c)-Dosya	13.264.220	12.847.135	13.128.225	15.236.122	15.869.846	16.204.425
c-Toplam Aylık/Gelir Alanlar (4a,4b,4c)-Kişi	12.490.714	13.644.030	13.933.020	16.030.256	16.677.617	17.015.688
Aktüeryal Denge (a/c)	1.87	1.81	1.89	1.58	1.54	1,55

Kaynak: SGK, (2026ç).

Tablo 9'a göre 2020-2025 döneminde toplam aktif sigortalı sayısı %12,8 civarında artarken aylık veya gelir alan kişi sayısı %36,2 civarında yükselmiştir. Dolayısıyla aylık veya gelir alanların sayısı, aktif sigortalı sayısından daha hızlı artmıştır. Aktif sigortalıların aylık veya gelir alan kişilere oranını ifade eden aktüeryal denge göstergesi ise 1,87'den 1,552e gerileyerek yaklaşık %17,1 civarında azalmıştır. Başka bir ifadeyle, 2020 yılında her bir aylık veya gelir alan kişiye karşılık yaklaşık 1,87 aktif sigortalı bulunurken 2025 yılında bu sayı 1,55'e düşerek ideal sayı olan 4'ün oldukça atında kalmıştır. Bu gelişme, aktif sigortalıların primleriyle mevcut aylık ödemelerinin finanse edildiği dağıtım esaslı sistem açısından finansman baskısına işaret etmektedir. Zira aktif sigortalı sayısındaki artış, aylık veya gelir alan kişi sayısındaki artışın gerisinde kalmıştır. Bu eğilim, sosyal güvenlik sisteminin uzun vadeli mali sürdürülebilirliği bakımından dikkatle izlenmesi gereken bir gelişmedir. Bununla birlikte, aktüeryal denge

yalnızca sigortalı ve aylık alan kişi sayılarına bağlı değildir; ücret düzeyleri, prim tahsilat oranları, emekli aylıklarının seviyesi, devlet katkıları ve istihdam yapısı da belirleyici olabilmektedir.

Tablo 10: Sosyal Güvenlik/GSMH Oranları (2020-2026)

Gösterge/Yıl	2020	2021	2022	2023	2024	2025(1)	2026(2)
Faktör Gelirleri	0,05	0,11	0,03	0,06	0,11	0,03	0,02
Fonlar	-1,78	-0,84	-0,64	-0,63	-0,72	-1,04	-0,78
Cari Transferler	1,40	0,26	0,32	0,20	0,08	0,42	0,06
Borçlanma Gereği	0,34	0,47	0,29	0,37	0,53	0,59	0,71

Kaynak: TCCB, (2026c). 1: Gerçekleşme Tahmini 2: Program

Tablo 10'a göre 2020-2026 dönemine ilişkin veriler, sosyal güvenlik sisteminin GSMH ile ilişkili faktör gelirleri, fonlar, cari transferler ve borçlanma gereği göstergelerinde yıllar itibarıyla dalgalanmalar yaşandığını ortaya koymaktadır. Özellikle borçlanma gereğinin dönem boyunca genel olarak yükselmesi, sosyal güvenlik sisteminin finansman ihtiyacının makroekonomik göstergeler açısından önemini koruduğuna işaret etmektedir. Ancak önem içi dalgalanmalar, cari transferlerin GSMH içindeki ağırlığının istikrarlı bir seyir izlemediğini de göstermektedir. Borçlanma gereğinin GSMH'ye oranındaki artış finansman ihtiyacı doğurma potansiyeline sahip olsa da bu durum prim gelirleri, devlet katkıları, fon dengesi ve harcama artışlarının birlikte ele alınmasını gerektirmektedir.

Sosyal Güvenlik Kurumu da bütçe uygulamaları bakımından Sayıştay denetimine tabidir. Bu kapsamda yapılan denetimlerde ciddi mali sapmalara ilişkin tespit ve bulgulara ulaşılmamakla birlikte en son 2025 yılı itibariyle yayımlanan raporda "*MOSİP programı ile kurum alacaklarının takip edildiği yazılımlar arasında entegrasyonun sağlanamadığı ve bazı prim alacaklarının tahakkuk esasına göre muhasebeleştirilmemesi nedeniyle kurum alacaklarının mali tablolarda hatalı yer aldığı*" ve "*Genel Sağlık Sigortası primlerinin tahakkuk ve tahsiline ilişkin hatalı uygulamaların bulunması*" hususlarına yer verilmiştir (Sayıştay, 2025).

4. AKTÜERYAL DENGEYE İLİŞKİN STRATEJİK YÖNETİMİN TEMEL NOKTALARI

Bu başlık altında 12 inci Kalkınma Planı (2024-2028), Orta Vadeli Program (2025-2027), Cumhurbaşkanlığı Yıllık Programı (2025) ve Sosyal Güvenlik Kurumu tarafından yayımlanan İdare Faaliyet Raporunda (2025) yer alan temel politika ve öncelik alanları incelenecektir.

4.1. On İkinci Kalkınma Planı (2024-2028)

Kalkınma planları genel olarak Türkiye'nin kalkınma hedeflerini belirleyen, kamu politikalarına yön veren, sosyal refahın artırılmasına ve büyüme, istihdam, yatırım, üretim ve kamu maliyesine ilişkin politika çerçevesini ortaya koyan ve bütün olarak bu konulara ilişkin öncelikli amaç ve hedefleri içeren, belirlediği çerçevede kamu ve özel sektör ile tüm paydaşların ortak hareket ermesini sağlayan temel stratejik belgedir. Kalkınma planları makroekonomik ölçütlere, yönlendirme, kaynak gösterme, izleme ve değerlendirmeye yönelik çeşitli ölçütleri barındırmaktadır. Sosyal güvenlik sistemi de istihdam, yaşlanma, gelirler ve sağlık harcamaları ile kamu maliyesi bağlamında kalkınma planlarıyla doğrudan ilişkilidir ve sistemin finansman yapısının güçlendirilmesi, sosyal korumanın sürdürülmesi ve planlar uzun vadeli mali sürdürülebilirliğin desteklenmesi bakımından önemli bir politika çerçevesi sunmaktadır. Türkiye'de halihazırda On İkinci Kalkınma Planı (2024-2028) yürürlüktedir.

On İkinci Kalkınma Planında özetle "politika alanları (temel hedef vetedbirler); "sosyal güvenlik kapsamı (farklı meslek ve gelir gruplarının sisteme katılımının kolaylaştırılması)", "prim gelirleri (kayıt dışı istihdam ve kayıt dışı ücretle mücadele edilerek prim tabanının genişletilmesi)", "aktüeryal denge (emeklilik ve sağlık harcamalarının uzun vadeli mali sürdürülebilirliğinin güçlendirilmesi)", "emeklilik sistemi (aylık bağlama sisteminin istihdamı teşvik edecek ve mali sürdürülebilirliği destekleyecek biçimde düzenlenmesi)", "yaşlanan nüfus (uzun süreli bakım sigortası ve mesleki rehabilitasyon uygulamalarının geliştirilmesi)", "tamamlayıcı sistemler (bireysel emeklilik sistemi (BES), otomatik katılım sistemi (OKS) ve tamamlayıcı emeklilik ve sağlık sistemlerinin desteklenmesi)", "sağlık harcamaları (ilaç, tedavi ve geri ödeme süreçlerinin daha etkin yönetilmesi)" ve "kurumsal kapasite (SGK'nın dijital altyapısının güçlendirilmesi, veri paylaşımının artırılması ve denetimlerin risk analizine dayandırılması)" olarak yer almıştır. Planda aktif sigortalıların aylık veya gelir alan kişilere oranı 2020'de 1,87 iken 2025'te 1,55'e gerilediği; bu durumun aktif sigortalı sayısının aylık alan kişi sayısına kıyasla daha yavaş arttığını ve bu açıdan aktüeryal dengeyi güçlendirme hedefine vurgu yapılmaktadır. Plan'ın uzun vadeli vizyonunda yaşlanan nüfus, kadınların işgücüne katılımı, nitelikli istihdam ve sosyal güvenlik sistemlerinin etkinliği öne çıkmaktadır. Plan'da sosyal güvenlik sisteminin kısa vadeli finansman ihtiyaçlarının karşılanmasının ötesinde, demografik değişimlere uyum sağlayan ve uzun vadeli mali sürdürülebilirliği gözeten bir yapıya kavuşturulması

amacına yer verilmiştir. Bu çerçevede kayıtlı istihdamın artırılması, prim tahsilatlarının güçlendirilmesi, emeklilik ve sağlık harcamalarının etkin yönetilmesi, tamamlayıcı emeklilik ve bakım sigortası uygulamalarının geliştirilmesi temel politika araçları olarak değerlendirilebilecektir. Netice itibarıyla On İkinci Kalkınma Planı sosyal güvenlik sisteminde mali sürdürülebilirlik ile sosyal adalet arasında denge kurmayı hedefleyen stratejik bir politika çerçevesi sunmaktadır (TCCB, 2023; SGK, 2026a:52-56).

Tablo 11: Sosyal Güvenlik Sistemine İlişkin Hedefler

Gösterge/Yıl	2022	2023[1]	2028[2]
SGK'ya Yapılan Bütçe Transferlerinin GSMH'ya Oranı (%)	2,6	3,6	3
Dosya Bazında Aktif/Pasif Oranı[3]	1,9	1,6	1,7
Toplam Prim Tahsilat Oranı (%)	85	85	90
Sosyal Sigorta Kapsamı	89	089	92

Kaynak: TCCB, (2023:77). 1: Gerçekleşme Tahmini 2: Plan Hedefi 3: Stajyer, kursiyer, çırak verileri hariç, sosyal güvenlik destek tabi olanların sayıları dahildir.

Tablo 11'de 2022-2028 döneminde sosyal güvenlik sisteminin mali sürdürülebilirliğini güçlendirmeye ve bütçe üzerindeki finansman yükünü azaltmaya yönelik hedefler yer almaktadır. Bu bağlamda SGK'ya yapılan bütçe transferlerinin GSMH'ye oranının 2023'te %3,6'dan 2028'de %3'e düşürülmesi, kamu kaynaklarına duyulan ihtiyacın azaltılmasının, dosya bazında aktif/pasif oranının 1,6'dan 1,7'ye yükseltilmesinin prim ödeyen sigortalılar ile aylık alanlar arasındaki dengenin iyileştirilmesinin ve prim tahsilat oranının %85'ten %90'a, sosyal sigorta kapsamının ise %89'dan %92'ye çıkarılmasının sistemin gelir kapasitesini ve kapsayıcılığını artırmaya yönelik hedefleri göstermektedir.

Tablo 12: İstihdam ve Çalışma Hayatı Hedefleri

Gösterge/Yıl	2022	2023	2028[1]
İşgücüne Katılma Oranı, Toplam (%)	53,1	53,7	56,7
İşgücüne Katılma Oranı, Kadın (%)	35,1	35,9	40,1
İstihdam Oranı (%)	47,5	48,3	52,5
İşsizlik Oranı (%)	10,4	10,1	7,5
İşsizlik Oranı, Genç Nüfus (%)	19,4	18,5	16,6
Kısmi Süreli Çalışan Oranı (%)	9,7	10,0	12,3
Kayıt Dışı İstihdam Oranı (%)	26,8	26,5	23,4
Ölümlü İş Kazası Oranı (‰)	6,6	6,6	6,2

Kaynak: TCCB, (2023:69). 1: Plan Hedefi

Tablo 12'de 2022-2028 dönemine ilişkin işgücü piyasasında istihdamın artırılmasına, işsizliğin azaltılmasına ve çalışma koşullarının iyileştirilmesine yönelik hedefler yer almaktadır. İşgücüne katılma, kadınların işgücüne katılma oranlarındaki artış esasında işgücü arzının genişletilmesine yönelik önemli hedefleri ortaya koymaktadır. Aynı şekilde istihdam oranının yükseltilmesi ve toplam işsizlik oranının düşürülmesi de daha fazla kişiye iş imkânı sağlanmasının amaçlandığını göstermektedir. Kayıt dışı istihdam oranının indirilmesi, sosyal güvenlik sisteminin prim tabanının genişletilmesi ve çalışanların sosyal güvencelerinin artırılması açısından önem taşımaktadır.

Tablo 13: Nüfus ve Yaşlanma Hedefleri

Gösterge/Yıl	2022	2023	2028[1]
Toplam Doğurganlık Hızı (Kadın Başına Çocuk Sayısı)	1,62	1,7	2,1
65 Yaşındakilerin Hayatta Kalma Beklentisi (Yıl)[2]	17,1	17,5	18,4
Kadın	18,8	19,2	20,1
Erkek	15,3	15,7	16,6
65 Yaş ve Üstü Nüfusun İşgücüne Katılım Oranı (%)	12,1	12,3	12,7

Kaynak: TCCB, (2023:203). 1: Plan Hedefi 2: 2020-2022 dönemine ilişkin veridir.

Tablo13'te 2022-2028 döneminde Türkiye'nin demografik yapısına ilişkin hedefler ve sosyal güvenlik sistemi üzerindeki olası etkileri yer almaktadır. Toplam doğurganlık hızında artış hedeflenmesi, nüfusun yenilenmesini ve uzun vadede demografik dengenin korunmasını amaçlamaktadır. Buna karşılık, 65 yaşındaki bireylerin

hayatta kalma beklentisinin yükselmesi, emeklilik ve sağlık harcamalarının uzun vadede artabileceğine işaret etmektedir.

4.2. Cumhurbaşkanlığı Yıllık Programı (2025)

Cumhurbaşkanlığı Yıllık Programında "sosyal güvenlik kapsamının genişletilmesi (farklı meslek ve gelir gruplarının sosyal güvenlik sistemine katılımı kolaylaştırılarak sigortalı sayısının artırılması)", "prim tabanının güçlendirilmesi (kayıtlı istihdamın artırılması ve yeni sigorta uygulamalarının geliştirilmesiyle prim gelirlerinin genişletilmesi)", "mikro sigorta uygulamaları (düşük gelirli esnaf, sanatkâr, çiftçi ve mevsimlik çalışanlar için özel sigorta programları geliştirilmesi)", "esnek çalışma modellerine uyum (uzaktan, hibrit ve kısmi süreli çalışma biçimlerinin sosyal güvenlik mevzuatına uyumlaştırılması)", "aktüeryal denge (sosyal güvenlik sisteminin gelirleri ile uzun vadeli yükümlülükleri arasındaki dengenin güçlendirilmesi)", "emeklilik sisteminin düzenlenmesi (aylık bağlama sisteminin çalışma hayatında daha uzun süre kalmayı teşvik edecek ve mali sürdürülebilirliği destekleyecek biçimde geliştirilmesi)", "otomatik ayarlama mekanizmaları (emeklilik yaşının beklenen yaşam süresindeki değişimlerle uyumlu belirlenmesine yönelik mekanizmalar üzerinde çalışılması)", "uzun vadeli mali izleme (sosyal güvenlik sisteminin mali görünümünün düzenli olarak izlenmesi ve raporlanması)", "yaşlı bakım sigortası (yaşlanan nüfusun uzun süreli bakım ihtiyaçlarının finansmanına yönelik bir sigorta modelinin geliştirilmesi)", "mesleki rehabilitasyon (sürekli iş göremezlik geliri veya maluliyet aylığı alan kişilerin yeniden istihdama katılımının desteklenmesi)", "prim tahsilatlarının artırılması (prim borçlarının takip ve tahsilat süreçlerinin etkinleştirilerek SGK gelirlerinin artırılması), "kayıt dışı istihdamla mücadele (risk analizine dayalı denetimlerle kayıt dışı çalışma ve eksik ücret bildirimlerinin azaltılması)", "dijitalleşme ve veri paylaşımı (SGK'nın bilişim kapasitesinin geliştirilmesi ve kurumlar arası veri paylaşımının artırılmasıyla hizmetlerin hızlandırılması)", "ilaç geri ödeme politikaları (ilaçların maliyet ve etkinlik değerlendirmeleri doğrultusunda geri ödeme sisteminin daha verimli hâle getirilmesi)", "sağlık harcamalarının kontrolü (gereksiz hizmet talebinin önlenmesi ve akılcı ilaç kullanımının teşvik edilmesiyle sağlık harcamalarının sürdürülebilirliği)", "değer bazlı geri ödeme (sağlık hizmetlerinin finansmanında elde edilen klinik sonuçları ve maliyet etkinliğini dikkate alan yöntemlerin yaygınlaştırılması)", "yapay zekâ destekli denetim (sağlık hizmet sunucularının denetiminde risk analizinden yararlanılarak usulsüzlüklerin ve etkin olmayan harcamaların azaltılması)", "sağlık hizmetlerinde veri analizi (anonimleştirilmiş sağlık verileri kullanılarak gelecekteki hizmet ve harcama ihtiyaçlarının planlanması)", "engellilerin sağlık hizmetlerine erişimi (engelli bireylerin ihtiyaç duyduğu tıbbi malzemelere erişiminin kolaylaştırılması ve geri ödeme düzenlemelerinin geliştirilmesi)" ve "sosyal güvenlik hizmetlerinin etkinliği (istihdam teşviklerinin gözden geçirilmesi ve bürokrasinin azaltılması yoluyla daha sade, erişilebilir ve etkili bir sistem oluşturulması)" alanlarına ilişkin 28 faaliyetin izleme ve değerlendirme ölçütlerine yer verilmiştir (TCCB, 2025c; SGK, 2026a:58-60).

Bu ölçütler sosyal güvenlik sisteminin kapsayıcılığını artırma, prim gelirlerini güçlendirme, kayıt dışılıkla mücadele etme ve emeklilik ile sağlık harcamalarını kontrol altında tutma hedefleri etrafında birleşmektedir. Bu hedeflerin birlikte gerçekleştirilmesi, SGK'nın uzun vadeli mali sürdürülebilirliğinin ve hizmet sunum kapasitesinin güçlendirilmesi açısından önem taşımaktadır.

4.3. Orta Vadeli Program (2025-2027)

Türkiye ekonomisinin önümüzdeki üç yıllık döneme ilişkin yol haritasını ortaya koyan Orta Vadeli Program (OVP), kalkınma vizyonunu makroekonomik politikalarla bütünleştiren ve kamu kaynaklarının stratejik öncelikler doğrultusunda tahsisini yönlendiren temel politika belgesidir. Söz konusu Programda "kamu harcamalarında etkinlik (kamu kaynaklarının verimli kullanılması ve gereksiz harcamaların azaltılması)", "mali disiplin (bütçe dengesinin korunması ve kamu maliyesinin sürdürülebilirliğinin güçlendirilmesi)", "dijitalleşme ve yapay zekâ (kamu yönetimi, mali işlemler ve denetim süreçlerinde dijital teknolojilerin yaygınlaştırılması), "mali şeffaflık ve hesap verebilirlik (kamu mali işlemlerinin izlenebilirliğinin ve hesap verebilirliğinin artırılması)", "kayıt dışılıkla mücadele (risk odaklı denetimler ve veri analizleriyle kayıt dışı ekonomi ve istihdamın azaltılması)", "vergide adalet ve etkinlik (vergi tabanının genişletilmesi ve vergi gelirlerinin eksiksiz tahsil edilmesi)", "sosyal güvenliğin mali sürdürülebilirliği (sosyal güvenlik sisteminin uzun vadeli mali dengesinin korunması ve güçlendirilmesi), "sosyal güvenlik kapsamı (farklı meslek ve gelir gruplarının sosyal güvenlik sistemine katılımının artırılması), "prim tahsilatı (prim borçlarının etkin takibi ve tahsilatıyla sosyal güvenlik gelirlerinin artırılması)", "emeklilik sistemi (aktüeryal dengeyi ve hakkaniyeti gözeten, çalışma hayatında kalmayı teşvik eden düzenlemelerin güçlendirilmesi)", "yeni nesil çalışma modelleri (esnek, uzaktan ve hibrit çalışma biçimlerinin sosyal güvenlik mevzuatına uyumlu hâle getirilmesi)", "istihdamın artırılması (kadınların, gençlerin ve engellilerin işgücüne

katılımının ve istihdam olanaklarının artırılması)", "mesleki eğitim ve beceri uyumu (eğitim programlarının işgücü piyasasının ihtiyaçlarına ve dijital-yeşil dönüşüme uygun hâle getirilmesi)", "sağlık harcamalarının yönetimi (ilaç ve tedavi harcamalarının etkin geri ödeme ve denetim mekanizmalarıyla kontrol edilmesi)", "birinci basamak sağlık hizmetleri (koruyucu ve önleyici sağlık hizmetlerinin güçlendirilerek sağlık sisteminin verimliliğinin artırılması)", "uzun dönemli bakım sigortası (yaşlanan nüfusun bakım ihtiyaçlarının sürdürülebilir biçimde finanse edilmesine yönelik altyapı oluşturulması)" ve "sosyal yardım sistemi (ihtiyaç sahiplerini destekleyen ve istihdama katılımı teşvik eden bütünleşik bir sosyal yardım sisteminin geliştirilmesi)" konularına ilişkin açıklamalara yer verilmiştir. (TCCB, 2025b; SGK, 2026a:57).

Bu bağlamda Programda Kalkınma Planında ve Yıllık Programda belirtilen hususlarla bağlantılı olarak sosyal güvenlik sisteminin mali sürdürülebilirliğinin sağlanması için prim tahsilatlarının artırılması, kayıt dışı istihdamın azaltılması ve sosyal güvenlik kapsamının genişletilmesi hedeflenmektedir. İstihdam politikalarında kadınların, gençlerin ve dezavantajlı grupların işgücüne katılımının artırılması ile mesleki becerilerin geliştirilmesine önem verilmektedir. Sağlık harcamalarının kontrolü, uzun dönemli bakım sigortasının geliştirilmesi ve sosyal yardım sisteminin güçlendirilmesi, nüfusun değişen ihtiyaçlarına yönelik temel politika alanlarını oluşturmaktadır.

4.4. Sosyal Güvenlik Kurumu Stratejik Planı (2024-2028)

Sosyal Güvenlik Kurumu tarafından yayımlana 2024-2028 yıllarına ilişkin Stratejik Planda "prim gelirlerinin artırılması (prim tahakkuk ve tahsilatının artırılması, prim borçlarının etkin biçimde tahsil edilmesi)", "sosyal güvenliğin yaygınlaştırılması (sosyal güvenlik kapsamının genişletilerek farklı meslek ve gelir gruplarının sisteme katılımının artırılması)", "kayıt dışı istihdamla mücadele (risk odaklı denetimler ve teknolojik analizler yoluyla kayıt dışı istihdamın azaltılması)", "mali sürdürülebilirliğin sağlanması (sosyal güvenlik sisteminin aktüeryal dengesinin korunması ve uzun vadeli mali yapısının güçlendirilmesi)", "sağlık harcamalarının kontrolü (sağlık hizmetlerine erişim kısıtlanmadan ilaç ve tedavi harcamalarının etkin yönetilmesi)", "sağlık hizmetlerinde etkinlik (akılcı ilaç kullanımı, değer bazlı geri ödeme ve etkili denetim mekanizmalarıyla sağlık kaynaklarının verimli kullanılması)", "hizmet kalitesi ve memnuniyet (SGK hizmetlerinin kalitesinin ve erişilebilirliğinin artırılarak hizmet alanların memnuniyetinin yükseltilmesi)", "kurumsal yönetimin geliştirilmesi (insan kaynakları, hukuk, eğitim ve varlık yönetimi alanlarında kurumsal kapasitenin güçlendirilmesi)","bilişim altyapısının geliştirilmesi (dijital sistemlerin ve kurumlar arası veri paylaşımının geliştirilmesiyle hizmet sunumunun hızlandırılması)", "istihdam teşviklerinin etkinleştirilmesi (kadınlar, gençler ve engellilere yönelik teşviklerin güçlendirilerek istihdama katılımın artırılması)", "esnek çalışma modellerine uyum (sosyal güvenlik mevzuatının dijital, kısmi süreli ve diğer esnek çalışma biçimlerine uyumlu hâle getirilmesi)", "sosyal güvenlik bilincinin artırılması (toplumda sosyal güvenlik ve prim ödeme bilincinin geliştirilmesiyle sisteme katılımın ve gönüllü uyumun artırılması)", "denetim ve kontrol mekanizmalarının güçlendirilmesi (prim tahsilatı, kayıt dışılık ve sağlık geri ödemelerine yönelik denetimlerin etkinliğinin artırılması)" ve "araştırma ve politika geliştirme (sosyal güvenlik ve sağlık sigortacılığı alanlarında araştırmalar yapılarak kanıta dayalı politikaların geliştirilmesi) amaç ve hedeflerine ilişkin açıklamalara yer verilmiştir (SGK, 2024; SGK, 2026a).

Stratejik Planında yer alan bu hususlar Kurumun mali sürdürülebilirliğini güçlendirmeyi ve sosyal güvenlik sisteminin etkinliğini artırmayı amaçlamaktadır. Prim gelirlerinin artırılması, kayıt dışı istihdamın azaltılması ve sosyal güvenlik kapsamının genişletilmesi, sistemin finansal yapısını güçlendiren temel öncelikler olarak öne çıkmaktadır. Sağlık harcamalarının kontrol altında tutulması ve kaynakların verimli kullanılması, sağlık hizmetlerine erişimin korunarak mali sürdürülebilirliğin sağlanmasına katkıda bulunacağına işaret etmektedir. Neticede söz konusu amaç ve hedefler sosyal güvenlik sisteminin daha kapsayıcı, verimli, teknolojik gelişmelere uyumlu ve uzun vadede sürdürülebilir bir yapıya kavuşturulmasını öngörmektedir.

Tablo 14: Sosyal Güvenlik Kurumları Mali Kaynak Analizi (2024-2028)

2024	2025	2026	2027	2028	Toplam Kaynak
39.995.743.000	47.047.236.962	52.738.066.000	59.800.137.998	67.910.278.000	267.491.461.960

Kaynak: (SGK, 2024:44 Tablo 19) 1: Cari transfer harcamaları dahi değildir 2: Artışlarda 2026 OVP oranı (%13,4) kullanılmıştır.

Tablo 14'te yer alan veriler, bütçe kaynaklarının yıllar itibarıyla düzenli bir artış gösterdiğini ortaya koymaktadır. 2024-2028 döneminde kaynak miktarının yaklaşık %69,8 oranında artması, sosyal güvenlik hizmetlerinin finansmanına ayrılan kaynağın önemli ölçüde genişlediğini göstermektedir. Beş yıllık toplam 267,49 milyar TL'lik kaynağın etkin ve verimli kullanılması, SGK hizmetlerinin sürdürülebilirliği ve sosyal güvenlik sisteminin mali dengesi açısından önemli olduğu açıktır ancak bütçenin bu durumun aktif/pasif sigortalı sayısı, prim gelirleri, devlet katkıları, fon dengesi ve harcama artışları gibi değişkenlerle birlikte dikkate alınması gerekmektedir.

4.5. Sosyal Güvenlik Kurumu İdare Faaliyet Raporu (2025)

Sosyal Güvenlik Kurumu tarafından yayımlanan İdare Faaliyet Raporunda "ek ödeme gelirleri (bütçe tahminine göre %2 artarak 156,7 milyar TL olarak gerçekleştiği)", "faturalı ödeme gelirleri (bütçe öngörüsünü %15,7 aşarak 414,5 milyar TL'ye yükseldiği)", "diğer gelirler (bütçe tahminine göre %198,9 artarak yaklaşık 92 milyar TL'ye ulaştığı; terkin tutarları, doğal afet katılım payları ve özelleştirme kaynaklı aktarımların bu artışta etkili olduğu)", "emekli aylıkları giderleri (bütçede öngörülen yaklaşık 3.684 milyar TL'yi %2,5 aşarak 3.775,5 milyar TL olarak gerçekleştiği)", "sağlık giderleri (bütçeye göre %5,4 artarak 1.353,1 milyar TL'ye ulaştığı)", "faturalı ödeme giderleri (bütçe tahminine göre %12,4 artarak 179,8 milyar TL olduğu)", "diğer sigorta ödemeleri (emzirme, cenaze, evlenme ve geçici iş göremezlik ödemelerinden oluşan giderlerin bütçeye göre %10,2 artarak 47,2 milyar TL'ye ulaştığı)", "diğer giderler (yönetim, yatırım ve komisyon giderlerini kapsayan bu kalemin, 2025 yılında bütçe tahmininin %26,4 altında gerçekleştiği)", "gelir-gider dengesi (gelirlerin bütçe tahminlerini aşması ve giderlerin öngörülenden daha sınırlı artması, SGK'nın gelir-gider dengesinin iyileşmesine katkıda bulunduğu)", "açık finansmanı (bütçe öngörüsüne göre %86,4 azalarak 75 milyar TL olarak gerçekleştiği)", "aktif sigortalı sayısı (aralık 2025 itibarıyla 26.328.559 kişiye ulaşan aktif sigortalıların SGK'nın prim gelirlerini destekleyen temel unsurlardan biri olduğu)", "pasif sigortalı sayısı (aralık 2025 itibarıyla 17.015.688 kişiye ulaşan pasif sigortalı sayısının emeklilik ve diğer uzun vadeli sigorta ödemeleri üzerindeki yükün göstergesi olduğu)" ve "sosyal güvenlik kapsamı (sosyal sigorta kapsamındaki 77.701.187 kişinin Türkiye nüfusunun yaklaşık %90'ına karşılık gelerek SGK'nın geniş hizmet alanını ortaya koyduğu)"hususlarına ilişkin açıklamalara yer verilmiştir (SGK, 2026a).

Bu bağlamda Raporda yer alan verilere göre 2025 yılı SGK bütçesinde prim yapılandırma gelirleri, devlet katkısı ve diğer gelir kalemlerindeki artışlar, kurumun mali dengesini olumlu yönde etkilemiştir. Özellikle prim gelirlerinin bütçe beklentilerini aşması ve çeşitli ek gelirlerin elde edilmesi, açık finansmanı ihtiyacının önemli ölçüde azalmasını sağlamıştır. Buna karşılık emekli aylıkları ve sağlık giderlerindeki artışlar, sosyal güvenlik sisteminin harcama yükünün sürdüğünü göstermektedir. Aktif sigortalı sayısındaki artış gelir tabanını desteklerken pasif sigortalı sayısındaki yükseliş, sistemin uzun vadeli finansman ihtiyacını artırabilecek bir unsur olarak öne çıkmaktadır. Bu nedenle SGK bütçesinin sürdürülebilirliği açısından kayıtlı istihdamın artırılması, prim tahsilatının güçlendirilmesi ve sosyal güvenlik harcamalarının etkin biçimde yönetilmesi önem taşımaktadır.

5. SONUÇ

Türkiye'de sosyal güvenlik sisteminin finansmanı temelde sigortalardan sağlanan prim tahsilatına dayanmaktadır. Ancak sistemin mali açıdan sürdürülebilirliği aktüeryal dengeye ilişkin rasyoya (4 aktif sigortalıya 1 pasif sigortalı) bağlı olduğundan, bu koşulun sağlanması sisteme yönelik mali risklerin stratejik yönetim anlayışı çerçevesinde ele alınmasını gerekli kılmaktadır.

Çalışmada sosyal güvenlik ve aktüeryal dengenin teorik boyutu üzerinde durulmuş ve temel istatistikler değerlendirilmiş ve aktüeryal deneye ilişkin yönetim stratejisinin temel unsurları politika, strateji ve planlama belgeleri üzerinden incelenmiştir. Bu bağlamda stratejik yönetimin hareket noktasını oluşturan mali sorunlar; prim gelirlerinin yetersizliği ve tahsilat sorunları, kayıt dışı istihdam, düşük ücret üzerinden prim ödenmesi, erken emeklilik uygulamaları, emekli aylıkları ve sağlık harcamalarının yüksek seyri, bütçe transferine bağımlılık, enflasyon şeklinde ortaya konuldu görülmektedir. Ayrıca nüfusun yaşlanması, doğurganlık oranlarının düşmesi, yaşam beklentisinin artması, aktif/pasif sigortalı oranının düşmesi, genç işsizliği ve istihdama geç katılım, kadınların iş gücüne katılımının sınırlı olması ve göç ve iş gücü hareketliliği bu kapsamda değerlendirilmiştir. Bu bağlamda toplumun tamamını ilgilendiren boyutu göz önünde bulundurularak On İkinci Kalkınma Planı, Orta Vadeli Program, Cumhurbaşkanlığı Yıllık Programı ve Sosyal Güvenlik Kurumu stratejik yönetim belgelerinde kayıt dışı istihdamın azaltılması, iş gücüne katılımın artırılması, prim tahsilatının güçlendirilmesi ve uzun vadeli aktüeryal projeksiyonlara dayalı mali risk yönetiminin geliştirilmesi hedeflerine yer verilmiştir. Bununla birlikte aktüeryal dengenin sürdürülebilirliği uzun dönemli bir stratejik açılıma dayandırılması gerekirken Kamu Mali Yönetimi Kontrol Kanunu esaslarına göre en fazla üç yıllık bir dönem için öngörüler içermektedir. Bu sürenin bütçe mevzuatına uygun ancak aktüeryal dengenin sağlanması ve korunması bağlamında kısa olduğu düşünülmektedir.

Öte yandan sosyal sigortalar alanında bir reforma ihtiyaç olduğu görülmektedir. Bu bağlamda gelir/gider dengesinin sağlanması bağlamında erken emekliliğin sınırlandırılması, sağlık harcamalarının etkin yönetimi, ilaç ve tıbbi malzeme tedarike yönelik önlemler, sistemden usulsüz ödemelerin önüne geçilmesi ile emeklilik ve sağlık politikalarında uzun vadeli planlama yapılması ve etkin bir denetim sisteminin yönetilmesi reformla çözüme kavuşturulacak öncelikli konular arasındadır. Zira sosyal güvenlik sisteminin mali sürdürülebilirliği, aktif sigortalıların ödediği primlerle pasif sigortalılara yapılan ödemeler arasındaki dengenin korunmasına bağlıdır. Aktif sigortalı sayısının pasif sigortalı sayısına oranla yetersiz kalması, sistemin finansman yükünü artırarak bütçe

açıklarının büyümesine neden olabilmektedir. Bu nedenle sosyal güvenlik sisteminde mali sürdürülebilirliğin sağlanması, yalnızca gelirlerin artırılmasıyla değil, harcamaların etkin yönetilmesi ve aktif-pasif sigortalı dengesini etkileyen yapısal sorunların uzun vadeli bir bakış açısıyla ele alınmasıyla mümkün olabilir. Bu noktada stratejik yönetim yaklaşımı; mevcut kaynakların etkin kullanılması, risklerin önceden belirlenmesi, ölçülebilir hedeflerin oluşturulması ve politikaların sonuçlarının düzenli olarak değerlendirilmesi açısından önemli bir araçtır.

KAYNAKÇA

Kitap/Makale/Tebliğ/Tez

Akçay, G. (2016). Kurumsal Risk Yönetiminde İç Denetimin Rolü ve Kamu İdarelerinde Yaşanan Gelişmeler. Denetişim, 7, 25-46.

Akdoğan, A. (2009). Kamu Maliyesi. 13. Baskı. Ankara: Gazi.

Analiz. (2026). "SGK'ya Aktarılan Devlet Katkısı 18 Yıl Sonra Kaldırıldı", https://analizgazetesi.com.tr (Erişim Tarihi: 7.9.2026).

Alan, T. (2023). Türkiye ve Dünyada Sosyal Güvenlik Sistemlerinin Karşılaştırılması ve Sürdürülebilirlikleri. International Journal of Sustainability-INTJOS, 1(1), 58-77.

Artuç, T., & Canbay, T. (2024). Sosyal Devlet Anlayışı Kapsamında Bir Karşılaştırma: Türkiye-Almanya Örneği. Jass Studies-The Journal of Academic Social Science Studies, 17(99), 489-514.

Asunakutlu, T. (2001). Sigorta Açısından Güvenlik ve Risk. Mevzuat Dergisi, 4(43). https://www.mevzuatdergisi.com (Erişim Tarihi: 29.8.2026).

Ayhan, A. (2012). Sosyal Güvenlik Kavramı ve Sosyal Güvenlik İlkeleri. Sosyal Güvenlik Dergisi, 2(1), 41-55.

Barca, M. (2022). "Stratejik Yönetim", TÜBİTAK Sosyal Bilimler Ansiklopedisi https://ansiklopedi.tubitak.gov.tr (Erişim Tarihi: 29.8.2026).

Bayrak, C. (1991). Yönetim Kavramı ve Yurt Kavramı. Anadolu Üniversitesi Eğitim Fakültesi Dergisi, 4(1-2), 35-53.

Bolukçu, F. (2020). Türkiye'nin Sosyal Güvenlik Harcamalarının Kapsamı ve Finansmanı. Türkiye Sağlık Bilimleri ve Araştırmaları Dergisi, 2(2), 11-27.

Bulut, M. (2019a). Emeklilikte Yaşa Takılma Sorununun Ekonomik Gerekçeleri ve "Hak" Kavramı Çerçevesinde Analizi. İş ve Hayat Dergisi, 5(9), 162-169.

Bulut, M. (2019b). Türkiye'de Sosyal Güvenliğin Finansmanında Devlet Katkısı Uygulaması ve İstatistiksel Görünüm. Sayıştay Dergisi, Sayı: 115: 83-108.

Çelik, T. (2024). Kayıt Dışı İstihdamla Mücadele: Sosyal Güvenlik Denetmenlerinin Bakış Açısı Üzerinden Bir Araştırma. Sosyal Güvence, 26, 1424-1441.

Çinar, A. (-). "Sosyal Güvenlik ve Aktüeryal Denge-Bölüm 1", https://www.muhasebekulisi.com (Erişim Tarihi: 7.9.2026).

Çinar, A. (-). "Sosyal Güvenlik ve Aktüeryal Denge-Bölüm 2", https://www.muhasebekulisi.com (Erişim Tarihi: 7.9.2026).

Egeli, H. (2013). Parafiskalite ve Parafiskal Yükümlülükler (Sosyal Güvenlik Reformu Kapsamında). 3. Baskı. İzmir: Altın Nokta.

Erdem, O.N. (2017). Türkiye'de Kamu Emeklilik Sistemlerinin Aktüeryal Modellemesi-Planlama Uzmanlığı Tezi. Ankara: T.C. Kalkınma Bakanlığı Yayınları No: 2969.

Esen, B. (2024). Makroekonomik İstikrar Açısından Kritik Önemde Bir Unsur Olarak Türk Sosyal Güvenlik Sisteminin Sürdürülebilirliği ve Reforma İlişkin Öneriler. Stratejist, 1, 50-65.

Gökbayrak, Ş. (2010). Türkiye'de Sosyal Güvenliğin Dönüşümü. Çalışma ve Toplum, 2(25), 141-162.

Gümüş, E., Çelikay, F., & Öz Yalama, G. (2014). "Küresel Eğilimler Bağlamında Sosyal Güvenlik: Sorunlar Ve Değerlendirmeler." (içinde 65-100). Prof.Dr. Fazıl Tekin'e Armağan. Eskişehir Osmangazi Üniversitesi İktisadi ve İdari Bilimler Fakültesi Maliye Bölümü.(Ed.: Erdal Gümüş, Ali Çelikkaya, Emrah Ferhatoğlu, Murat Aslan, Erhan Gümüş, Semih Bilge, Melih Çildir). Eskişehir: Osmangazi Üniversitesi Basımevi.

Gürcan, N. (2022). Strateji Kavramının ve Stratejik Yönetimin Yeni Yönelim ve Kullanım Alanları Üzerine Bir İnceleme. Stratejik ve Sosyal Araştırmalar Dergisi, 6(2), 333-348.

Herekman, A. (1972). Teoride ve Türkiye'de Parafiskal Gelirler. Eskişehir: İktisadi ve İdari Bilimler Akademisi Yayınları No:1972.

Işık, A., Ay, H., Meriç, Y., & Baran, T. (2011). Türkiye'de Bireysel Emeklilik Sisteminde Vergisel Avantajlar ve Uygulamaları. Süleyman Demirel Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi, 16(1), 25-45.

Kara, B. (2025). Uzun Süreli Bakım Sigortasının Türkiye Bağlamında Politika Analizi. Hacettepe Sağlık İdaresi Dergisi, 28(1), 127-150.

Karaca, C., & Çam, Y. (2019). Türkiye'de Sosyal Devlet Anlayışının Değerlendirilmesi. Türkiye'de Sosyal Devlet Anlayışının Değerlendirilmesi. Maliye Dergisi, 176, 72-97.

Karaman, M. H. (2014). 5510 Sayılı Kanunda Tanımlı Sosyal Sigorta Statüleri ve Çakışan Sigortalılık İlişkisi. Marmara Üniversitesi Hukuk Fakültesi Hukuk Araştırmaları Dergisi, 20(1), 875-894.

Madendere, M.A. (2005). Kurumsal Risk Yönetiminde İç Denetim Rolü, (Çeviri/Derleme), TİDE Dökümanı.

Taşdemir, B. (2025). Sosyal Güvenlik Sistemine Yapılan Bütçe Transferlerinin Etkileri: Türkiye Örneği. Turkuaz Uluslararası Sosyo-Ekonomik Stratejik Araştırmalar Dergisi, 7(2), 70-98.

Öçal, M., & Boyacıoğlu, N. (2018). Sosyal Güvenlik Hizmetlerinin Finansman Yöntemleri: Türkiye'de ve Dünyada Sosyal Güvenliğin Finansmanına Kısa Bir Bakış. Mehmet Akif Ersoy Üniversitesi Sosyal Bilimler Enstitüsü Dergisi, 10(26), 910-923.

Özer, M.A. (2010). Türkiye'de Sigorta Sektörü ve Risk Yönetimi. Resüror, Milli Reasürans TAŞ, 14-32.

Özok, Ö. (2004). Sosyal Güvenlik. TBB Dergisi, 53, 31-34.

Sakal, M. (2003). Türkiye'de Mali Disiplin Sorunu: Kamu Açıkları ve Borçlanmanın Sürdürülebilirliği (1988-2000 Dönem Analizi). Ankara: Gazi.

Sayar, N. S. (1975). Kamu Maliyesi- Kamu Gider ve Gelirleri Prensipleri. C1, 5.B, İstanbul: İstanbul İktisadi ve İdari Bilimler Akademisi Yayınları No:256.

Tiritoğlu Ersoy, H.H. (2019). Türkiye'de Mültecilerin Çalışma ve Sosyal Güvenlik Hakları. Yıldırım Beyazıt Hukuk Dergisi, 2, 435-474.

Tuna, G. (2009). Genel Sağlık Sigortası Primini Basamaklandırmanın Aktüeryal Denge Üzerine Etkisi. (Sosyal Güvenlik Kurumu Uzmanlık Tezi). Ankara: Sosyal Güvenlik Kurumu.

Yanici Erdal, İ. Ö. (2019). Türkiye'de Kayıt Dışı İstihdam ve Kayıt Dışı İstihdamla Mücadele Politikaları. Ufuk Üniversitesi Sosyal Bilimler Enstitüsü Dergisi, 8(16), 225-246.

Yaşarlar, Y., & Bayraktar, Y. (2019). Sustainability of the Actuarial Balance: Turkey's Experience Between 1972-2013. Doğuş Üniversitesi Dergisi, 20(1), 141-158.

Yurdadoğ, V., Akça, H., & Bozatlı, O. (2019). Sürdürülebilir Sosyal Güvenlik Sistemi İçin Mali Kural Önerisi. Yönetim Ve Ekonomi Dergisi, 26(2), 651-675.

Yurt, Ş., & Şiman, Y. (2024). Kayıt Dışı İstihdam: Sosyal Adaletsizlikler. Çalışma İlişkileri Dergisi, 5(1), 63-84.

Mevzuat/Kurum Yayını/İstatistik

AnY. (1982). Türkiye Cumhuriyeti Anayasası. (RG; 9.11.1982, 17863).

SSGSS. (2006). 31.5.2006 tarihli ve 5510 sayılı Sosyal Sigortala ve Genel Sağlık Sigortası Kanunu. (RG; 6.6.2006, 26200).

GK. (1999). 27.10.1999 tarihli ve 4458 sayılı Gümrük Kanunu. (RG; 4.11.1999, 23866).

KMYKK. (2003). 10.12.2003 tarihli ve 5018 sayılı Kamu Mali Yönetimi ve Kontrol Kanunu. (RG; 24.12.2003, 25326).

HMB. (2026a). Sosyal Güvenlik Kurumları-Bütçe Dengesi 2016-2025, https://muhasebat.hmb.gov.tr (Erişim Tarihi: 9.9.2026).

HMB. (2026b). Sosyal Güvenlik Kurumları-Bütçe Harcamaları 2016-2025, https://muhasebat.hmb.gov.tr (Erişim Tarihi: 9.9.2026).

HMB. (2026c). Sosyal Güvenlik Kurumları-Bütçe Gelirleri 2016-2025, https://muhasebat.hmb.gov.tr (Erişim Tarihi: 9.9.2026).

Sayıştay. (2026). Sayıştay Başkanlığı 2025 yılı Sosyal Güvenlik Kurumu Denetim Raporu, https://www.sayistay.gov.tr (Erişim Tarihi: 1.10.2026).

SGK. (2013). Sosyal Güvenlik Terimleri, https://www.sgk.gov.tr (Erişim Tarihi: 1.9.2026).

SGK. (2024). Stratejik Plan 2024-2028, https://www.sgk.gov.tr (Erişim Tarihi: 1.9.2026).

SGK. (2026a). İdare Faaliyet Raporu 2025, https://www.sgk.gov.tr (Erişim Tarihi: 1.9.2026).

SGK. (2026b). Gelir-Gider Dengesi, https://net.sgk.gov.tr (Erişim Tarihi: 30.9.2026).

SGK. (2026c). Devlet Katkısı ve Bütçe Transferleri, https://net.sgk.gov.tr (Erişim Tarihi: 30.9.2026).

SGK. (2026ç). Aktif-Pasif Sigortalı Sayısı, https://net.sgk.gov.tr (Erişim Tarihi: 30.9.2026).

SGK. (2026d). Hakkımızda, https://www.sgk.gov.tr (Erişim Tarihi: 30.9.2026).

SGK, (2026e). Sosyal Güvenlik Kurumu Bütçe Yönergesi, https://files.sgkport.com (Erişim Tarihi: 9.9.2026).

TBMM. (2026). Bazı Kanun ve Kanun Hükmünde Kararnamelerde Değişiklik Yapılmasına Dair Kanun Teklifi, https://www.tbmm.gov.tr (Erişim Tarihi: 28.8.2026).

TCCB (2018). 4 sayılı Bakanlıklara Bağlı, İlgili, İlişkili Kurum ve Kuruluşlar ile Diğer Kurum ve Kuruluşların Teşkilatı Hakkında Cumhurbaşkanlığı Kararnamesi (RG; 15.7.2018, 30479).

TCCB. (2023). On İkinci Kalkınma Planı 2024-2028, https://www.sbb.gov.tr (Erişim Tarihi: 1.9.2026).

TCCB. (2025a). Bütçe Hazırlama Rehberi 2026-2028, https://www.sbb.gov.tr (Erişim Tarihi: 1.9.2026).

TCCB. (2025b). Orta-Vadeli-Program 2026-2028, https://www.sbb.gov.tr (Erişim Tarihi: 1.9.2026).

TCCB. (2025c). Cumhurbaşkanlığı Yıllık Program 2026, https://www.sbb.gov.tr (Erişim Tarihi: 1.9.2026).

TDK, (2026). Güncel Türkçe Sözlük, https://sozluk.gov.tr (Erişim Tarihi: 25.8.2026).

TÜİK. (2021). https://data.tuik.gov.tr/Bulten/Index?p=Isgucu-Istatistikleri-Ekim2020-37485 (Erişim Tarihi: 06.01.2021).

TÜİK. (2025). Sosyal Koruma İstatistikleri-Meta Veri, https://veriportali.tuik.gov.tr (Erişim Tarihi: 30.9.2026).

TÜİK. (2026). Sosyal Koruma İstatistikleri, https://veriportali.tuik.gov.tr (Erişim Tarihi: 30.9.2026).

Avrupa ve Batı Asya Ülkelerinde Yerel Vergilerin ve Mali Yerelleşmenin Mekânsal Otokorelasyon Analizi

Arş. Gör. Dr. Yaprak Karadağ Duymazlar[1]

[1] İzmir Kâtip Çelebi Üniversitesi, İktisadi ve İdari Bilimler Fakültesi, Maliye Bölümü,
yaprak.karadag.duymazlar@ikc.edu.tr, Orcid:0000-0002-1127-3181

Özet: Bu çalışma, 41 Avrupa ve Batı Asya ülkesinin 2022 yılına ait verilerine dayanarak vergi gelirlerinin yerel düzeyde dağılımı ile mali yerelleşmenin mekânsal otokorelasyonunu ortaya koymayı hedeflemektedir. Analizde merkez dışı yönetim (yerel yönetim ve eyalet) vergi gelirinin GSYİH'ye oranı ile temsil edilen yerel vergiler ve yerel vergilerin genel yönetim vergi gelirine bölünmesiyle hesaplanan mali yerelleşme derecesi göstergeleri ayrı ayrı değerlendirilmiştir. Genel yönetim vergi gelirinin GSYİH'ye oranı ise referans gösterge olarak ayrıca kullanılmıştır. Mekânsal ilişkiler, vezir (queen) komşuluk matrisini esas alan Global ve Yerel Moran's I istatistikleriyle test edilmiştir. Bulgular, her üç göstergede de anlamlı ve pozitif mekânsal otokorelasyon olduğunu göstermektedir. Yerel vergi gelirlerinin dağılımında Almanya, Danimarka, Finlandiya, Fransa, İsveç ve İsviçre Yüksek-Yüksek kümesinde, Türkiye ise Düşük-Düşük kümesinde yer almaktadır. Mali yerelleşme derecesinde ise Almanya, Belarus, Danimarka, Finlandiya ve İsviçre Yüksek-Yüksek kümesinde, Türkiye Düşük-Düşük kümesinde konumlanırken, Litvanya ve Estonya Düşük-Yüksek mekânsal aykırı değerler olarak öne çıkmaktadır. Kümelenmenin federal ülkelerle sınırlı kalmayıp üniter yapıdaki ülkeleri de kapsaması, idari yapının yanı sıra coğrafi komşuluğun da mali yerelleşme örüntüsünde rol oynadığına işaret etmektedir.

Anahtar Kelimeler: Mali yerelleşme, mekânsal otokorelasyon, Moran's I, LISA, mali federalizm

GİRİŞ

Mali yerelleşme, kamusal mal ve hizmetlerin sunumu ve mali karar alma yetkisinin merkezi yönetimden merkez dışı alt yönetim birimlerine aktarılması olarak tanımlanabilir (Karagöz, 2015). Mali merkezileşme, çoğunlukla ulusal birliğin gerekliliklerine bir yanıt olarak görülürken; mali yerelleşme, toplumdaki farklılaşan taleplere ve hesap verebilirliğe verilen bir karşılık olarak değerlendirilmektedir (Nacar Karabacak ve Karabacak, 2014). Tartışmanın özünde, kamu kesiminde etkinliği sağlayacak şekilde vergileme ve harcama yetkilerinin merkezi ve yerel yönetim kademeleri arasında nasıl paylaştırılması gerektiği sorusu yer almaktadır (Çukur, 2022).

Temelinde mali federalizm teorisine dayanan mali yerelleşme, yalnızca federal ülkelerle sınırlı bir yaklaşım değildir. Federal olmayıp üniter yapıya sahip pek çok ülke (özellikle Avrupa ülkeleri), idareler arası mali ilişkilerin belirlenmesinde bu yerel yaklaşımı benimsemektedir (Karagöz, 2015). Mali yerelleşmenin ardında yatan temel motivasyon ve beklenen potansiyel faydalar; kamu yönetiminde etkinlik, kaynak tahsisinde verimlilik, hesap verebilirlik, demokratikleşme ve katılımcılıkta ilerleme, bölgesel kalkınma ve uzun dönemde ekonomik büyüme olarak sıralanabilir. Bununla birlikte, gelirin yeniden dağıtım politikalarının bozulması, bölgeler arası eşitsizliklerin artması, oligarşik yapılanma, partizanlık, yolsuzluk, idareler arası koordinasyon eksikliği ve kamu kesiminin büyüklüğünde artış, mali yerelleşmenin doğurabileceği potansiyel zararlar ve yöneltilen temel eleştirilerdir (Acar ve Kitapçı, 2009).

Mali yerelleşmenin başarısını artıran faktörler arasında milli gelirin artışı ve gelişmiş demokratik sistemler yer almaktadır. Yüz ölçümü büyük ülkeler ve etnik-dil farklılıklarının olduğu ülkeler ise mali yerelleşmeyi tercih etmeye daha yatkındır (Panizza, 1999; Karagöz, 2015). Mali yerelleşmenin değerlendirilmesi açısından ise dört temel bileşen olduğu söylenebilir: harcamalar, gelirler, idareler arası transferler ve borçlanma. Bu bileşenler içerisinde özellikle gelirler kısmı öne çıkmaktadır. Nitekim kamusal mal ve hizmetlerin sunumu için gerekli harcamaların yapılabilmesi, idarenin gelirlerine bağlıdır (Özkök, 2018). Bu çerçevede mali yerelleşmenin ölçülmesinde kullanılan başlıca göstergelerden biri, yerel yönetim gelirlerinin toplam kamu gelirleri içindeki payıdır. Bu oran, kamusal kaynakların merkezi ve yerel yönetimler arasında nasıl paylaşıldığını ve yerel yönetimlerin elindeki kaynakların zaman içindeki seyrini yansıtması bakımından önem taşır. Yüksek bir pay, o ülkede mali yerelleşmenin görece güçlü olduğuna dair bir fikir vermektedir (Ulusoy ve Akdemir, 2009).

Literatürde mali yerelleşmenin gerekçeleri, belirleyicileri ve ölçüm yöntemlerine yönelik tartışmalar süregelirken, ülkeler arasındaki coğrafi komşuluğun mali yerelleşme düzeyi üzerindeki olası etkisi cevaplanmayı bekleyen bir sorudur. Bu sorudan hareketle çalışma, yerel vergilerin ve mali yerelleşme derecesinin coğrafi bir bağımlılık ilişkisi sergileyip sergilemediğini sınamayı amaçlamaktadır. Bu doğrultuda, 41 Avrupa ve Batı Asya ülkesinin 2022 yılı verileriyle mekânsal otokorelasyon analizi gerçekleştirilmiştir.

VERİ SETİ VE YÖNTEM

Çalışmada Uluslararası Para Fonu'nun (IMF) Government Finance Statistics (GFS): Statement of Operations (IMF, 2026) veri setine dayanarak 41 Avrupa ve Batı Asya ülkesinin 2022 yılı verisi kullanılmıştır. [4]

Analizde kullanılan Yerel Yönetim Vergi Gelirleri (%), Eyalet Vergi Gelirleri (%) ve Genel Yönetim Vergi Gelirleri (%) göstergeleri doğrudan IMF veri setinden elde edilmiştir. Bu üç ham göstergeden, kümelenme analizinde kullanılan iki değişken türetilmiştir:

Yerel Vergi Gelirleri = Yerel Yönetim Vergi Gelirlerinin GSYİH oranı + Eyalet Vergi Gelirlerinin GSYİH oranı

Mali Yerelleşme Derecesi= Yerel Vergi Gelirleri / Genel Yönetim Vergi Gelirlerinin GSYİH oranı

Yerel vergiler, yerel meclislerce belirlenen ve o idarenin sınırları içinde yerel bütçeye gelir olarak ayrılan bir vergi türüdür. Yerel idarelerin bu konudaki yetkileri ülkeden ülkeye değişmektedir: kimi ülkelerde yerel idareler yalnızca tahsilat yapabilirken, kimilerinde merkezi yönetimin tanıdığı yetkiyle vergi matrahını ve oranını da kendileri belirleyebilmektedir (Tortop, 1984'ten akt. Çiftçi ve Organ, 2019). Bu çalışmada *Yerel Vergi Gelirleri* göstergesi, yerel yönetim ve eyalet düzeyi vergi gelirlerinin toplamının GSYİH'ye oranını ifade etmektedir. *Mali Yerelleşme Derecesi* ise yerel vergi gelirleri göstergesi ve genel yönetim vergi gelirlerinin GSYİH oranının birbirine bölünmesiyle elde edilmiştir.

Mali göstergelerin belirlenmesinin ardından ülkeler arasındaki mekânsal bağımlılık ilişkilerinin ortaya konulması aşamasına geçilmiştir. Bir değişkenin mekânsal komşuluğuna bağlı olarak benzer değerler sergileme eğilimi mekânsal bağımlılık olarak adlandırılmaktadır. Bu bağımlılığı ölçmek için kullanılan ölçüt ise mekânsal otokorelasyondur. Benzer değerlerin birbirine yakın konumlanması pozitif, farklı değerlerin yakın konumlanması ise negatif otokorelasyonu düşündürmektedir (Gangodagamage vd., 2007). Mekânsal otokorelasyonu ölçmede en yaygın kullanılan teknik Moran's I'dır. Moran's I istastiği örneklemin bütünü için tek bir değer üretmektedir; bu nedenle Global Moran's I olarak da anılmaktadır. Global Moran's I, bir değişkenin örneklem genelinde mekânsal bağımlılık taşıyıp taşımadığını gösterirken, bu bağımlılığın hangi birimlerde ve hangi yönde gerçekleştiğini belirlememektedir (Yamada, 2024). Bu sınırlılığı gidermek amacıyla Anselin (1995) tarafından geliştirilen Yerel Moran's I (LISA), her ülke için ayrı bir istatistik üreterek kümelenmenin mekânsal dağılımını göstermektedir.

LISA istatistikleri dört kategoride tanımlanmaktadır. Yüksek-Yüksek (HH), yüksek bir değerin yüksek değerli komşularla çevrili olduğu; Düşük-Düşük (LL), düşük bir değerin düşük değerli komşularla çevrili olduğu; Yüksek-Düşük (HL) ve Düşük-Yüksek (LH) ise bir birimin değerinin komşularının değerinden ters yönde ayrıştığı durumları ifade etmektedir (Anselin, 1995). Bir diğer ifadeyle hangi ülkelerin benzer komşularıyla birlikte yüksek ya da düşük değerler sergilediğini, hangilerinin ise komşularından farklılaştığı ortaya çıkarılmaktadır.

Bu kapsamda çalışmada ilk olarak genel yönetim vergi gelirleri, yerel vergi gelirleri ve mali yerelleşme derecesi göstergeleri için Global Moran's I istatistikleri hesaplanmıştır. Ardından, çalışmanın esas ilgi konusunu oluşturan yerel vergi gelirleri ve mali yerelleşme derecesi göstergeleri üzerinden LISA istatistikleri hesaplanmıştır. %95 güven düzeyinde ($p<0.05$) anlamlı çıkan sonuçlara dayanılarak, vergilemeye ilişkin göstergelerin ülkeler arasında coğrafi olarak nasıl kümelendiği ortaya konulmuştur. Stata yazılımı ile gerçekleştirilen analizlerde mekânsal otokorelasyon ilişkileri, ülkeler arasındaki komşuluk ilişkilerinin vezir (queen) kriteriyle oluşturulduğu ve satır standardizasyonun uygulandığı ağırlık matrisine dayandırılarak hesaplanmıştır.

BULGULAR

Tablo 1. Global Moran's I Sonuçları

Değişken	Moran's I	p-değeri	Anlamlılık
Genel Yönetim Vergi Gelirleri (%)	0.234	0.011	Anlamlı ($p<0.05$)

[4] Almanya, Arnavutluk, Avusturya, Azerbaycan, Belarus, Belçika, Birleşik Krallık, Bosna Hersek, Bulgaristan, Çek Cumhuriyeti, Danimarka, Ermenistan, Estonya, Finlandiya, Fransa, Gürcistan, Hırvatistan, Hollanda, İrlanda, İspanya, İsveç, İsviçre, İtalya, Karadağ, Kuzey Makedonya, Letonya, Litvanya, Lüksemburg, Macaristan, Moldova, Norveç, Polonya, Portekiz, Romanya, Rusya, Sırbistan, Slovakya, Slovenya, Türkiye, Ukrayna, Yunanistan.

Değişken	Moran's I	p-değeri	Anlamlılık
Yerel Vergi Gelirleri (%)	0.359	0.000	Anlamlı (p<0.05)
Mali Yerelleşme Derecesi	0.218	0.017	Anlamlı (p<0.05)

Global Moran's I istatistiklerine göre çalışmada incelenen her üç mali göstergede mekânsal otokorelasyon bulunmaktadır. İstatistiklere göre çalışmanın ülkeleri, kendi komşu ülkelerle genel yönetim vergi gelirlerinde yaklaşık %23, yerel vergi gelirlerinde %36 ve mali yerelleşme derecesinde %22 pozitif otokorelasyonludur.

Değişkenler arasında yerel vergi gelirleri, üç değişken arasında en yüksek mekânsal otokorelasyon düzeyine sahiptir. Bu sonuç, ülkelerin yerel yönetim vergi kapasitelerinin coğrafi komşuluğa en güçlü bağlı olan gösterge olduğunu düşündürmektedir. Genel yönetim vergi gelirleri ve mali yerelleşme derecesi de anlamlı pozitif otokorelasyon göstermekle birlikte, otokorelasyon düzeyleri yerel vergi gelirlerine kıyasla daha zayıftır. Bu fark, mali yerelleşme derecesinin payda kısmındaki genel vergi yükü etkisiyle bir miktar zayıfladığını göstermektedir.

Global istatistiğin ardından, kümelenmenin hangi ülkelerde yoğunlaştığını belirlemek amacıyla LISA istatistiğine geçilmiştir.

Tablo 2. Yerel Vergi Gelirleri İçin LISA Sonuçları

Ülke	I_i	z	p-değeri	Durum	Otokorelasyon
Almanya	0.691	2.447	0.007	Anlamlı (p<0.05)	Yüksek-Yüksek
Finlandiya	1.914	3.518	0.000	Anlamlı (p<0.05)	Yüksek-Yüksek
Fransa	0.613	1.704	0.044	Anlamlı (p<0.05)	Yüksek-Yüksek
Danimarka	4.611	4.737	0.000	Anlamlı (p<0.05)	Yüksek-Yüksek
İsveç	1.857	2.753	0.003	Anlamlı (p<0.05)	Yüksek-Yüksek
İsviçre	1.240	2.685	0.004	Anlamlı (p<0.05)	Yüksek-Yüksek
Türkiye	0.729	1.814	0.035	Anlamlı (p<0.05)	Düşük-Düşük

Yerel vergi gelirleri göstergesinin LISA analizi sonuçlarına göre Almanya, Danimarka, Finlandiya, Fransa, İsveç, İsviçre ve Türkiye kendisine komşu ülkelerle istatistiksel olarak anlamlı pozitif otokorelasyona sahiptir. Bu ülkeler arasında yalnızca Türkiye LL kümesinde iken diğer ülkeler HH kümesindedir.

Tablo 2'de Danimarka, en yüksek I_i değerine (4.611) ve en güçlü anlamlılık düzeyine (p= 0.000) sahip ülke olarak öne çıkmaktadır. Bu durum, Danimarka'nın kendisinin de komşularının da yerel vergi gelirlerinin GSYİH içindeki payının belirgin biçimde yüksek olduğunu göstermektedir. HH kümesinde yer alan ülkelere bakıldığında, kümenin ağırlıklı olarak Kuzey ve Orta Avrupa ülkelerinden (Danimarka, Finlandiya, İsveç, Almanya, İsviçre) oluştuğu, Fransa'nın ise Batı Avrupa konumuyla bu coğrafyaya yakın olduğu görülmektedir. Türkiye'nin tabloda LL kümesindeki tek ülke olması, yerel vergi gelirleri payının düşük olmasının yalnızca kendine özgü bir durum olmadığını, komşu ülkelerin de benzer şekilde düşük yerel vergi gelirlerine sahip olduğunu düşündürmektedir.

Tablo 3. Mali Yerelleşme Derecesi İçin LISA Sonuçları

Ülke	I_i	z	p-değeri	Durum	Otokorelasyon
Almanya	0.565	2.036	0.021	Anlamlı (p<0.05)	Yüksek-Yüksek
Belarus	1.334	3.305	0.000	Anlamlı (p<0.05)	Yüksek-Yüksek
Danimarka	2.024	2.120	0.017	Anlamlı (p<0.05)	Yüksek-Yüksek
Estonya	-1.168	-1.693	0.045	Anlamlı (p<0.05)	Düşük-Yüksek
Finlandiya	1.074	2.019	0.022	Anlamlı (p<0.05)	Yüksek-Yüksek
İsviçre	1.582	3.451	0.000	Anlamlı (p<0.05)	Yüksek-Yüksek
Litvanya	-1.101	-2.310	0.010	Anlamlı (p<0.05)	Düşük-Yüksek
Türkiye	0.681	1.717	0.043	Anlamlı (p<0.05)	Düşük-Düşük

İkinci olarak, mali yerelleşme derecesi göstergesi için LISA analizi HH kümesinde Almanya, Belarus, Danimarka, Finlandiya, İsviçre; LL kümesinde Türkiye yer almaktadır. Litvanya ve Estonya ise LH kümesinde kendilerine yer edinmiştir.

Tablo 3'e göre en yüksek I_i değerine Danimarka (2.024) sahipken, en yüksek istatistiksel anlamlılığa (en düşük p-değeri, en yüksek z-skoru) İsviçre (z=3.451, p<0.001) ve Belarus (z=3.305, p<0.001) sahiptir. Bu iki ülkenin bir arada güçlü kümelenme göstermesi dikkat çekicidir. Zira İsviçre'nin federal yapısı ve kantonal vergilendirme geleneği ile Belarus'un idari yapısı çok farklı olmakla birlikte, her iki ülke de mali yerelleşme derecesi açısından

çevrelerindeki ülkelerle benzer düzeydedir. Yine üniter yapılı Finlandiya ve federal yapılı Almanya da aynı kümede yer almaktadır.

Türkiye, yerel vergi gelirleri göstergesinde olduğu gibi burada da tek başına LL kümesinde yer almaktadır. Bu tutarlılık, Türkiye'nin mali yerelleşme açısından düşük düzeyinin komşu ülkelerle paylaşılan bir bölgesel örüntü olduğunu doğrulamaktadır.

Litvanya (I_i=-1.101) ve Estonya (I_i=-1.168) ise negatif I_i değerleriyle LH mekânsal aykırı değerler olarak karşımıza çıkmaktadır. Bu iki ülkenin kendi mali yerelleşme dereceleri, komşularının ortalamasının altında kalmaktadır. Diğer bir ifadeyle Baltık bölgesinde görece daha merkeziyetçi bir yapıya sahip olmalarına karşın, çevrelerinde daha yerelleşmiş komşular (örneğin daha kuzeydeki İskandinav ülkeleri) bulunduğu söylenebilir.

SONUÇ VE ÖNERİLER

Bu çalışma; yerel vergilerin ve mali yerelleşmenin seçili ülkeler arasında rastgele dağılmadığını, aksine coğrafi olarak kümelendiğini ortaya koymaktadır. Global Moran's I sonuçları; yerel vergi gelirleri, genel yönetim vergi gelirleri ve mali yerelleşme derecesi göstergelerinin üçünde de anlamlı pozitif mekânsal otokorelasyon olduğunu göstermiştir.

LISA sonuçları, çoğunluğu Kuzey ve Orta Avrupa'da yer alan ülkeler için hem yerel vergi gelirleri hem de mali yerelleşme derecesi bakımından birbirine benzer, yüksek değerler sergilerken; Türkiye her iki göstergede de komşularıyla birlikte düşük bir kümede yer almaktadır. Dolayısıyla Türkiye'nin merkeziyetçi vergi yapısının yalnızca kendi ulusal tercihinden kaynaklanmadığı, bölgesindeki genel eğilimle örtüştüğü ifade edilebilir.

Bulguların dikkat çeken bir yönü, kümelenmenin idari rejimle birebir örtüşmemesidir. Nitekim federal yapıya sahip İsviçre ve Almanya ile üniter yapıdaki Belarus, Danimarka ve Finlandiya aynı kümede yer almaktadır. Bu durum, bir ülkenin mali yerelleşme düzeyinin yalnızca kendi anayasal/idari tercihiyle değil, içinde bulunduğu coğrafi bölgenin genel eğilimiyle de ilişkili olabileceğini düşündürmektedir.

Çalışmanın bazı sınırlılıklar bulunmaktadır. İlgili coğrafyada kara sınır komşuluğu bulunmayan ada ülkeleri analize dâhil edilmemiştir. Kesit veri kullanılması nedeniyle tespit edilen mekânsal örüntünün zaman içindeki istikrarı değerlendirilmemiştir. Gelecek çalışmalar için panel veri kullanılarak mekânsal örüntünün zamansal istikrarının incelenmesi önerilmektedir. Ayrıca mesafe temelli veya k-en yakın komşu ağırlık matrisleri kullanılarak da istatistiki testler uygulanabilir.

KAYNAKÇA

Acar, İ. A., & Kitapçı, İ. (2009). Bir mali yerelleşme deneyimi olarak İsveç. *Maliye Dergisi*, (157), 85-104.

Anselin, L. (1995). Local indicators of spatial association—LISA. Geographical Analysis, 27(2), 93–115. https://doi.org/10.1111/j.1538-4632.1995.tb00338.x

Çiftçi, T. E., & Organ, İ. (2019). Yerel Vergileme. *OPUS International Journal of Society Researches*, *10*(17), 1705-1734. https://doi.org/10.26466/opus.530820

Çukur, A. (2022). Türkiye'de mali yerelleşme ve kamu kesimi büyüklüğü: 2009-2020 dönemi. *Maliye Dergisi*, (182), 108-129.

Gangodagamage, C., Zhou, X., & Lin, H. (2007). Autocorrelation, Spatial. Shekhar, S., & Xiong, H. (Der.), *Encyclopedia of GIS* içinde (ss. 32-37). Springer Science & Business Media

IMF. (2026). Government Finance Statistics (GFS): Statement of Operations [Veri seti]. https://data.imf.org/

Karagöz, B. (2015). Türkiye'de mali yerelleşme emareleri ve yatay eşitsizlik sorunu. *Sosyoekonomi*, *23*(26), 139-163.

Nacar Karabacak, B., & Karabacak, Y. (2014). Mali yerelleşme teorilerinin temel yerel gelir türlerine bakışı. *Çukurova Üniversitesi Sosyal Bilimler Enstitüsü Dergisi*, *23*(1), 251-266.

Özkök, Y. (2018). Mali federalizm kapsamında gelirlerin yerel yönetimlere devri. *Akademik Sosyal Araştırmalar Dergisi*, *6*(69), 294-305.

Panizza, U. (1999). On the determinants of fiscal centralization: Theory and evidence. *Journal of Public Economics*, *74*(1), 97-139.

Tortop N. (1984). Mahalli idareler. Ankara: Türkiye ve Orta Doğu Amme İdaresi Enstitüsü Yayınları No: 211.

Ulusoy, A., & Akdemir, T. (2009). Yerel yönetimler ve mali özerklik: Türkiye ve OECD ülkelerinin karşılaştırmalı analizi. *Balıkesir Üniversitesi Sosyal Bilimler Enstitüsü Dergisi*, *12*(21), 259-287.

Yamada, H. (2024). Moran's I for multivariate spatial data. Mathematics, 12(17), 2746. https://doi.org/10.3390/math12172746

Destinasyon Pazarlamasında Dijitalleşme

Aysun Bulut[1] Neslihan Cavlak[2] Bige Küçükefe[3]

[1] Tekirdağ Namık Kemal Üniversitesi/ Sosyal Bilimler Enstitüsü, İşletme Yüksek Lisans Öğrencisi, abulut70@gmail.com, ORCID: 0009-0005-7512-0175

[2] Doc Dr Neslihan Cavlak (Tekirdağ Namık Kemal Üniversitesi), ncavlak@nku.edu.tr ORCID: 0000-0002-6712-971X

[3] Doc Dr Bige Küçükefe (Tekirdağ Namık Kemal Üniversitesi), bkucukefe@nku.edu.tr ORCID:0000-0003-1945-3037

Özet: Turizm, sağladığı istihdam, döviz girdisi ve bölgesel kalkınmaya katkısı nedeniyle Türkiye ekonomisi açısından stratejik öneme sahip sektörlerden biridir. Günümüzde hızla ilerleyen dijitalleşme süreci, bu sektörün işleyişini, pazarlama anlayışını ve tüketici davranışlarını köklü biçimde dönüştürmekte; işletmelerin ve destinasyonların rekabet gücünü doğrudan etkilemektedir. Turistlerin seyahat kararı öncesi bilgi arama, karşılaştırma yapma ve deneyim paylaşma süreçlerinin büyük ölçüde dijital platformlara taşınması, destinasyonların da pazarlama stratejilerini bu değişime uygun biçimde yeniden şekillendirmesini zorunlu kılmaktadır. Bu çalışma, dijitalleşmenin turizm sektörüne etkilerini incelemeyi ve bu dönüşümün gelecekteki durumunu değerlendirmeyi amaçlamaktadır. Çalışma kapsamında öncelikle destinasyon pazarlaması kavramı kuramsal çerçevede ele alınmış, geleneksel pazarlama yaklaşımlarından ayrıldığı temel noktalar ortaya konularak dijitalleşmenin turizm pazarlamasındaki rolü tartışılmıştır. Ardından sosyal medya platformları ve yapay zekâ, artırılmış/sanal gerçeklik, büyük veri gibi yeni nesil teknolojiler başta olmak üzere destinasyon pazarlamasında kullanılan dijital pazarlama stratejileri incelenmiştir. Bu stratejilerin destinasyon pazarlamasındaki somut uygulamaları literatürdeki örnek çalışmalar üzerinden değerlendirilmiş, destinasyonların marka imajını güçlendirmek ve rekabet avantajı elde etmek amacıyla bu araçlardan nasıl yararlandığına değinilmiştir. Dijital pazarlama stratejilerinin destinasyon rekabetçiliğine katkıları tartışılmış, hem akademik alanyazına hem de sektör uygulayıcılarına yönelik somut önerilerde bulunulmuştur.

Anahtar Kelimeler: Destinasyon pazarlaması, dijitalleşme, dijital pazarlama, turizm, sosyal medya

Digitalization In Destination Marketing

Abstract: Tourism is one of the strategically important sectors for the Turkish economy due to its contribution to employment, foreign currency inflow, and regional development. Today, the rapidly advancing process of digitalization is fundamentally transforming the operations, marketing understanding, and consumer behavior of this sector, directly affecting the competitiveness of both businesses and destinations. The fact that tourists' pre-travel information search, comparison, and experience-sharing processes have largely shifted to digital platforms compels destinations to reshape their marketing strategies in line with this transformation. This study aims to examine the effects of digitalization on the tourism sector and to evaluate the future state of this transformation. Within the scope of the study, the concept of destination marketing is first addressed within a theoretical framework, the key points distinguishing it from traditional marketing approaches are outlined, and the role of digitalization in tourism marketing is discussed. Subsequently, digital marketing strategies used in destination marketing—particularly social media platforms and next-generation technologies such as artificial intelligence, augmented/virtual reality, and big data—are examined in detail. The concrete applications of these strategies in destination marketing are evaluated through example studies in the literature, addressing how destinations utilize these tools to strengthen their brand image and gain competitive advantage. In line with the findings obtained, the contributions of digital marketing strategies to destination competitiveness are discussed, and concrete recommendations are offered for both academic literature and industry practitioners.

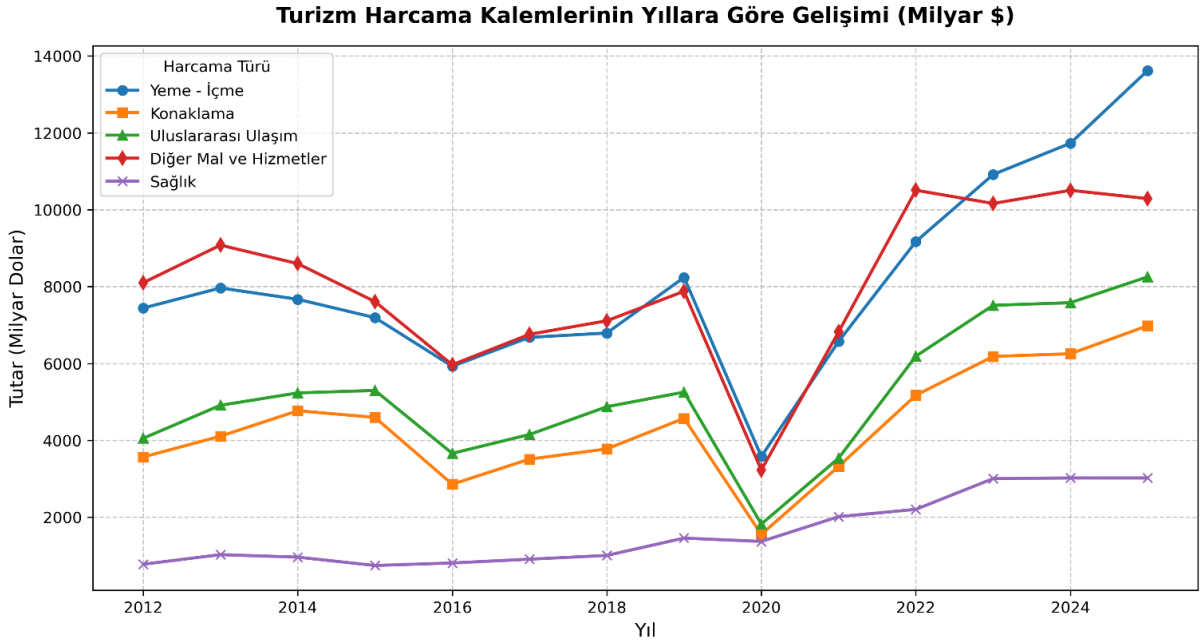
Keywords: Destination marketing, digitalization, digital marketing, tourism, social media

1. GİRİŞ

Turizm, iş süreçlerini dünya çapında dijitalleştirerek servislerini çevrimiçine taşıyan sektörlerden biridir. Uçuş ve otel rezervasyonlarının çevrimiçine taşınması bu sektörde öncü rol üstlenmiş, lokanta menülerinde QR kod kullanılması, otel giriş işlemlerini çevrimiçi yapma, müze giriş biletlerinin çevrimiçi satılması ve ücretsiz wifi servisleri gibi çok çeşitli alanlara yayılmıştır. Bilgi ve iletişim teknolojilerindeki gelişmeler, güncel turizm pazarlaması planlamasında devrimsel değişikliklere neden olmuştur. Ülkelerin ve bölgelerin cazibe merkezlerini ortaya çıkarmak üzere tasarladığı dijital destinasyon pazarlaması stratejileri, giderek daha çok geleneksel pazarlama stratejilerinin yerini almaktadır. Turizm sektörü doğru kullanıldığında ekonomik gelişmenin ve istihdamın yüklenicisi konumuna gelebilir. International Telecommunication Union [ITU] (2022)'a göre 2019 yılında, pandemi öncesinde, dünya GSYH'sının %4'ü 3,5 trilyon USD ile turizm sektöründen geliyordu. Türkiye'nin

yıllık 64 Milyar Dolara ulaşan toplam turizm geliri, ülke GSMH'da ve istihdamda önemli bir yer tutan turizm sektörünün dünyadaki trende uyum sürecinde stratejik önemini giderek daha fazla arttırmaktadır.

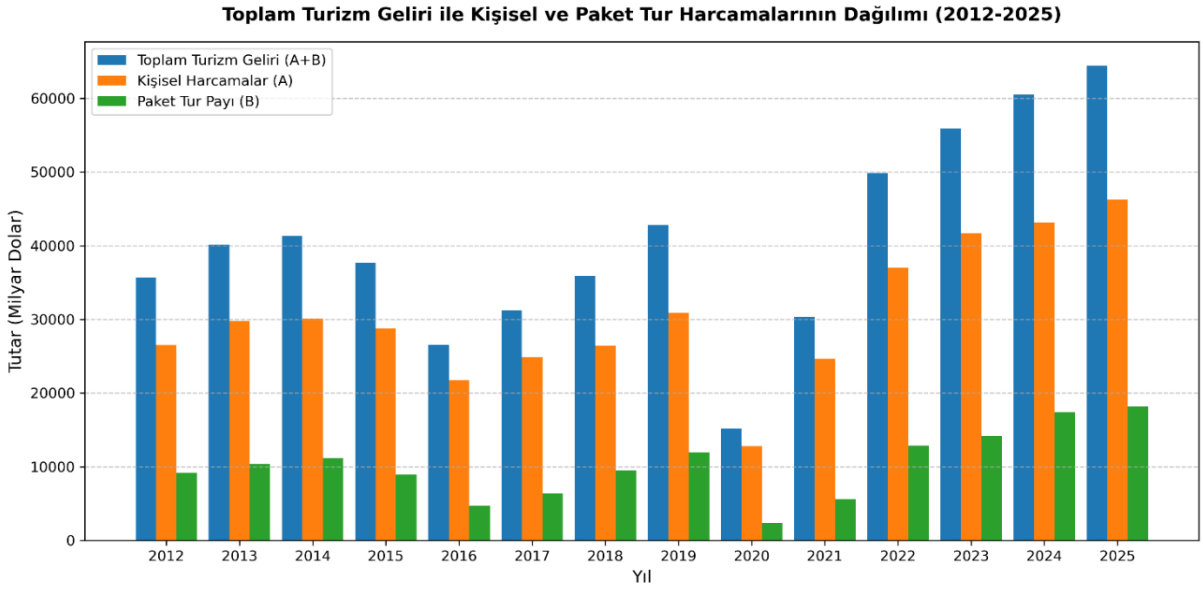
Şekil 1 : Turizm Harcamalarının Yıllara Göre Değişimi



Kaynak : Türkiye İstatistik Kurumu [TÜİK]. (2026).

Şekil 1'de TÜİK verilerine göre (2026), turizm gelirlerinin ülkeye sağladığı katma değer, harcama kalemlerine göre incelenmiştir. Tüm kalemlerde 2020 yılındaki COVID 19 pandemisi etkisi gözlenirken sağlık sektöründeki harcamalar etkilenmemiş, pandemi etkisinden sonra da bu sektördeki harcama tutarı artmaya devam etmiştir. Yeme-içme sektöründeki harcamaların artış hızı 2022 yılından itibaren diğer sektörlerin önüne geçtiği görülmektedir. Yeme içme sektörünü sırasıyla diğer mal ve hizmetler ve uluslararası ulaşım kalemleri takip etmektedir. Konaklama ve sağlık turizminde ise hedeflenen ivmenin gerisinde kalınmıştır. Grafikte 2016 yılında da dış şok yaşandığı görülmektedir ancak sağlık turizmi bu dış şoktan da etkilenmemiştir. Sağlık turizmi harcamalarında görülen düzenli artış, Türkiye'nin turizmde çeşitlendirme ve niteliği arttırma hedeflerinde oldukça başarılı olduğunu göstermektedir.

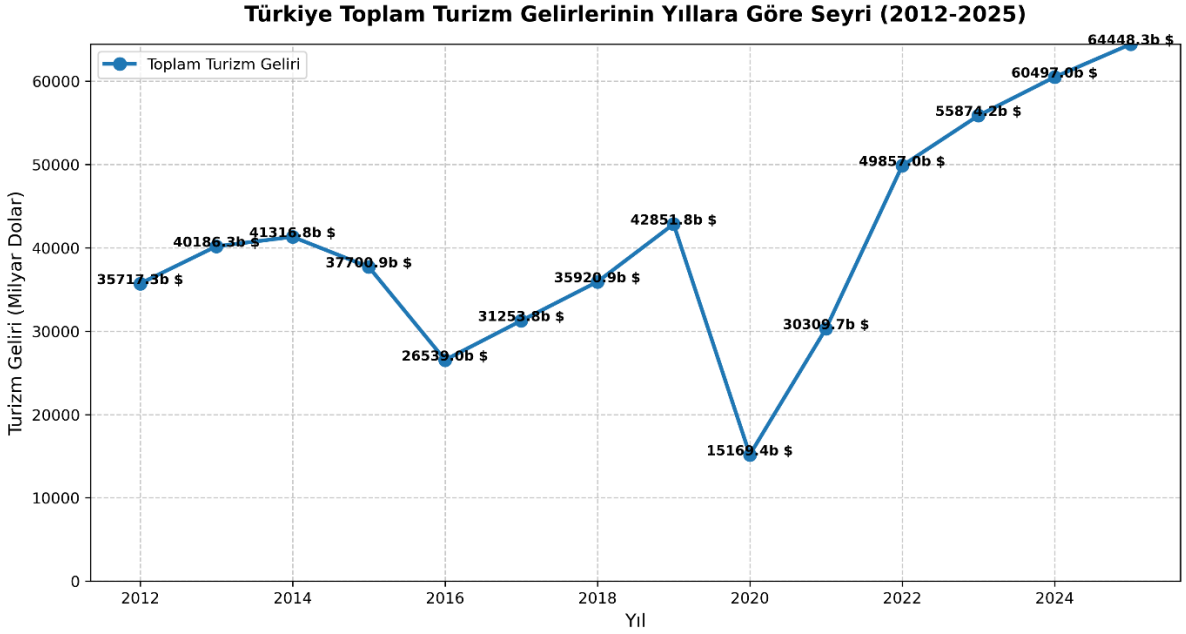
Şekil 2 : Toplam Turizm Geliri ile Kişisel ve Paket Tur Harcamalarının Dağılımı



Kaynak : Türkiye İstatistik Kurumu [TÜİK]. (2026).

Şekil 2'de TÜİK verilerine göre (2026) turizm gelirleri içinde paket tur harcamaları ve kişisel harcamalar karşılaştırılmaktadır. Türkiye'yi ziyaret eden turistler paket turlardan ziyade bireysel seyahati tercih etmektedir. 2020 yılındaki COVID 19 pandemisi ile birlikte paket tur harcamaları ve kişisel harcamalar birlikte minimuma düşerken daha sonra tüm harcamalar V şeklinde hızla toparlanmıştır. Kişisel harcamaların paket tur harcamalarının çok daha üstünde olması, paket tur harcamalarını destekleyici ikincil unsur haline getirmektedir. Kitle turizmi ile bireysel turizmin birlikte artması, turizmin yerel ekonomik aktörlere önemli katkı yaptığının işaretidir.

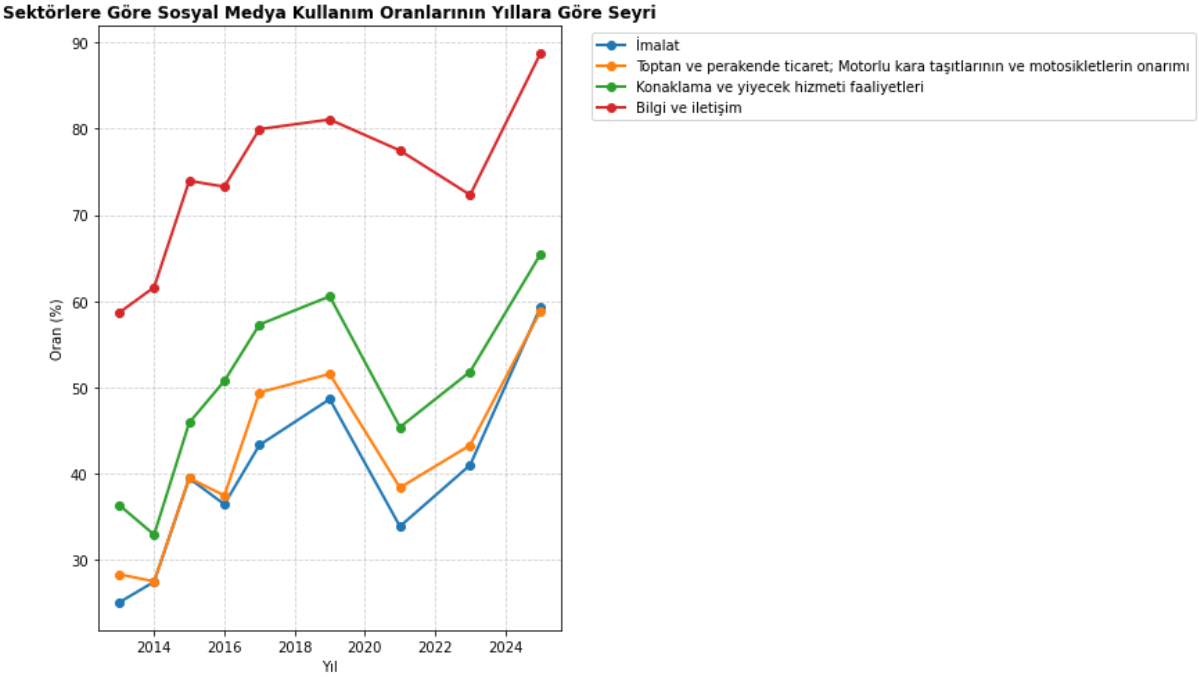
Şekil 3 : Türkiye Toplam Turizm Gelirlerinin Yıllara Göre Seyri



Kaynak : Türkiye İstatistik Kurumu [TÜİK]. (2026).

Şekil 3'de Türkiye İstatistik Kurumu [TÜİK] 'nun 2026 tarihli verilerine göre Türkiye'nin toplam turizm gelirleri dışsal şoklarla dalgalı bir seyir izlemekle birlikte güçlü bir yukarı ivmelenme hareketi göstermektedir. Yapısal kırılmalardan ilki 2016 yılındaki darbe süreci, ikincisi ise 2020 yılındaki COVID 19 pandemisidir. Her iki kırılma da hızla atlatılmış ve V şeklinde hareketle hızla büyüme evresine geçilmiştir. Bu durum, sektörün krizlere karşı yüksek adaptasyon yeteneğinin kanıtıdır.

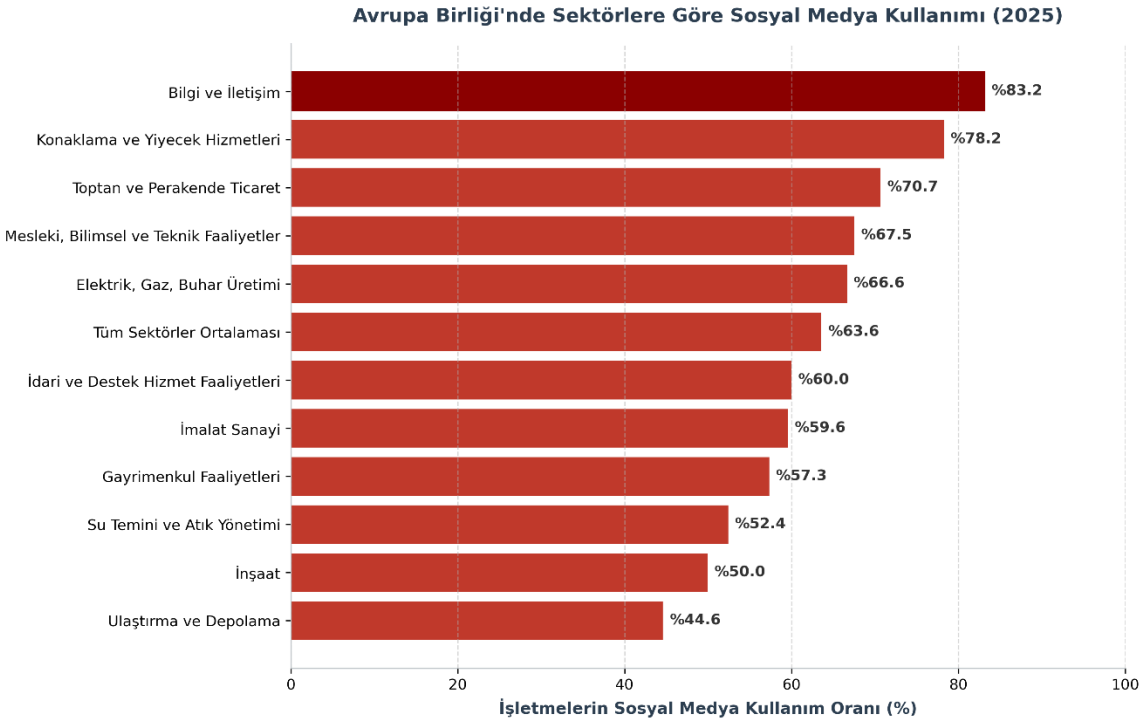
Şekil 4 : Sektörlere Göre Sosyal Medya Kullanım Oranlarının Yıllara Göre Seyri



Kaynak : Türkiye İstatistik Kurumu [TÜİK]. (2026).

Türkiye İstatistik Kurumu [TÜİK] 'nun 2026 tarihli verileriyle Şekil 4'te Sektörlere Göre Sosyal Medya Kullanım Oranlarının Yıllara Göre Seyri gösterilmektedir. Buna göre, Türkiye'de Dijitalleşmenin öncülüğünü teknoloji odaklı Bilgi ve İletişim şirketleri sürdürürken ikinciliği Konaklama ve Yiyecek Faaliyetlerinde faaliyet gösteren şirketler almıştır. İmalat sektörü son sıradadır. 2016 yılı tüm sektörlerde kırılma yılı olmuş ancak konaklama sektörü dijitalleşmedeki ikinci yerini bu dışsal şok yılında da sürdürmüştür. İkinci kırılma dönemi COVID 19 pandemisinin ardından gelen 2021 yılında yaşanmış ancak daha sonra tüm sektörlerde toparlanmaya geçilmiştir.

Şekil 5: Avrupa Birliği'nde Sektörlere Göre Sosyal Medya Kullanımı



Kaynak : Eurostat (2026).

Şekil 5'de Eurostat'tan alınan 2026 tarihli verilere göre Avrupa Birliği'ne üye ülkelerdeki işletmelerin Sektörlere Göre Sosyal Medyayı Kullanım Oranları görülmektedir. Birincilik ve ikincilik aynı Türkiye'de olduğu gibi sırasıyla Bilgi ve İletişim sektörüyle Konaklama ve Yiyecek Sektörlerine aittir. Bilgi ve İletişim Sektörünün birinci olması, sektörün tabiatı gereğidir. Konaklama ve Yiyecek Hizmetlerinde ise sektörde dijitalleşme zorunluluğu nedeniyledir ve sektörde klasik iş akışlarının güçlü bir şekilde değiştiğini göstermektedir. İmalat sektörü Türkiye'de olduğu gibi Avrupa Birliğinde de sosyal medya kullanımında gerilerdedir. Grafikte tüm sektörler ortalamasının 63,57 olması, her 10 şirketten 6-7'sinin sosyal medyayı aktif kullandığı anlamına gelmektedir.

2. DESTİNASYON PAZARLAMASI

Gutierriz vd., (2025)'e göre; Bilgi ve İletişim Teknolojileri temelli turizm uygulamalarının turistlerin planlama ve deneyimleme aracı olarak giderek daha sık kullanılması sosyal ve ekonomik önemlerini arttırmakta ve turizmle uğraşan şirketlere rekabetçi avantajlar sağlamaktadır. Teknoloji geçmişte sadece işletme maliyetlerinde tasarruf amacıyla kullanılırken bugün artık işletme, verimlilik ve iş kalitesi ve hatta turizm ekosistemine yardımcı olmak gibi çok değişik alanlarda kullanılmaktadır. Özellikle Arttırılmış Gerçeklik ve Sanal Gerçeklik uygulamaları turizmde devrim yaratmış ve destinasyonların potansiyel müşterilerine sunabilecekleri ihtimalleri sergileyebilme olanağı vermiştir. İnteraktif deneyimler ve sürükleyici hikaye anlatıcılığı yeni teknolojiler sayesinde Destinasyon Pazarlamasında olanaklı hale gelmiştir. Platformlar arasındaki Bütünleşik Pazarlama İletişimleri marka güvenilirliğini arttırmaktadır. Dijital Marka Yönetiminin ziyaretçilerin değerleriyle uyumlu olması durumunda müşteri sadakati ve sürdürülebilirlik algısında kayda değer ilerleme sağlanmaktadır. Sosyal medya fenomeni içeriği veya interaktif formatlar benzeri E-pazarlama araçları destinasyon çekiciliğini arttırmaktadır. (Alhaddar ve Kummitha, 2025). Örneğin Dijital Pazarlama iyi kullanılabildiği takdirde düşük bütçeli işletmeler bile geniş kesimlere ulaşma imkanı bulmaktadır. Cep telefonlarının kullanımı ile birlikte daha da artan internet kullanım sıklığı, turizm pazarını ve turistlerin tüketim alışkanlıklarını değiştirmiştir. Bu da dijital ekonominin ülkeler ve bölgelerin sürdürülebilir kalkınmasını ve aralarındaki eşitsizlikleri ortadan kaldırmaları yönünde rol oynamasını sağlamıştır. İş modelleri artık geniş ölçüde teknolojiye bağımlıdır ve süreçlerin otomasyonu artık yeni çalışan yetenekleri gerektirmektedir.

3. DESTİNASYON PAZARLAMASINDA DİJİTALLEŞME

Dijital teknolojiler, sosyal medya platformlarından gelişmiş telefon uygulamalarına kadar geniş bir spektrumda ziyaretçilere kişiselleştirilmiş bilgi ve deneyim sunarak Destinasyon Pazarlamasının güçlü bir sürükleyicisi haline gelmişlerdir. Turistler, destinasyon imajını kendilerine ulaşabilen bilgi kaynaklarından etkilenerek değiştirmektedirler. Ishida, K., (2016)'ya göre, bu bilgi kaynaklarının en etkilisi ve en baskını Ağızdan Ağıza İletişimdir (WOM). Elektronik iletişim teknolojilerindeki gelişmeler, geleneksel WOM'a eWOM'un eklenmesini sağlamıştır ve her ikisi de ilgi ve satınalma kararları üzerinde etkilidir. Bu bağlamda dijital hikaye anlatıcılığı ve çevrimiçi yorumlar turistlerin kararlarında ve destinasyon rekabetçiliğinde çok önemli bir rol oynamaktadır. eWOM, klasik WOM'a göre aynı anda çok sayıda insana hitap edebilen doğası gereği daha geniş ölçekli, anonim, her an iletişime açık ve kalıcıdır. Bu durum işletmelere turizm pazarlamasında müşteri iletişiminin etkisini yaratıp analiz etmenin ve yönetmenin yeni olanaklarını sağlamaktadır. Tüm bu avantajlarına rağmen eWOM, yüzyüze iletişim ya da ticari olmayan web sayfaları kadar güvenilir bulunmamaktadır. Bununla birlikte, ölçek büyüklüğünün de etkisiyle, eWOM destinasyon imajı üzerinde klasik WOM'dan daha fazla etki yaratmaktadır. Olumsuz WOM'un etkisi olumlu WOM'a göre daha küçükken turistler olumsuz eWOM'a olumlu eWOM'dan daha az önem veriyor ve olumsuz eWOM, olumsuz WOM'dan daha fazla dikkat çekiyor.

Dijital pazarlama; müşterilerle direkt iletişime dayanan, hedeflenmiş kitleye yönelik esnek, ölçülebilen ve internet mobil araçlar sosyal medya arama motorları ve benzeri platformlar gibi dijital enformasyon teknolojileri sayesinde gerçekleştirilebilen pazarlama çalışmaları içerir. Bu sayede müşterilerle daha duygusal bir bağ kurulabilmektedir. Uong, L. N. T. (2025)'nin belirttiği gibi, özellikle turizmde bu tür çevrimiçi pazarlama kampanyalarının uzun soluklu olmasına ihtiyaç vardır. Çünkü turizmde dijital pazarlamanın etkinliği yalnızca turist sayısıyla değil aynı zamanda müşteri memnuniyetinin derecesi, turistlerin tekrar gelme oranı ve destinasyon imajının dijital platformlarda yayılma kapasitesine de bağlıdır. Dijital pazarlama, teknolojiyi müşteri müşteri servislerine entegra ederek ve marka promosyonu sayesinde turizm endüstrisindeki işletme performansını olumlu etkilemektedir ki bu da ilgili destinasyonun uzun vadedeki çekiciliğini arttırmaktadır. Destinasyon marka tanınırlığının uzun vadeli artışı da dijital pazarlama sayesinde üretilen içeriğin hedef kitleye ulaştırılması ve destinasyonla turistler arasındaki arttırılmış etkileşimin sonucudur. Dijital pazarlamanın en büyük özelliklerinden biri, müşterilere gönderilecek mesajların kişiselleştirme derecelerindeki artıştır. Çünkü dijital kanalların

kullanıcıların geçmiş alışkanlıklarına ulaşma yeteneği vardır ve kullanıcılar geleneksel pazarlamadaki herkese gönderilen tek tip mesaj yerine kendi özelliklerine uyarlanmış mesajlarla karşılaşırlar. Her hedef kitleye göre özelleştirilmiş mesajlar, daha yüksek dönüş oranına ulaştıkları gibi kullanıcıyı özel hissettirmeyi başarır ve manevi bağ ihtimalini güçlendirir.

4. DİJİTAL DESTİNASYON PAZARLAMASI STRATEJİLERİ

Giderek daha fazla küreselleşen ve sonucunda rekabetin daha da arttığı turizm pazarında destinasyonlar hedef kitleleri için daha sürdürülebilir, yaratıcı ve unutulmaz deneyimler sağlamak üzere daha yenilikçi stratejiler geliştirme çabası içindeler. International Telecommunication Union [ITU] (2022)'a göre bu stratejik vizyon ve yenilikçi girişimcilik yaklaşımı genellikle Destinasyon Yönetimi/Pazarlaması Organizasyonları yardımıyla gerçekleştirilmektedir. Birleşmiş Milletler, uluslararası topluma "akıllı şehir" kavramını tanıtmış, arkasından da Akıllı Turizm Destinasyonlarının gerçekleştirilmesi çalışmaları başlamıştır. Bir turizm destinasyonunun akıllı olması, öncelikle turistlerin deneyimini geliştirebilmek ve kişiselleştirebilmek için teknolojik altyapıyı tüm detaylarıyla birlikte gereken sıklıkta kullanabilmesine bağlıdır. Turist akışının analizi, her turistin ihtiyacına yönelik destinasyon önerisinin aracısız olarak turiste ulaştırılabilmesi gibi nitelikler bu kapsamda sayılabilir. Ayrıca yeterli, güncel ve güvenilir veriyi, Destinasyon Yönetimi/Pazarlaması Organizasyonlarının, yerel kurumların ve yerel turizm işletmelerinin kullanımına sunabilme becerisine sahip olması gerekir. Böylelikle tutarlılık ve birlikte çalışabilirlik standartları çerçevesinde destinasyon verilerinden en yüksek verim alınabilir ve turizmle ilgili kararlar veriye dayandırılabilir.

Kumar, A.,'nın 2024 yılındaki makalesine göre, Dijital Promosyon Stratejileri ile Destinasyon Pazarlaması Etkenliği arasında pozitif ilişki vardır. Ayrıca dijital yenilikler sunmak, olumlu destinasyon algısı yaratma ve turist davranışını etkileme konularında güçlü ve olumlu etki yapmaktadır.

SONUÇ

Bu çalışmada ikincil verilerden ve literatür çalışmalarından faydalanılarak dijitalleşmenin destinasyon pazarlamasındaki yeri incelenmiştir. Türkiye'de turizm sektöründe 2016 ve 2020 yıllarındaki dışsal şokların atlatılarak ilerlemeye devam edilmesi, sektörün yüksek uyum kapasitesinin göstergesidir. Paket turlardan ziyade bireysel seyahati tercih eden turislerin sayısının fazla olması, dijitalleşmeye gereken önemin verilmesini zorunlu kılmaktadır. Tabiatı gereği dijitalleşmeyi önceleyen Bilgi ve İletişim sektörlerini, dijitalleşmeyi pek çok alanının 1 numaralı platformu hale getiren turizm sektörü takip etmektedir. Birleşmiş Milletlerin akıllı kentler projesinin hedefleri için Türkiye'de büyük şehirler dışında da çalışılmalıdır. Turistlerin paket turları tercih etmemesi nedeniyle, geçimini turizmden sağlayan kasabalar için karşılaştırma ve karar verme süreçlerinin dijitale kayması bir zorunluluktur. Çünkü özellikle bireysel seyahat turizmi sektörünün dijitale her geçen gün daha fazla bağımlı olduğu görülmektedir. Dijital kanallar aynı zamanda müşteri iletişimini daha esnek ve kişiselleştirilebilir şekle sokmaktadır ve bu yolla küçük işletmeler büyüklerle rekabet edebilecek ölçekte pazarlama yapabilirler. Turizm sektöründeki küçük işletmelerin büyümesi, sektörün krizlere dayanıklılığını arttırır. Dijitalleşme aynı zamanda Ağızdan Ağıza İletişimin takibini ve cevaplandırılmasını da olanaklı hale getirmektedir. Turist akışı ve davranışına ilişkin veriler yerel organizasyonlar vasıtasıyla değerlendirilerek stratejik kararlar yerel yöneticiler vasıtasıyla verilmelidir.

KAYNAKÇA

Alhaddar, M. B., & Kummitha, H. R. (2025). Digitalization and sustainable branding in tourism destinations from a systematic review perspective. Discover Sustainability, 6(1), 1167.

Eurostat. (t.y.). Social media usage by enterprises (isoc_cismtn2) [Veri setine ait tablo]. Avrupa Komisyonu. Erişim tarihi: 28 Eylül 2026, https://ec.europa.eu/eurostat/databrowser/view/isoc_cismtn2__custom_21770150/bookmark/table?lang=en&bookmarkId=0f467c7a-ec35-41ad-b5db-f09f301afaff&c=1780994512000

Gutierriz, I., Ferreira, J. J., & Fernandes, P. O. (2025). Digital transformation and the new combinations in tourism: A systematic literature review. Tourism and Hospitality Research,

International Telecommunication Union. (2022). U4SSC – Smart tourism: A path to more secure and resilient destinations. https://www.itu.int/hub/publication/t-tut-smartcity-2022-07/

Ishida, K., Slevitch, L., & Siamionava, K. (2016). The Effects of Traditional and Electronic

Word-of-Mouth on Destination Image: A Case of Vacation Tourists Visiting Branson, Missouri. Administrative Sciences.

Kumar, A., & Barua, C. S. (2024). Leveraging digital innovations in tourism marketing: A study of destination promotion strategies. International Journal of Business and Management Research, 12(1), 08-12.

Türkiye İstatistik Kurumu [TÜİK]. (2026). Harcama türlerine göre ziyaretçilerden elde edilen turizm geliri (2012-2026) [Veri seti].

Uong, L. N. T. (2025). The ability to maintain the attractiveness of destinations: Exploring the role of digital marketing. Advances in Consumer Research.

A Comparative Analysis of The Turkish And Greek Economies In Terms Of Risk Indicators In The Post-Covid-19 Period

Dr. Tuna Şener[1]

[1] Trakya University, İpsala Vocational School, Department of Foreign Trade, tunasener@trakya.edu.tr, ORCID: 0000-0003-2715-1661

Abstract: The COVID-19 pandemic, first identified in late 2019, quickly developed into a worldwide public health crisis, generating far-reaching repercussions across economic, social and political spheres. While production and international trade volumes declined due to pandemic-related restrictions and disruptions to economic activity, unemployment rates, inflationary pressures, and global uncertainties rose markedly. Furthermore, supply chain disruptions and escalating geopolitical risks heightened the vulnerability of economies - particularly those that are developing or highly indebted-to external shocks. This study aims to conduct a comparative analysis of the macroeconomic risk levels of the Turkish and Greek economies for the 2020-2026 period in light of these developments. In this context, the economic risk profiles of both countries are assessed through a set of key macroeconomic and financial indicators, including the current account balance, inflation, public debt-to-GDP ratio, economic growth, CDS spreads and sovereign credit ratings.

A comparative risk profile of Türkiye and Greece has been constructed using current macroeconomic data from international organizations. The findings indicate that Greece exhibits a more stable outlook regarding risk indicators, thanks to the fiscal discipline implemented after 2010 and structural reforms conducted under European Union supervision; conversely, despite having lower public debt, Türkiye faces a higher market risk premium due to high inflation, political uncertainty, and a lack of confidence in monetary policy. However, the risk profiles of the two countries should be evaluated not only through quantitative indicators but also by considering structural factors such as institutional trust, the credibility of monetary policy, institutional independence and foreign policy uncertainties.

Keywords: Monetary Policy, Current Account Balance, Inflation, Credit Rating, CDS Premiums

1. INTRODUCTION

The spread of the COVID-19 pandemic, which began in the latter part of 2019, across the world in 2020 and its transformation into a global crisis placed significant pressure on the economic structures and macroeconomic balances of countries. In the literature, a pandemic is defined as a situation caused by infectious diseases that spread across a wide geographical area, transcend national borders, and affect a significant proportion of societies (Porta, 2008). Approximately a century ago, the 1918 influenza pandemic claimed the lives of at least 50 million people, making it one of the deadliest events documented in human history (Morens & Taubenberger, 2020).

Within the scope of efforts to combat the COVID-19 pandemic, significant increases in public expenditures were observed in many countries with the aim of supporting economic activity and reducing the resulting social costs, while budget balances deteriorated and central banks resorted to more accommodative monetary policy measures. These policy responses led to significant changes in the course of economic risk indicators at the global level. In particular, expansionary monetary and fiscal policies have ranked among the primary policy instruments that strengthened governments' intervention capacity - aimed at maintaining healthcare services, increasing social support, and safeguarding economic activities during the pandemic - and have become key components of crisis management (Park & Maher, 2020).

The economic conditions that emerged following the COVID-19 pandemic led to a reshaping of risk assessments among investors and other economic actors, making it necessary to address the relative vulnerabilities of countries from different dimensions. In this context, Türkiye and Greece constitute two suitable cases for comparative analysis, despite their differences in terms of economic structures and institutional characteristics, given their geographical proximity to each other and the ways in which they have been exposed to economic shocks emerging at the global level. Following the debt crisis experienced in the 2010s, Greece underwent a process of economic restructuring that placed particular emphasis on the sustainability of public finances and debt management within the framework of fiscal discipline policies implemented under the European Union. Although the Turkish economy achieved considerable growth rates during the same period, it exhibited a profile associated with a higher risk premium in financial markets due to high inflation, significant fluctuations in the exchange rate, and ongoing concerns regarding confidence in monetary policy.

The primary objective of this study is to comparatively evaluate the responses of the Turkish and Greek economies to similar global economic conditions and to identify the areas in which the two countries exhibit greater vulnerability and those in which they demonstrate stronger resilience. Accordingly, the study aims to provide an analytical framework that may contribute to the assessments of policymakers and to academic research based on the findings obtained. During the 2020-2026 post-pandemic period, the economic risk levels of the two countries were comparatively examined based on key macroeconomic and financial indicators, including the public debt-to-GDP ratio, inflation rate, economic growth, CDS (credit default swap) premiums, current account balance, and credit ratings. These indicators are important not only because they provide information on the domestic macroeconomic conditions of the countries, but also because they reflect international investors' perceptions of country-specific economic risk, their level of confidence, and their expectations regarding financial markets.

The changes in global economic conditions following the COVID-19 pandemic have necessitated a reassessment of the internal and external risk factors faced by countries. In this context, examining the macroeconomic indicators and economic risk profiles of Türkiye and Greece together not only contributes to understanding the economic conditions of these two countries but also has the potential to provide generalizable insights for assessing the economic vulnerabilities of other countries exposed to similar income levels, economic characteristics, and regional risks.

2. GENERAL CONDITIONS IN THE POST-PANDEMIC PERIOD

The COVID-19 pandemic caused significant demographic changes and unemployment, while economic activities were suspended in order to protect human life. The transportation and travel industries were among the sectors most severely affected, and global tourism declined to nearly zero during this period (Bashir et al., 2020: 1404). In 2020, as the coronavirus pandemic exerted its impact on a global scale, the world economy contracted by 4.0%, a rate that was approximately twice the contraction recorded during the 2008 global financial crisis (Oxford Economics, 2020).

Table 1: GDP Growth Rates of Selected Countries in 2020 (%)

Countries	Realized Growth Rates in 2020 (%)
China	2.3
TÜRKİYE	1.7
Bulgaria	-3.2
USA	-3.4
Brazil	-4.0
Germany	-4.8
Japan	-4.8
Canada	-5.4
India	-7.9
France	-8.1
Italy	-8.8
GREECE	-9.2
United Kingdom	-9.7

Source: The World Bank, Development Indicators; OECD (2020).

The data presented in Table 1 indicate that the global economies contracted significantly following the COVID-19 pandemic and that this contraction resulted in a pronounced economic slowdown on a global scale, including in advanced economies. In 2020, the economy of the United States contracted by 3.4%, while the economic contraction in the Euro Area reached 6.6%. In contrast, the Chinese economy recorded growth of 2.3%, while the Turkish economy grew by 1.7%, thereby ranking among the countries that achieved positive growth despite the overall contraction in the global economy. During the same period, the Greek economy experienced a significant contraction of 9.2%, indicating that the country's economy was substantially affected by the pandemic-induced economic shock.

These adverse developments in growth rates during the pandemic period also led to significant disruptions in the economic and financial systems of countries. The uncertainties generated by the crisis increased the importance of risk management, particularly for developing countries and those with vulnerable economies. In this context, this study conducts a comparative analysis of risk indicators between Greece and Türkiye, which

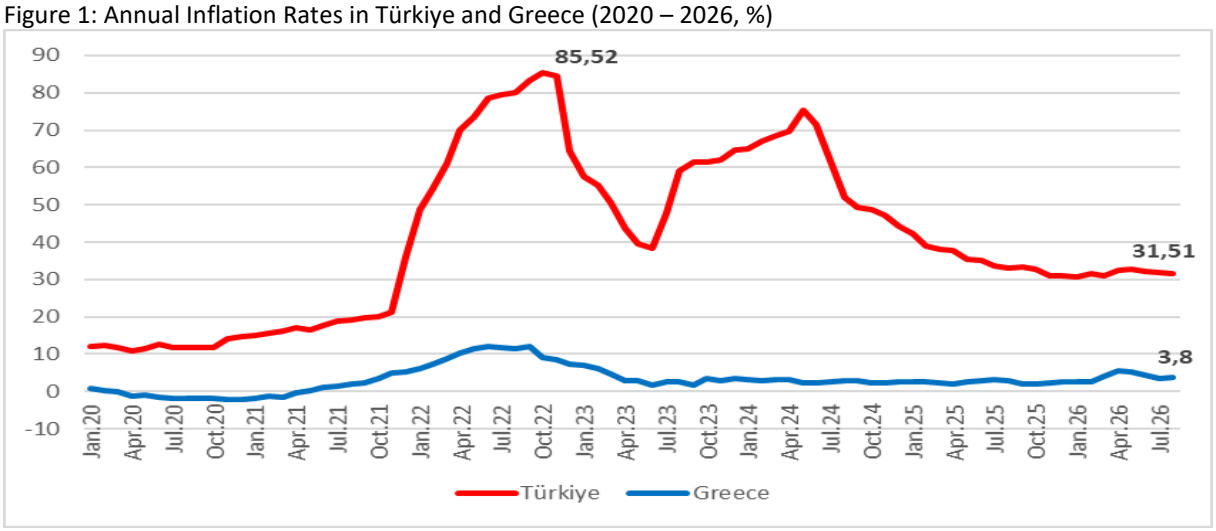
exhibit similar economic structures. Both countries are characterized by high public debt, externally dependent economic structures, and past experiences of financial crises.

3. RESARCH AND FINDINGS

In the comparative assessment of the economic risk factors of the two countries, the inflation indicator will be addressed first. In the economics literature, inflation is defined as a persistent upward trend in the general price level of an economy over a given period. Various economic and policy-related factors may contribute to increases in the price level, and inflationary developments may generate various economic consequences for households, producers, and public authorities. An excess of aggregate demand over the existing supply capacity, high interest rates, unanticipated or unplanned devaluation practices, investment expenditures exceeding the volume of savings, and the adoption of inappropriate economic policies are among the principal factors that may trigger increases in the general price level (Çiftci, 2015).

When Figure 1, which comparatively presents the inflation rates of Türkiye and Greece for the 2020–2026 period, is examined, it can be observed that inflation in Greece, which rose above 10% in 2022, subsequently entered a pronounced downward trend and declined to 3.8% as of August 2026. This development indicates that inflation-related risks in the Greek economy decreased considerably during the period. In Türkiye, however, the inflation rate exceeded 85% in October 2022, reaching a remarkably high level, and despite the subsequent implementation of tight monetary policies, it had declined only to 31.51% as of August 2026. At this inflation rate, Türkiye ranks among the countries with the highest inflation rates globally.

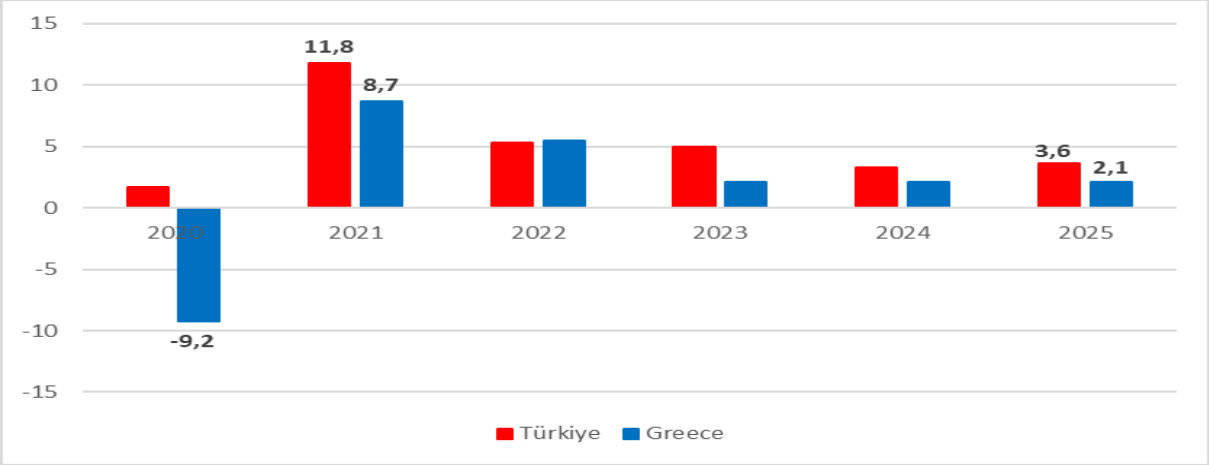
Figure 1: Annual Inflation Rates in Türkiye and Greece (2020 – 2026, %)



Source: TÜİK and EuroStat

The quarantine and lockdown measures implemented to limit the spread of the COVID-19 pandemic caused significant disruptions in global production and supply processes, while also exerting contractionary effects on aggregate demand conditions (Qin et al., 2020). These developments, which emerged alongside disruptions in production activities and a decline in economic activity, increased uncertainties regarding countries' economic performance in the post-pandemic period and made the risk of economic stagnation a significant macroeconomic threat. In this context, Figure 2 comparatively presents the annual GDP growth rates of the Turkish and Greek economies for the 2020-2026 period. The data indicate that, as a result of the economic contraction caused by the COVID-19 pandemic, the Greek economy contracted by 9.2% in 2020; however, it subsequently achieved a rapid recovery and grew by 8.7% in 2021. Despite the pandemic conditions, the Turkish economy recorded growth of 1.7% in 2020, while its growth rate increased to 11.8% in 2021. Although the pace of economic growth in both countries slowed in the following years compared with previous periods, the available data do not indicate a pronounced stagnation in economic activity. Indeed, the fact that the Greek economy grew by 2.1% in both 2024 and 2025, while the Turkish economy recorded growth rates of 3.3% and 3.6%, respectively in the same years indicates that a positive growth trend, rather than economic contraction, continued in both countries during the period under examination.

Figure 2: Annual GDP Growth Rates of Türkiye and Greece (2020 – 2026, %)



Source: TÜİK and EuroStat

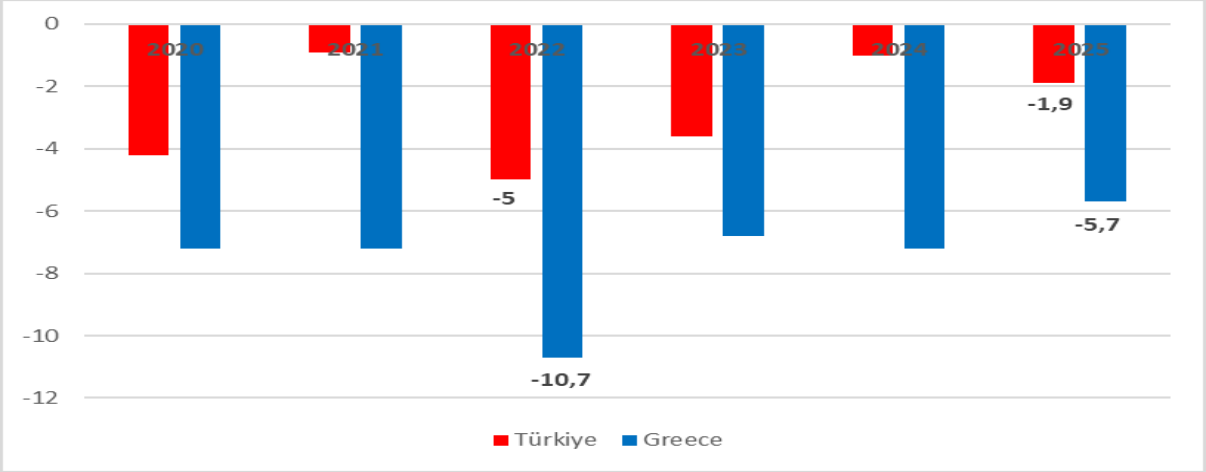
Another key indicator that should be taken into consideration in the assessment of economic risks is the current account balance. One of the economically significant characteristics of the current account balance is its ability to provide early-warning signals regarding crises that have not yet materialized. In particular, a gradual widening of the current account deficit can be regarded as one of the leading indicators of exchange rate crises that may emerge in subsequent periods (Peker & Hotunluoğlu, 2010). When the current account deficit reaches unsustainable levels, downward pressure may arise on the national currency, and this process may result in a sharp depreciation of the exchange rate. If the central bank intervenes in the foreign exchange market to limit such depreciation, this may lead to consequences such as higher interest rates and a rapid decline in international reserves. Therefore, the concept of a financial crisis is not limited solely to a substantial depreciation or devaluation of the national currency; extraordinary increases in interest rates and rapid and pronounced declines in central bank foreign exchange reserves are also regarded as important indicators of a crisis process (Kaminsky & Reinhart, 1999).

During the 2001-2010 period, the financing of the current account deficit that emerged in Türkiye to a significant extent through short-term capital flows enabled the deficit to become sustainable to a certain degree. During this process, the current account deficit became one of the fundamental dynamics of economic growth, while this growth structure based on external capital inflows also laid the groundwork for the current account deficit to become a chronic problem in the Turkish economy over time (Saçık & Alagöz, 2010).

Various sustainability approaches have been developed to determine whether a current account deficit constitutes an economic risk in a country. However, assessing the sustainability of such a deficit solely on the basis of its nominal level or its level independent of GDP may not be sufficient to reach a definitive conclusion. Therefore, the ratio of the current account deficit to GDP is widely used in analyses of the sustainability of the current account balance. Dornbusch regarded a current account deficit exceeding 4% of GDP as a critical threshold in terms of sustainability (Uygur, 2001). Freund (2000), on the other hand, examined the current account dynamics of industrialized countries and identified this threshold as 5% in terms of sustainability.

When Figure 3, which comparatively presents the current account deficit-to-GDP ratios of Türkiye and Greece for the 2020-2026 period, is examined, it can be observed that the ratio in Greece remained above the 5% level, which is considered critical in terms of sustainability, throughout the period. In particular, the current account deficit-to-GDP ratio reaching 10.7% in 2022 indicates that the country exhibited significant vulnerability in terms of its current account balance. Nevertheless, the ratio stood at 5.7% in 2025. From the perspective of Türkiye, it is noteworthy that the economy, which experienced a pronounced current account deficit problem in the early 2000s, exhibited a relatively more favorable outlook in terms of the current account balance during the 2020s. Indeed, the current account deficit-to-GDP ratio, which increased to 5% in 2022, declined to 1.9% as of 2025. Within this framework, the indicators presented in Figure 3 suggest that, during the period under examination, Greece exhibited a higher degree of vulnerability in terms of its current account balance compared with Türkiye.

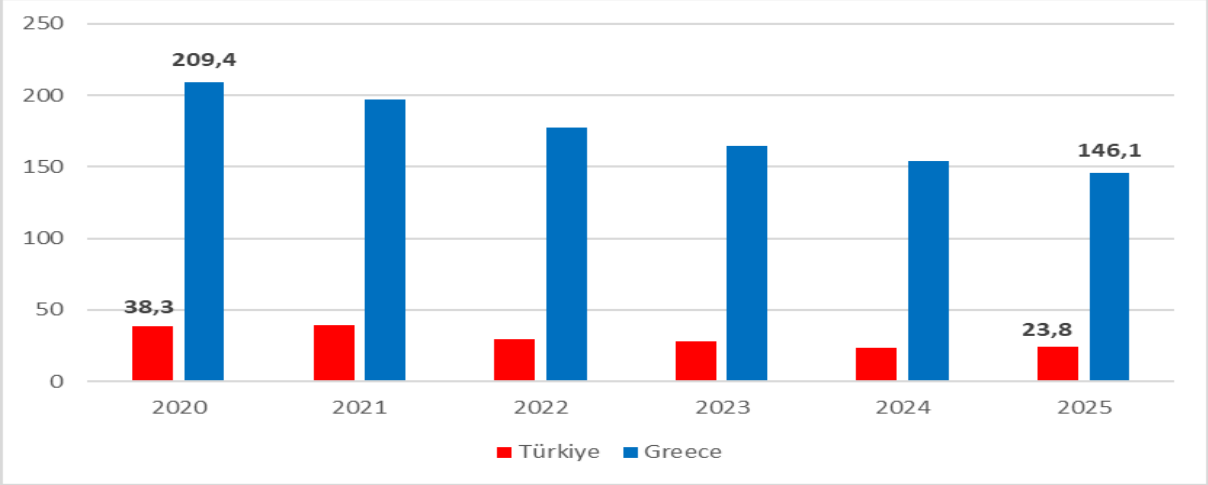
Figure 3: Current Account Deficit-to-GDP Ratios of Türkiye and Greece (2020 – 2026, %)



Source: TÜİK and EuroStat

One of the key indicators considered in assessing the risk profile of national economies is the level of public sector indebtedness. The slowdown that emerged in the global economy following the COVID-19 pandemic, together with the expansionary policy measures implemented to support economic activity, led to increases in public debt, particularly in emerging market economies and developing countries. However, when assessing the level of risk associated with public debt, focusing solely on the nominal size of debt is not sufficient. Instead, the public debt-to-GDP ratio, which indicates the size of the debt stock relative to the economy's overall production capacity, provides a more meaningful basis for assessment. In this context, Figure 4 comparatively presents data on the public debt-to-GDP ratios of Türkiye and Greece for the 2020–2026 period.

Figure 4: Public Debt-to-GDP Ratios of Türkiye and Greece (2020 – 2026, %)



Source: TÜİK and EuroStat

When the data presented in Figure 4 are evaluated, it can be observed that the effects of the Greek sovereign debt crisis that emerged toward the end of 2009 have continued to a considerable extent to the present day, despite the steady decline in the public debt-to-GDP ratio during the 2020–2026 period. Although the debt ratio declined continuously throughout the period in question, it is noteworthy that, as of 2025, this ratio still stood at a considerably high level of 146.1%. In other words, Greece's public debt stock corresponds to approximately 1.5 times the total economic value produced by the country in the same year. In contrast, the public debt-to-GDP ratio in Türkiye, which has also experienced various challenges in terms of public indebtedness throughout its history, stood at 23.8% in 2025, indicating a substantial difference in the debt structures of the two countries.

With the increasing integration of global economies and financial markets, credit rating agencies have assumed an important role in the international assessment of countries' economic performance and financial structures. These agencies analyse various economic, fiscal, and financial indicators within the framework of specific methodologies and assessment criteria and provide evaluations regarding the ability of governments and companies to meet their existing debt obligations. The results of these assessments are communicated to the

public through credit ratings expressed in alphabetical or numerical symbols, which summarize the credit risk and debt-servicing capacity of the borrower (Çalışkan, 2003: 9).

The scope of credit rating agencies' activities is quite broad, encompassing borrowers of different types, including banks, public institutions, local governments, and sovereign states. Although approximately 150 credit rating agencies are reported to operate globally; Standard & Poor's, Fitch, and Moody's stand out among the institutions exerting the greatest influence on the structure and functioning of the industry at the international level. Owing to their influence in the credit rating market and their extensive international presence, these three agencies are regarded as the principal actors in the industry (White, 2010: 216).

Credit rating agencies and the credit ratings assigned to countries by these agencies have been subject to various criticisms over time due to their influence on international capital markets. In particular, following financial crises, the assessment methodologies employed by these agencies and the effects of credit ratings on financial markets have been subject to more intensive debate (Gür & Öztürk, 2011: 69). Nevertheless, despite these criticisms, credit rating agencies continue to perform an important function in assessing countries' credit risk and key economic risk factors and remain among the principal actors in the global financial system. Table 2 comparatively presents the credit rating scales used by Standard & Poor's, Fitch, and Moody's. In terms of the respective rating systems, BBB- for Standard & Poor's and Fitch and Baa3 for Moody's represent the lower threshold of investment-grade status.

Table 2: Credit Rating Agencies' Rating Scale

Standard& Poor's	Fitch	Moody's	Note Description
AAA	AAA	Aaa	Prime
AA+	AA+	Aa1	High Grade
AA	AA	Aa2	
AA-	AA-	Aa3	
A+	A+	A1	Upper Medium Grade
A	A	A2	
A-	A-	A3	
BBB+	BBB+	Baa1	Lower Medium Grade
BBB	BBB	Baa2	
BBB-	BBB-	Baa3	
BB+	BB+	Ba1	Non-investment Grade
BB	BB	Ba2	
BB-	BB-	Ba3	Speculative
B+	B+	B1	
B	B	B2	Highly Speculative
B-	B-	B3	
CCC+	CCC	Caa	Substantial Risks
CCC	CC	Caa3	
CC	C	C	In Default
D	DDD DD D	D	Junk

Source: Kronwald, C. 2009. Credit rating and the impact on capital structure. Munich, GRIN Verlag

The credit ratings assigned to Türkiye by Standard & Poor's and Moody's during the 2020-2026 period are presented in Table 3. An examination of the table indicates that both credit rating agencies have recently made upward revisions to Türkiye's credit rating. Nevertheless, as of September 2026, Türkiye's credit rating stands at BB- according to Standard & Poor's and Ba3 according to Moody's. Under both rating scales, these ratings are three notes below investment-grade status, indicating that Türkiye's credit risk continues to be assessed as above the investment-grade threshold.

Table 3: Standard & Poor's and Moody's Credit Ratings of Türkiye (2020-2026)

	S&P				Moody's		
	Date	Rating	Outlook		Date	Rating	Outlook
1	01.11.2024	BB-	Stable	1	25.07.2025	Ba3	Stable

2	03.05.2024	B+	Positive	2	19.07.2024	B1	Positive
3	30.11.2023	B	Positive	3	12.01.2024	B3	Positive
4	29.09.2023	B	Stable	4	12.08.2022	B3	Stable
5	31.03.2023	B	Negative	5	11.09.2020	B2	Negative
6	30.09.2022	B	Stable				
7	10.12.2021	B+	Negative				

Source: https://www.spglobal.com/ratings, https://www.moodys.com

The credit ratings assigned to Greece by Standard & Poor's and Moody's during the same period are presented in Table 4. An examination of the data in Table 4 indicates that, as of September 2026, Greece is rated BBB by Standard & Poor's and Baa3 by Moody's, which means Greece is assessed as an "investment-grade" country by both credit rating agencies.

Table 4: Standard & Poor's and Moody's Credit Ratings of Greece (2020-2026)

	S&P				**Moody's**		
	Date	**Rating**	**Outlook**		**Date**	**Rating**	**Outlook**
1	18.04.2025	BBB	Stable	1	18.09.2026	Baa3	Positive
2	19.04.2024	BBB-	Positive	2	14.03.2025	Baa3	Stable
3	20.10.2023	BBB-	Stable	3	14.09.2024	Ba1	Positive
4	21.04.2023	BB+	Positive	4	15.09.2023	Ba1	Stable
5	22.04.2022	BB+	Stable	5	17.03.2023	Ba3	Positive
6	23.04.2021	BB	Positive	6	06.11.2020	Ba3	Stable
7	24.04.2020	BB-	Stable				

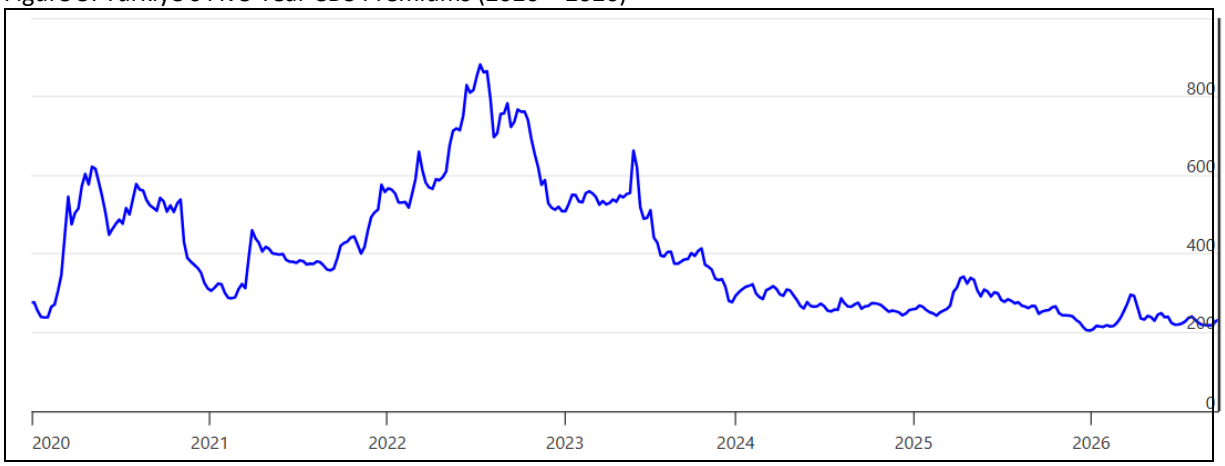
Source: https://www.spglobal.com/ratings, https://www.moodys.com

In addition to credit ratings, CDS (Credit Default Swap) premiums are among the important indicators used to measure sovereign credit risk. A CDS is a financial contract that enables investors to protect themselves against potential financial losses arising from situations such as a borrower's default, bankruptcy, or difficulty in fulfilling its obligations, while allowing the associated risk to be transferred to third parties. Unlike credit ratings, CDS premiums are continuously traded in financial markets and can be monitored in real time in response to changes in market conditions (Kaya et al., 2015).

Following the 2008 global financial crisis, discussions regarding whether the credit ratings issued by credit rating agencies adequately reflected the actual credit risk of countries and other borrowers gained greater prominence (Mora, 2006). This process increased the need for alternative indicators of credit risk that did not rely solely on credit ratings. In this context, CDS premiums emerged as an indicator capable of more directly reflecting market participants' expectations regarding credit risk, and the view that they could be used as an alternative measure to credit ratings has gained a place in the literature (Flannery, Houston & Partnoy, 2010).

Figure 5 presents the evolution of Türkiye's five-year CDS premiums. In general, a CDS premium remaining above 300 basis points is regarded as a strong market indicator of a high level of credit and default risk associated with a country's economy. An examination of Türkiye's CDS performance over the past five years shows that the premiums reached a particularly high level, exceeding 800 basis points in June 2022. The significant changes in the monetary policy approach implemented during this period and the risk perception in financial markets may be considered among the factors contributing to the increase in CDS premiums. In the subsequent period, CDS premiums declined markedly, falling to 232.78 basis points as of September 21, 2026. Nevertheless, the current level still remains relatively close to the 300-basis-point reference threshold.

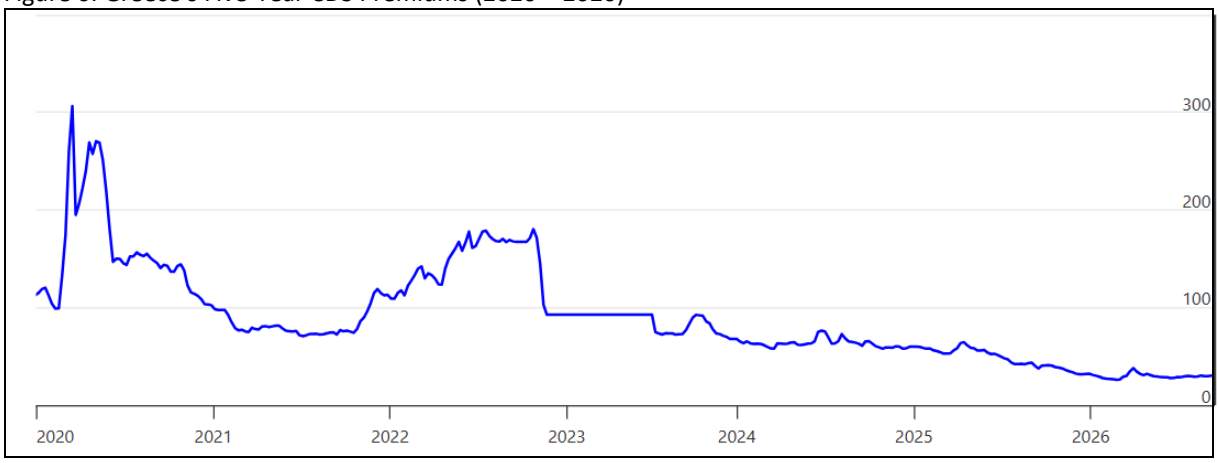
Figure 5: Türkiye's Five-Year CDS Premiums (2020 – 2026)



Source: https://www.worldgovernmentbonds.com/cds-historical-data/turkey/5-years/

Figure 6 presents the evolution of Greece's five-year CDS premiums since 2020. Despite Greece having significant macroeconomic risk factors, such as a high current account deficit and high public debt, its CDS premiums have remained below 100 basis points since 2023. CDS premiums, which temporarily exceeded 300 basis points in March 2020, entered a pronounced downward trend from the last quarter of 2023 onward. As this downward trend continued, the CDS premium reached a relatively low level of 30.73 basis points as of September 21, 2026. This development indicates that Greece's perceived sovereign credit risk in financial markets has declined considerably in recent years.

Figure 6: Greece's Five-Year CDS Premiums (2020 – 2026)



Source: https://www.worldgovernmentbonds.com/cds-historical-data/turkey/5-years/

4. CONCLUSION

The economic uncertainties caused by the COVID-19 pandemic on a global scale have necessitated a more comprehensive assessment of countries' macroeconomic risk indicators. In this context, comparing the economies of Türkiye and Greece, which share similar geographical characteristics and have experienced similar crises, is important for understanding the differences in the risk profiles exhibited by the two countries in the post-pandemic period. The analyses conducted for the 2020–2026 period indicate that Türkiye had lower ratios than Greece in terms of the public debt-to-GDP and current account deficit-to-GDP indicators. Indeed, according to the 2025 data, Türkiye's current account deficit-to-GDP ratio stood at -1.9%, whereas the corresponding ratio for Greece was -5.7%. Similarly, Türkiye's public debt-to-GDP ratio stood at 23.8% in 2025, while the corresponding ratio for Greece was 146.1%. These indicators suggest that, during the period under examination, Türkiye exhibited a lower degree of vulnerability than Greece in terms of public indebtedness and the current account balance.

Nevertheless, when CDS premiums, which reflect countries' market-based credit risk, and credit ratings are taken into consideration, a different risk profile emerges compared with the aforementioned indicators. Although Greece exhibits greater vulnerability than Türkiye in terms of key macroeconomic indicators such as public debt

and the current account deficit, as of September 2026, its CDS premium of 30.73 basis points represents a considerably lower risk premium than Türkiye's CDS premium of 232.78 basis points. A similar divergence is also observed in terms of credit ratings. While Greece is rated at investment-grade level by both Moody's and Standard & Poor's, Türkiye's credit ratings remain below investment-grade status according to both agencies. Therefore, traditional macroeconomic risk indicators, such as public debt and the current account balance, and market-based risk indicators yield different conclusions regarding the risk profiles of the two countries.

This divergent outlook indicates that the assessment of countries' credit risk should take into consideration not only quantitative macroeconomic indicators but also factors related to their economic and institutional structures. The fiscal discipline policies implemented by Greece under European Union supervision in the post-2010 period, regulations aimed at ensuring the sustainability of public finances, and institutional reforms contributed to restoring confidence in the country's economic management, which in turn led to a marked improvement in its credit ratings and CDS premiums. In the case of Türkiye, despite relatively low levels of public debt and current account deficits, factors such as high inflation, fluctuations in economic policies, concerns regarding the credibility of monetary policy, the adverse effects of high interest rates on economic activity, and confidence issues concerning the economic program implemented have been considered among the factors contributing to a higher perception of risk in the country's market-based risk indicators. Within this framework, it can be argued that market-based indicators such as CDS premiums and credit ratings are influenced not only by prevailing macroeconomic conditions but also by perceptions of institutional confidence, policy predictability, and economic stability.

In terms of reducing risk premiums and improving credit ratings in Türkiye, strengthening the institutional framework, enhancing the credibility of monetary policy, and improving the predictability of economic policies are of particular importance. The case of Greece suggests that strengthening fiscal discipline, implementing structural reforms, and establishing a policy framework in cooperation with international institutions can contribute to restoring investor confidence. In Türkiye, the decline in the inflation rate from above 85% in October 2022 to 31.5% as of August 2026, following the changes implemented within the monetary policy framework after June 2023, demonstrates the importance of price stability in the assessment of country risk. The improvements observed in CDS premiums and credit ratings during the same period also indicate that these developments should be evaluated in conjunction with changes in market risk perceptions. Within this framework, permanently establishing price stability, strengthening financial stability, and maintaining structural reforms that support the credibility of economic policies can be considered among the factors that may contribute to a more favorable outlook for Türkiye's risk indicators.

REFERENCES

Bashir, M. F., Ma, B., & Shahzad, L. (2020). A brief review of socio-economic and environmental impact of COVID-19. *Air Quality, Atmosphere & Health, 13*, 1403–1409.

Çalışkan, Ö. (2003). Kredi derecelendirme kuruluşları ve risk değerleme kriterleri [Credit rating agencies and risk assessment criteria]. *Sakarya Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi, 2*.

Çiftci, E. (2015). *Türkiye'de enflasyon ile ekonomik büyüme arasındaki ilişki: Ampirik bir uygulama (1980–2014)* [The relationship between inflation and economic growth in Türkiye: An empirical application (1980–2014)] [Master's thesis, Selçuk University].

Flannery, M. J., Houston, J. F., & Partnoy, F. (2010). Credit default swap spreads as viable substitutes for credit ratings. *University of Pennsylvania Law Review, 158*, 2085–2123.

Freund, C. L. (2000). Current account adjustment in industrialized countries. *International Finance Discussion Papers*, No. 692. Board of Governors of the Federal Reserve System.

Gür, H. T., & Öztürk, H. (2011). Ülke riski, derecelendirme kuruluşları, aksaklıklar ve yeni düzenlemeler [Country risk, rating agencies, deficiencies, and new regulations]. *Sosyoekonomi,* 69.

Kaminsky, G. L., & Reinhart, C. M. (1999). The twin crises: The causes of banking and balance-of-payments problems. *American Economic Review, 89*(3), 473–500.

Kaya Öner, E., Kaya, B., & Yalçıner, K. (2015). Reaction of credit default swap spreads to rating announcements: An event study for Turkey. *Journal of Economics, Finance and Accounting, 2*(4), 558–571.

Kronwald, C. (2009). *Credit rating and the impact on capital structure*. Munich, GRIN Verlag.

Mora, N. (2006). Sovereign credit ratings: Guilty beyond reasonable doubt? *Journal of Banking & Finance, 30*(7), 2041–2062.

Morens, D. M., & Taubenberger, J. K. (2020). The 1918 influenza pandemic and its legacy. *Cold Spring Harbor Perspectives in Medicine, 10*(10).

Oxford Economics. (2020). *Oxford Economics*. https://www.oxfordeconomics.com/

Park, S., & Maher, C. S. (2020). Government financial management and the coronavirus pandemic: A comparative look at South Korea and the United States. *The American Review of Public Administration, 50*(6–7), 590–597.

Peker, O., & Hotunluoğlu, H. (2010). Türkiye'de cari açığın nedenlerinin ekonometrik analizi [Econometric analysis of the causes of the current account deficit in Türkiye]. *Atatürk Üniversitesi İktisadi ve İdari Bilimler Dergisi, 23*(3), 221–237.

Porta, M. (2008). *Dictionary of epidemiology*. Oxford University Press.

Qin, M., Zhang, Y. C., & Su, C. W. (2020). The essential role of pandemics: A fresh insight into the oil market. *Energy Research Letters, 1*(*1*), 1–6.

Saçık Yapar, S., & Alagöz, M. (2010). Türkiye'de cari işlemler açığı sorunu ve borçlanma ile ilişkisi [The current account deficit problem in Türkiye and its relationship with borrowing]. *Ekonomi Bilimleri Dergisi, 2*(2).

Uygur, E. (2001). *Krizden krize Türkiye: 2000 Kasım ve 2001 Şubat krizleri* [Türkiye from crisis to crisis: The November 2000 and February 2001 crises] (Discussion Paper No. 2001/1). Türkiye Ekonomi Kurumu.

White, L. J. (2010). Markets: The credit rating agencies. *Journal of Economic Perspectives, 24*(2), 211–226.

Tozlaşma Hizmeti Güvenliği: Tarımsal Risk Yönetişimi için Bir Stok–Akış–Tahsis–Refah Çerçevesi

Assoc.Prof. Dr.Zekiye ŞENGÜL ABEDI[1] **Prof. Dr.Gamze SANER[2]**

[1] Siirt University, Faculty of Agriculture, Department of Agricultural Economics, Siirt, Türkiye; Email: zekiye.sengul@siirt.edu.tr, ORCID: 0000-0002-2496-2867

[2] Ege University, Faculty of Agriculture, Department of Agricultural Economics, İzmir, Türkiye; Email: gamze.saner@ege.edu.tr, ORCID: 0000-0002-2897-9543

Özet: Tozlaşma, birçok tarım ürününde verim ve kaliteyi etkileyen bir ekosistem hizmetidir. Yalnızca yıllık üretim katkısına odaklanan ekonomik değerlemeler, hizmetin sürekliliğini, çiftçilerin erişimini ve aksamalardan doğan kayıpların paydaşlar arasındaki dağılımını birlikte ele almakta yetersiz kalmaktadır. Bu çalışmada, söz konusu boyutları bütünleştiren Tozlaşma Hizmeti Güvenliği kavramı önerilmektedir. Gıda güvencesinin temel boyutlarından yararlanan bu kavram, bir tarım sisteminin tozlayıcı popülasyonlarının yenilenme kapasitesini koruyarak yeterli, istikrarlı, çiçeklenme dönemiyle uyumlu ve çiftçilerin erişebildiği bir tozlaşma hizmeti sağlama kapasitesini ifade etmektedir. Arı popülasyonlarını, gerçekleşen tozlaşma hizmetini, kovan kiralama yoluyla erişimi ve risk altındaki toplumsal refahı birbirine bağlayan basit bir dinamik model kurulmaktadır. Modelin varsayımları altında, yıllık üretim katkısına odaklanan değerlemeyi tamamlayan dört temel sonuç elde edilmektedir. Birincisi, ortalama tozlaşma düzeyi aynı olsa bile, arı popülasyonlarının daha yavaş yenilenmesi hizmet yetersizliklerinin sıklığını ve yıllar arası sürekliliğini artırmaktadır. İkincisi, yabani arıların artışı kiralık kovan talebini azaltabilmekte; ancak bu talep tepkisi, yabani ve yönetilen arıların tozlaşma üretiminde ikame olduğunu tek başına göstermemektedir. Üçüncüsü, tozlaşma kaybı toplam toplumsal refahı azaltırken, talebin fiyat açısından esnek olmadığı durumlarda yükselen fiyatlar üreticilerin toplam gelirini artırabilmektedir. Dördüncüsü, tek bir tozlaşma kaynağına dayanmak beklenen ekonomik getiriyi artırabilse de, yabani ve yönetilen arıların birlikte kullanılması büyük kayıp riskini azaltabilmektedir. Bu getiri ve risk ilişkisini değerlendiren bir karar kuralı sunulmaktadır. Çerçeve, sınanabilir önermeler, izleme göstergeleri ve veri kısıtlı bölgeler için kademeli bir uygulama yaklaşımıyla tamamlanmaktadır. Çalışma ampirik tahmin içermemekte; önerilen çerçevenin sınanması için gereken verileri ortaya koymaktadır.

Anahtar Kelimeler: Tozlaşma Hizmetleri; Gıda Güvencesi; Doğal Sermaye; Refah Etkilerinin Dağılımı; Koşullu Riske Maruz Değer.

Pollination Service Security: A Stock–Flow–Allocation–Welfare Framework for Agricultural Risk Governance

Abstract: Pollination valuation usually prices an observed flow, leaving implicit the stocks that generate it, the institutions that allocate it and who bears losses under uncertainty. This article develops Pollination Service Security (PSS): the capacity of an agricultural system to deliver sufficient, stable, well-matched and accessible pollination while renewing pollinator capital. It transfers the pillars of food security to a service produced by living capital and adds a contract-allocation stage to the ecosystem-service cascade. A four-component model (bee stocks, realised service, contracts and access, risk-adjusted welfare) yields four results. Holding the mean stock constant, stock variance and persistence fall with the net renewal rate over its biologically relevant range, so equal mean service can hide unequal multi-season shortage risk. A binding sufficiency target makes managed-colony demand decreasing in wild service at any interior solution, whatever the finite elasticity of substitution: procurement substitution coexists with biological complementarity. To first order, with season costs sunk, a shock raises crop-producer revenue if and only if demand is inelastic, while total surplus falls by roughly the value of lost output. For two symmetric sources with convex loss, diversification is preferred if and only if the gross-of-loss mean advantage of concentration lies below a threshold—closed-form at the tail level equal to the failure probability—that rises with loss convexity and tail-risk aversion and falls with failure correlation; its tail-risk component is positive only above the joint-failure probability. Five refutable propositions, five diagnostic indicators, a three-tier protocol for data-poor settings and a policy-ranking map over normative weights follow. Rather than estimating, the article specifies the minimum data required for identification.

Keywords: Pollination Services; Food Security; Natural Capital; Welfare İncidence; Conditional Value at Risk.

1. INTRODUCTION

Animal pollination supports the reproduction of a large share of the world's crops, with a dependence that varies by crop (Klein et al., 2007; Aizen et al., 2009) and extends to quality and shelf life (Klatt et al., 2014); its loss would affect nutrition as well as output (Smith et al., 2015). Pollinator populations are under pressure from land use, pathogens, pesticides and climate-related stress (Potts et al., 2010, 2016; IPBES, 2016); yields are frequently limited by insufficient pollination even where honey bees are present (Reilly et al., 2020; Turo et al., 2024); wild

pollinators raise fruit set independently of honey-bee abundance (Garibaldi et al., 2013); and pollination demand and managed-honey-bee supply can drift apart geographically (Breeze et al., 2014). Reviews of the economic literature find a growing number of monetary estimates whose reliability remains contested (Hanley et al., 2015; Breeze et al., 2016), describe policy and economic analysis as embryonic and concentrated in developed countries (Porto et al., 2020), and identify the contribution of wild pollinators, the joint management of wild and managed pollinators and the future sustainability of rental markets as open questions (Baylis et al., 2021). The economic problem is broader than attaching a price to an ecosystem service.

Three distinctions organise the argument. First, pollinator populations, colony health and habitat are stocks; flower visits during a crop's receptive window are flows, and a high flow in one season can be obtained by drawing down a stock, importing colonies or shifting service away from another location. Second, aggregate biological capacity is not farm-level access: timing, mobility, contracting costs, information, bargaining power and crop profitability determine who receives service. Third, gross production value is not social welfare: a production gain is divided among farmers, beekeepers, processors and consumers, while pesticide exposure, habitat depreciation and programme costs appear elsewhere in the accounts.

Existing valuation methods each answer a specific question. Dependency ratios expose the scale of vulnerability (Gallai et al., 2009); replacement cost prices a feasible substitute under stated conditions (Allsopp et al., 2008); production-function approaches link ecological inputs to pollination delivery and output (Kremen et al., 2002), and the attributable-net-income method subtracts input costs so that only the pollination actually used is valued (Winfree et al., 2011); spatial assessments show that benefits are unevenly distributed (Lautenbach et al., 2012). Adjacent research supplies the remaining components one at a time: coupled pollination and crop markets (Lee et al., 2019), economy-wide loss analysis (Bauer and Sue Wing, 2010, 2016), partial-equilibrium agri-food simulation of a wild-pollinator collapse (Feuerbacher et al., 2025), farm-level ecological–economic integration (Kleftodimos et al., 2021), pollinator diversity valued as resilience in a dynamic two-stock model (Engström et al., 2020) and operational-risk assessment of managed delivery (Castro Mercado et al., 2024). The economics of pollination markets—from the reciprocal beekeeper–grower externality (Meade, 1952) and its internalisation through contracts (Cheung, 1973; Rucker et al., 2012) and market adaptation to disease shocks (Rucker et al., 2019), through the bioeconomics of colony management (Champetier et al., 2015), to the determinants of almond pollination fees and long-distance colony supply (Goodrich, 2019; Goodrich et al., 2019)—shows that access to managed service is priced, contracted and rationed rather than automatic, and the insurance value of biodiversity and ecosystem resilience (Baumgärtner, 2007; Quaas and Baumgärtner, 2008; Baumgärtner and Strunz, 2014) supplies the risk logic for valuing a diverse pollinator portfolio. None treats renewal of pollinator capital, allocation through contracts, tail risk and welfare incidence at the same time.

This article proposes Pollination Service Security (PSS) as the construct that connects them. The claim is deliberately narrow: not to invent dynamics, contracting, resilience valuation or welfare analysis, but to place renewable stocks, matched flows, contract access and risk-bearing welfare in one diagnostic sequence, to derive what that sequence implies and to state how the implications could be refuted. Section 2 defines PSS and its four modules. Section 3 states a minimal dynamic model. Section 4 derives four analytical results from it, and Section 5 turns them into refutable propositions and diagnostic indicators. Section 6 sets out the policy and implementation logic, including a three-tier route for data-poor settings. Section 7 is a synthetic calculation check that displays the decision rule as a map over normative weights. Section 8 discusses the framework's position and limits, and Section 9 concludes. The article is a theory-building contribution: it reports no empirical dataset or estimate, and the numerical example of Section 7 carries no empirical interpretation.

2. POLLINATION SERVICE SECURITY

2.1 Definition, antecedents and the corrected errors

Pollination Service Security is the ability of an agricultural system to deliver a sufficient, stable, accessible and spatiotemporally matched pollination flow for valued crops, while maintaining the ecological and managed capital required to reproduce that flow and distributing residual risk transparently.

The definition transfers the four pillars of food security—availability, access, utilisation and stability, implicit in the 1996 definition (FAO, 1996) and made explicit by FAO (2006), the first three of which Barrett (2010) treats as hierarchical and which the High Level Panel of Experts has extended with agency and sustainability (HLPE, 2020; Clapp et al., 2022)—to a service produced by living capital. The same multi-attribute logic underlies water

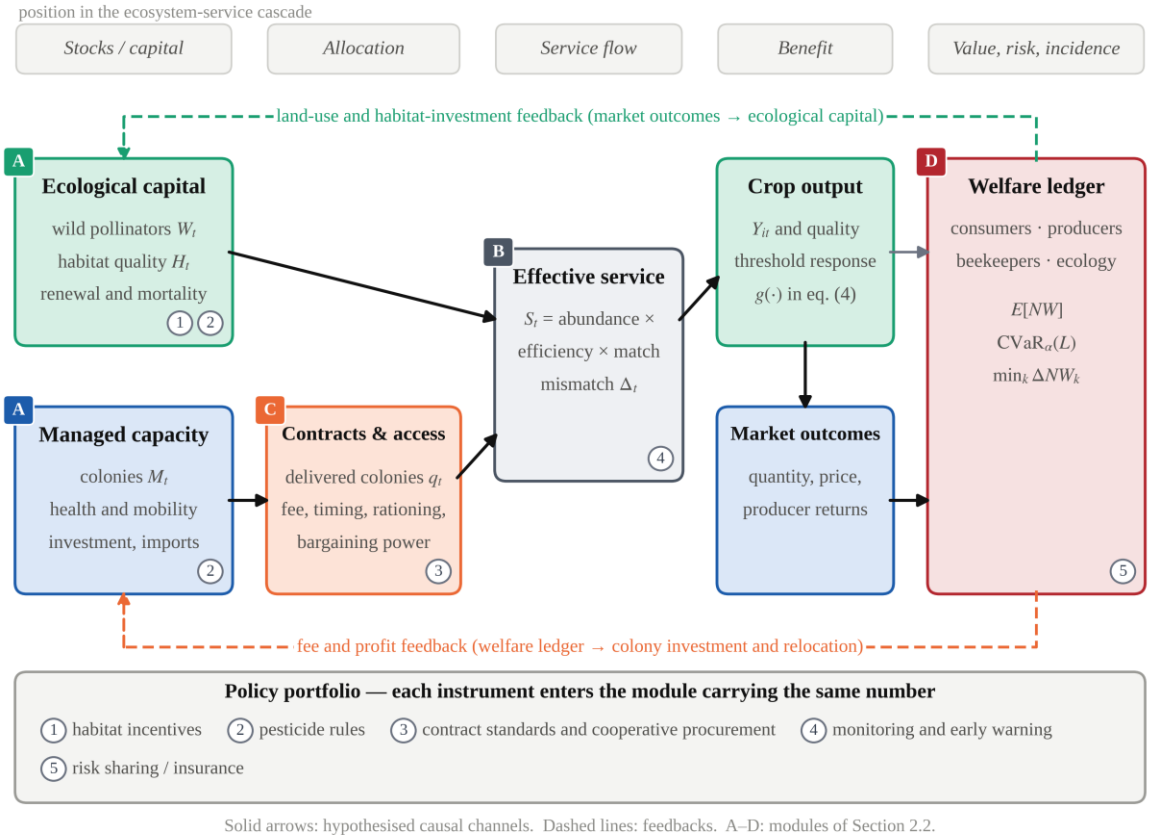
security (Grey and Sadoff, 2007; Cook and Bakker, 2012) and energy security (Sovacool and Mukherjee, 2011), although attribute lists have been criticised for leaving the object of security undefined (Cherp and Jewell, 2014); here the object is the flow of effective pollination during a crop's receptive window, together with the stock that produces it and the institution that allocates it. The term itself is not new: it has served as a management and resilience objective in applied programmes—guidelines for securing crop pollination (Hort Innovation, 2021) and a project on biodiversity as a provider of pollination security (FiBL, 2021)—and Australia's first national status report defines pollination security as reliable and sustainable access to pollination services from healthy, diverse pollinators and reports hive supply against crop demand under scenarios (Wheen Bee Foundation, 2026). The definition adopted here is compatible with those usages but names the object of security and makes each of its elements measurable; what is claimed as a contribution is the integrated model and the conditional results derived from it, not the term. Table 1 states the correspondence and adds what distinguishes a service produced by a renewable stock from a commodity: the condition of the asset, which natural-capital accounting records separately from the flow (United Nations et al., 2021) and which corresponds to the sustainability dimension of the six-dimensional food-security framework (HLPE, 2020). Each dimension is matched with an indicator from Section 5, allowing the security status to be assessed via a dashboard.

Table 1. Correspondence between the food-security pillars, the PSS dimensions and the diagnostic indicators of Section 5.

Food-security pillar	PSS dimension	Diagnostic question	Indicator (Section 5)
Availability	Sufficient	Is the delivered service enough for the crop-specific target?	SSR
Access	Accessible	Does biological capacity reach the farms that need it, at an affordable fee and in time?	CAC
Utilisation	Matched and effective	Is service present when and where the crop is receptive, and from guilds that are effective for the crop?	SMI
Stability	Stable	How large are expected and tail losses across ecological and market states, and how concentrated is service across sources?	RWL (with CVaR); PPD
-(asset condition)	Renewable	Is today's flow financed by depreciating the stock that produces it?	Net renewal $r - \bar{\mu}$; habitat trend (asset-condition account)

Five category errors recur in applied pollination valuation, each conflating two adjacent stages of the ecosystem-service cascade (Haines-Young and Potschin, 2010; Potschin and Haines-Young, 2011), an asset with the flow it generates (United Nations et al., 2021) or intermediate with final services (Boyd and Banzhaf, 2007): (i) a colony count or habitat area is treated as delivered pollination; (ii) regional capacity is treated as farm-level access; (iii) gross crop value is reported as net social benefit; (iv) expected output is treated as security, so that volatility, threshold failure and tail loss disappear; and (v) managed colonies are assumed to replace wild-pollinator functions rather than tested for it. Several have been noted individually (Breeze et al., 2016); PSS corrects them jointly, and they coexist in practice: a region may report many colonies yet lose a crop because they arrive after peak bloom, a replacement-cost estimate may then price additional hives although the constraint is coordination, and successful short-run importation can conceal habitat deterioration. The framework therefore begins with the production and renewal process, not with a valuation technique. The system boundary is crop–region–season specific: an application states the crops and quality attributes, the pollinator guilds, the spatial unit over which colonies move, the time step, the service window and the welfare groups; honey enters only when it changes colony investment, mobility or joint-product economics, and non-market ecological effects are recorded as separate quantities unless a defensible shadow price exists.

2.2 Four linked modules



Solid arrows: hypothesised causal channels. Dashed lines: feedbacks. A–D: modules of Section 2.2.

Fig. 1. The PSS architecture. Renewable stocks (Module A) generate an effective service flow (Module B); contracts and access (Module C) allocate mobile managed capacity before it enters the flow; crop and market outcomes determine a risk-adjusted welfare ledger (Module D); and economic outcomes feed back into habitat, land use and colony investment. The band above the boxes gives the position of each module in the ecosystem-service cascade (Haines-Young and Potschin, 2010); the allocation stage makes explicit, for this service, the institutional mediation that the canonical cascade leaves implicit (Spangenberg et al., 2014). Solid arrows are hypothesised causal channels, dashed lines feedbacks; numbered circles mark the module on which each instrument of Table 4 acts (③ covers both contracting rows).

Figure 1 shows the four modules. Module A (renewable capital): wild-pollinator capacity, managed-colony capacity and habitat quality persist across periods but depreciate or regenerate; they are state variables, not measures of delivered service. Module B (effective service): service depends on abundance, pollination efficiency, floral compatibility, weather and coincidence with the crop's receptive window. Module C (allocation and access): mobile colonies are assigned through contracts, informal exchange or vertical integration, and search costs, transport, bargaining power and credit can ration access even when total capacity is adequate. The canonical cascade has no explicit allocation stage between potential supply and realised benefit; cascade extensions (Spangenberg et al., 2014), work on who benefits and through which institutions (Daw et al., 2011; Fisher et al., 2014) and the co-production literature (Palomo et al., 2016; Woodhead et al., 2025) recognise such mediation in general terms, and PSS makes it a separate, measurable state for one service—colonies delivered under contract, q—because for managed pollination the institution determines which farm receives the flow, at what fee and when. Module D (welfare and risk): production enters crop markets, changes prices and redistributes surplus; the accounting boundary also includes beekeeper returns, programme costs, ecological depreciation and losses concentrated in adverse states.

3. A MINIMAL DYNAMIC MODEL

The model is deliberately parsimonious and is not estimated here. Each equation identifies a mechanism and the observations required to test it; Section 4 derives what the equations jointly imply. Let *i* index crop-location units, *r* regions over which colonies move, *t* seasons and *z* states of the world.

3.1 Ecological and managed stocks

Wild-pollinator capacity *W* evolves through density-dependent renewal, habitat-dependent carrying capacity, mortality pressure and net immigration:

$$W_{i,t+1} = W_{i,t} + r_i^W W_{i,t}\left[1 - \frac{W_{i,t}}{K_i(H_{i,t})}\right] - \mu_i(P_{i,t}, C_{i,t})W_{i,t} + I_{i,t} \quad (1)$$

Here *H* is habitat quality, *K*(*H*) the carrying capacity it supports, *P* pesticide exposure, *C* climatic stress and *I* net movement; *W* may be a latent capacity inferred from repeated guild-specific observations rather than a single abundance index, provided the measurement model is reported. Visitation and pollinator richness decline with distance from natural habitat (Ricketts et al., 2008), and the global synthesis of Kennedy et al. (2013) confirms that local and landscape habitat variables predict wild-bee abundance and richness across agroecosystems; distance-weighted habitat share within the foraging range, the core of the Lonsdorf et al. (2009) landscape model, is therefore a widely used low-cost proxy for *K*. Managed capacity *M* responds to biological depreciation, beekeeper investment and mobility:

$$M_{r,t+1} = (1 - \delta_{r,t}^M)M_{r,t} + J_r(\Pi_t^b, b_t) + \iota_{r,t}^+ - \iota_{r,t}^- \quad (2)$$

where *J* is investment in new colonies as a function of expected beekeeper profit Π^b and credit access *b*, and $\iota^{\pm}$ are colony imports and exports; region *r* can differ from crop location *i* because colonies move. In the bioeconomic model of Champetier et al. (2015), which is specified per bee, the beekeeper chooses honey extraction (feeding being its negative) and culling, revenue comes from pollination fees and honey, winter mortality is embedded in the seasonal decay of the bee stock, and maintenance and transport costs are absorbed into a net pollination price per bee. Equation (2), which is specified at the colony level because contracts, fees and losses are recorded per colony, keeps that structure but separates its components—mortality as the explicit rate δ^M, and transport, labour, feeding and colony-renewal costs as separate entries in Π^b—because the access indicator and the incidence accounts of Sections 5 and 6 require each to be observed and priced on its own. Managed supply is therefore endogenous rather than an unlimited engineering substitute: the global managed stock has grown more slowly than the demand for pollination (Aizen and Harder, 2009); the supply of colonies shipped into California for almond bloom is price-responsive at the extensive geographic margin but nearly inelastic in traditional supplier regions (Goodrich et al., 2019); and fees and colony numbers have adjusted to disease shocks (Rucker et al., 2019).

3.2 Effective, matched service

Raw abundance becomes economically relevant only after effectiveness and mismatch are considered. Service is a nested constant-elasticity-of-substitution (CES) aggregate of effectiveness-weighted wild and managed inputs, scaled by foraging weather and discounted for spatiotemporal mismatch:

$$S_{i,t} = A_{i,t}\Phi\left(E_{i,t}^W W_{i,t}, E_{i,t}^M q_{i,t}\right) exp\left(-\chi_i \Delta_{i,t}\right), \quad \Phi(x,y) = [a^W x^\rho + a^M y^\rho]^{1/\rho}, \quad \sigma = \frac{1}{1-\rho} \quad (3)$$

A captures weather during foraging; E^W and E^M are per-unit pollination effectiveness of wild and managed guilds; *q* is managed capacity actually delivered to unit *i* (the quantity constrained in equation (5)); Δ is temporal and spatial mismatch; and σ is the elasticity of substitution. The parameter ρ nests the alternative forms ($\rho = 1$ perfect substitutes, $\rho \to 0$ Cobb–Douglas, $\rho < 0$ complements, $\rho \to -\infty$ Leontief), so complementarity is a testable restriction, $\sigma < 1$, rather than a maintained biological fact. The mismatch term is motivated by simulations showing that differential phenological shifts can reduce plant–pollinator overlap (Memmott et al., 2007), by reviews concluding that shifts may differ between plants and their pollinators although parallel responses are common (Hegland et al., 2009; Forrest, 2015), and by observed mismatches (Kudo and Ida, 2013; Burkle et al., 2013)—although long-term records also show parallel advances that preserve synchrony for some generalist bees (Bartomeus et al., 2011), so that Δ is a quantity to be measured rather than presumed—and by the

observation that induced early flowering can leave a crop without adequate native pollination (Sritongchuay et al., 2021).

3.3 Crop response

For crop *i* with pollination dependence *d* between zero and one, output separates into a non-pollination component and a pollination-dependent component:

$$Y_{i,t} = \bar{Y}_{i,t}\left[(1-d_i) + d_i g_i\left(\frac{S_{i,t}}{S_i^*}\right)\right] exp(\varepsilon_{i,t}), \quad g' > 0 \qquad (4)$$

S^* is the service requirement for the chosen yield or quality target. Two options for the response g are distinguished and must be pre-specified. Option (4a), the concave response, imposes $g'' \leq 0$ throughout and suits crops for which additional visits have diminishing returns. Option (4b), the threshold response, allows $g'' > 0$ below an inflection point $\tilde{S} < S^*$ and $g'' \leq 0$ above it, so that fruit set collapses below a critical visitation rate; its limiting case is the step function used in Result 2, and the convex downside loss of Result 4 is its welfare counterpart. Crop experiments are needed to identify g: dependence categories describe the loss under complete pollinator removal, not the shape of the response (Aizen et al., 2009), whereas visitation–yield curves estimated within crops (Reilly et al., 2020; Turo et al., 2024) and the global positive but management- and climate-dependent yield–abundance relationship (Vezzani et al., 2025) constrain it.

3.4 Allocation through contracts

Delivered managed capacity is constrained by available mobile capacity, logistics and an access indicator:

$$\sum_i \ell_i q_{i,t} \leq M_t^{mob}, \quad q_{i,t} \geq 0, \quad q_{i,t} = 0 \; if \; a_{i,t} = 0 \qquad (5)$$

The load factor ℓ incorporates travel time, colony-days and handling, and $a_{i,t} \in \{0, 1\}$ records whether unit *i* has contract access. Access may fail because the expected crop margin cannot cover the fee, credit is absent, minimum contract size is too large, information arrives late or suppliers ration capacity. A competitive benchmark allocates q where its marginal value product equals marginal delivery cost. The empirical pollination-market literature shows that this benchmark is informative but incomplete: fees respond to colony strength (Goodrich, 2019), to honey by-product value and to pest-induced cost shocks, whereas the pollinated crop's own price had no statistically significant effect in the sample of Rucker et al. (2012); supply is geographically concentrated, with the marginal supplier lying increasingly far from the crop (Goodrich et al., 2019); and contract terms themselves carry value—beekeepers accept lower fees in exchange for pesticide-protection clauses (Fenton et al., 2025). Market power, bilateral bargaining or cooperative allocation therefore produce different incidence and should be modelled rather than hidden inside an average fee.

3.5 Risk-adjusted social welfare

Let z denote a joint state of weather, pollinator health and market demand. Net welfare in state z is

$$NW_t(z) = CS_t(z) + PS_t^{crop}(z) + PS_t^{bee}(z) - C_t^{pol}(z) - D_t^{eco}(z) - X_t(z) \qquad (6)$$

where *CS* is consumer surplus, the *PS* terms are crop-producer and beekeeper surplus, *C* is real public programme cost, *D* is ecological depreciation not already internalised and *X* records other external costs. Transfers such as fees and taxes are not social costs, although they matter for distribution.

Security requires more than expected welfare. Let π_0 be the status quo and, for any policy portfolio π, let $\Delta NW(\pi, z) = NW(\pi, z) - NW(\pi_0, z)$ be the welfare change, $\Delta NW_k(\pi)$ the expected change for stakeholder group k, and $L(\pi, z) = \max\{0, NW^{ref} - NW(\pi, z)\}$ the shortfall below a reference level fixed before the analysis and held constant across policies. A portfolio is ranked by

$$\Omega(\pi) = E[\Delta NW(\pi)] - \lambda \, CVaR_\alpha[L(\pi)] + \eta \min_k\{\Delta NW_k(\pi)\} \qquad (7)$$

$CVaR_\alpha$ is conditional value at risk, defined throughout as the expected shortfall over the worst α share of probability mass (Rockafellar and Uryasev, 2000); $\alpha = 0.10$ therefore corresponds to the 90% level in the confidence-level convention. The last term gives explicit weight to the least-benefited stakeholder group. The

reference level in L is pre-specified—typically the expected status-quo outcome or a legislated target—so that tail losses are comparable across portfolios; changing it changes every *CVaR* by the same construction and must be reported as a sensitivity. The expected-welfare and group terms are changes relative to the status quo and the tail term is a level, all in the same welfare units, so λ and η are dimensionless; the status quo therefore scores $-\lambda\ CVaR_\alpha[L(\pi_0)]$ rather than zero, and only the differences $\Omega(\pi) - \Omega(\pi_0)$ are decision-relevant. Because *CVaR* is coherent in the sense of Artzner et al. (1999) for general, including discrete, loss distributions (Pflug, 2000; Rockafellar and Uryasev, 2002; Acerbi and Tasche, 2002), the mean–CVaR criterion respects second-order stochastic dominance and rewards diversification through sub-additivity; variance-based criteria are consistent with stochastic dominance only under restrictive conditions (Chavas, 2004) and are not sub-additive in this sense. The stakeholder set k comprises consumers, crop producers and beekeepers and—as a declared normative choice—the ecological account $-D^{eco}$, read as the surplus of future users of the pollinator asset who cannot bargain in the present season; this extends the insurance value of natural capital (Quaas et al., 2019) and the resilience value of ecosystems (Hahn et al., 2023) to the intergenerational view of natural capital as an inclusive-wealth asset (Dasgupta, 2021) and is the counterpart of the renewal dimension in Table 1. This is not double counting in the accounting sense—$-D^{eco}$ enters *NW* once, as a cost—but it is a deliberate normative re-weighting: with the ecological account in k, the weight η raises the weight on ecological depreciation above the weight it carries inside *NW*, and it is declared as such. The alternative reading treats ecological depreciation purely as an efficiency cost inside *NW* and restricts k to human groups; both are legitimate, the choice must be reported, and Section 7 reports the ranking under both.

Where risk is borne unequally, (7) extends to a criterion in which each group's expected change is penalised by the tail of its own loss L_k at a group-specific weight λ_k:

$$\Omega'(\pi) = E[\Delta NW(\pi)] - \lambda\ CVaR_\alpha[L(\pi)] + \eta \min_k\{\Delta NW_k(\pi) - \lambda_k\ CVaR_\alpha[L_k(\pi)]\} \quad (7a)$$

Here $L_k(\pi, z) = \max\{0, NW_k^{ref} - NW_k(\pi, z)\}$ is group k's shortfall below a group-specific reference level NW_k^{ref} that, like NW^{ref}, is fixed before the analysis and held constant across policies, and $\lambda_k \geq 0$. Equation (7a) is a model extension rather than part of (7): with $\lambda_k = 0$ it collapses to (7), and it is where an instrument that redistributes risk without changing the aggregate loss, such as insurance, shows its value (Section 6.1).

Equation (7) is not implemented by asking an analyst to pick a single 'correct' pair of λ and η. Expected net welfare, tail loss and the stakeholder incidence vector are reported before aggregation, and portfolios dominated on all three are discarded. Where a scalar decision is required, λ can be elicited from an indifference question (how much expected welfare the authority would give up to reduce one unit of worst-tail loss) and recorded as a range, and distributional protection is more transparent as a constraint, $\Delta NW_k \geq b_k$, than as an opaque η. Where preferences cannot be elicited, the default is robustness rather than invented weights (Lempert et al., 2006): report the winning portfolio over a grid of λ and η with its margin of victory, identify switch points and apply minimax regret (Savage, 1951) as a secondary rule. Equation (7) is thus a sensitivity surface and a governance device, not a claim that ethics can be estimated from ecological observations.

4. FOUR ANALYTICAL RESULTS

Equations (1)–(7) are identities and behavioural hypotheses, not conclusions; this section shows what they jointly imply under stated assumptions. Results 1 and 3 apply standard tools—the linearisation of a stochastic renewal process and textbook incidence analysis—to the pollination setting, and their contribution lies in what they imply for measurement and reporting. Results 2 and 4 are new in this context relative to the method literature reviewed in Section 8.2, although neither is a deep theorem: Result 2 is an identification result, and Result 4 states a diversification threshold in closed form in observable quantities.

4.1 Result 1: stock–flow non-equivalence

Consider one unit with managed delivery fixed at $\bar{q}$, so that service is a strictly increasing function of the wild stock, $S = s(W)$ with $s' > 0$ from (3), and the shortage event $S < S^*$ is equivalent to $W < W^* \equiv s^{-1}(S^*)$. Let mortality contain an additive shock, $\mu_t = \bar{\mu} + \sigma_\mu e_t$, with e_t independent standard-normal innovations, so that the linearised stock below is Gaussian and the normal probabilities used in this section are exact for the linear approximation. With $I = 0$ the deterministic steady state of (1) is $\bar{W} = K(1 - \bar{\mu}/r)$. Two systems can share the same $\bar{W}$—and therefore, to first order, the same mean service and the same single-season valuation (exactly so when s is linear; for concave s the higher-variance system has slightly lower mean service, which reinforces the result)—while

differing in r and $\bar{\mu}$, provided habitat K differs: faster renewal on less habitat, or slower renewal on more. Linearising (1) around $\bar{W}$ for the deviation $x_t = W_t - \bar{W}$ gives

$$x_{t+1} = \varphi x_t - \sigma_\mu W e_t, \quad \varphi = 1 - (r - \bar{\mu}) \tag{8}$$

The stock is a first-order autoregressive process whose persistence φ and stationary variance are both governed by the net renewal rate $r - \bar{\mu}$ (stationarity requires $0 < r - \bar{\mu} < 2$; the biologically relevant range, in which the stock does not overshoot, is $0 < r - \bar{\mu} < 1$):

$$Var(W) = \frac{\sigma_\mu^2 W^2}{(r-\bar{\mu})(2-(r-\bar{\mu}))} \tag{9}$$

Holding $\bar{W}$ fixed, both φ and Var(W) are strictly decreasing in $r - \bar{\mu}$ on $0 < r - \bar{\mu} < 1$; Var(W) is minimised at $r - \bar{\mu} = 1$ and rises again on (1, 2), where the process overshoots, so every statement of Result 1 and Proposition 1 is restricted to $0 < r - \bar{\mu} < 1$. Let $z = -(\bar{W} - W^*)/\sqrt{\text{Var}(W)}$ be the standardised headroom. The probability of a single-season shortage is $\Phi(z)$, which rises with the variance provided the mean stock exceeds the requirement ($\bar{W} > W^*$, so $z < 0$); with negative headroom a larger variance lowers the shortage probability, but such a system is insecure on its mean alone and lies outside the case Result 1 addresses. The probability of shortage in two consecutive seasons is the bivariate-normal orthant probability

$$Pr(W_t < W^*, W_{t+1} < W^*) = \Phi_2(z, z; \varphi) \tag{10}$$

which is increasing in φ for fixed z by Slepian's inequality (Slepian, 1962), applicable because the two coordinates have equal variance.[5] Both channels point the same way: conditional on the mean stock and with positive headroom, a lower net renewal rate raises the probability, the persistence and hence the expected duration of shortage. Figure 2 illustrates: two simulated stocks with identical long-run mean but net renewal rates of 0.30 and 0.10 differ visibly in the length of their excursions below W^* (panel a), and the two-season shortage probability falls by between one and more than four orders of magnitude across $0 < r - \bar{\mu} < 1$, depending on headroom (panel b). A single-season valuation, which conditions on the realised flow, cannot distinguish the two systems. The result is derived for additive Gaussian shocks. This is Proposition 1 and the formal reason for reporting the asset condition (Table 1, last row) alongside the flow.

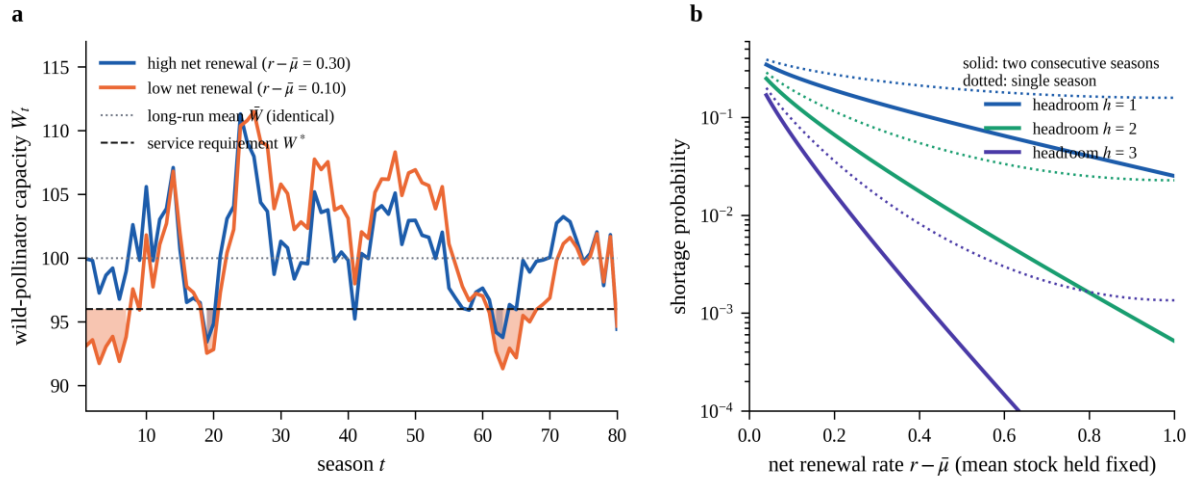


Fig. 2. Stock–flow non-equivalence (Result 1). (a) Two simulated wild-pollinator stocks from equation (1) with identical long-run mean ($\bar{W}$ = 100), identical Gaussian mortality shocks (σ_μ = 0.03) and different net renewal rates; habitat K is set so that the means coincide. Shaded areas mark seasons in which the stock falls below the service requirement W^* = 96. (b) Probability of shortage in one season (dotted) and in two consecutive seasons (solid) as a function of the net renewal rate, from equations (9)–(10), for standardised headroom $h = (\bar{W} - W^*)/(\sigma_\mu \bar{W})$ of 1, 2 and 3; log scale. Analytical or simulated values from stated parameters; none is empirical.

[5]For a centred bivariate normal vector with equal variances and correlation φ, Pr($X \le z$, $Y \le z$) is non-decreasing in φ (Slepian, 1962). The conditional probability of a second shortage given a first, $\Phi_2(z, z; \varphi)/\Phi(z)$, rises from 0.34 at φ = 0.3 to 0.76 at φ = 0.9 for z = −0.8.

4.2 Result 2: a binding sufficiency target generates procurement substitution even under biological complementarity

Suppose the farmer's procurement problem is to reach the sufficiency target $S \geq S^*$ at minimum fee cost, which is the relevant margin whenever g in (4) follows the threshold option (4b). Write $x = E^W W$ and $y = E^M q$ for the effectiveness-weighted inputs in (3). The managed demand q^* solves $\Phi(x, y) = \Phi^* \equiv (S^*/A)\exp(\chi\Delta)$, and implicit differentiation gives

$$\frac{dq^*}{dW} = -\frac{E^W}{E^M} \cdot \frac{a^W}{a^M} \cdot \left(\frac{x}{y}\right)^{\rho-1} < 0 \qquad (11)$$

at any interior solution with $q^* > 0$ and for every finite ρ, that is, for every elasticity of substitution short of the Leontief limit—including $\sigma < 1$, where the two inputs are complements in production; at the corner $q^* = 0$, where wild service alone attains the target, and in the Leontief limit the derivative is zero rather than negative. Under a binding sufficiency target, the negative sign of the procurement response alone therefore does not identify the elasticity of substitution: the sign holds for every finite ρ, while the magnitude of the slope in (11) still depends on σ through $(x/y)^{\rho-1}$. A negative response of managed procurement to wild service is thus consistent with a binding sufficiency constraint rather than evidence of biological substitutability. Under strong complementarity ($\rho < 0$) there is, moreover, a floor $W_{\min} = \Phi^*/[E^W(a^W)^{1/\rho}]$ below which no quantity of managed colonies reaches the target—the case in which the private substitution margin ceases to exist. If the farmer observes wild service with noise, $\tilde{W} = W + e$, and acts on the conditional expectation, the response estimated from procurement data is attenuated to first order by the information reliability:

$$\beta_{q,W} = \frac{\tau^2}{\tau^2 + \sigma_e^2} \cdot \frac{dq^*}{dW} \qquad (12)$$

where τ^2 is the variance of wild service across units and σ_e^2 the noise variance; the approximation deteriorates where q^* is strongly convex, that is, near the floor $W_{\min}$. Where the target is not binding and the grower maximises profit, the procurement response depends on σ and on relative prices and can take either sign; Result 2 is therefore a scope-conditioned statement for the binding case, not a universal sign. Result 2 yields a joint prediction rather than an existence claim: in systems where factorial field data give $\sigma < 1$, procurement data should show a negative response of managed demand to wild service whose magnitude increases with the quality of farmers' information about wild service. Either a non-negative response in such systems, or a response invariant to information quality, refutes the sufficiency-constraint reading. Because crop-pollination delivery is concentrated in a few common species, the delivery argument alone is insufficient for conserving rare pollinators (Kleijn et al., 2015); Result 2 adds that the sign of the procurement margin observed by growers is silent about the biological value of the wild stock.

4.3 Result 3: incidence of a pollination shock

Result 3 is textbook incidence analysis. It is stated because the welfare ledger turns on it, and because a recent partial-equilibrium simulation of a European wild-pollinator collapse in the CAPRI agri-food market model displays the same pattern: producer prices rise enough that producers as a group gain, consumers bear the brunt and net welfare falls (Feuerbacher et al., 2025). Let aggregate crop supply in a season fall by a proportion ϑ because S falls below S^* in (4). With inverse demand $P(Q)$, price elasticity of demand $\varepsilon < 0$ and season-fixed input costs, the first-order changes in crop-producer surplus, consumer surplus and total surplus are

$$\Delta PS^{crop} = \theta PQ\left(\frac{1}{|\varepsilon|} - 1\right), \quad \Delta CS = -\frac{\theta PQ}{|\varepsilon|}, \quad \Delta TS = -\theta PQ \qquad (13)$$

To first order, total surplus falls by the value of the lost output whatever the elasticity; consumers always lose; and crop producers gain if and only if $|\varepsilon| < 1$, their gain being financed entirely by consumers. These are local approximations that presume sunk season costs—with variable harvest costs the social loss is smaller than ϑPQ—and for a discrete shock with linear demand the exact condition is

$$\Delta PS^{crop} > 0 \quad \Leftrightarrow \quad |\,\varepsilon_0\,| < 1 - \theta \qquad (14)$$

so that a larger shock narrows the range of elasticities over which producers gain. If farm j loses a proportion ϑ_j while the aggregate shock is $\bar{\vartheta}$, its revenue change is

$$\Delta R_j = PQ_j\left(\frac{\theta}{|\varepsilon|} - \theta_j\right) \quad (15)$$

Farms with exposure below $\bar{\vartheta}/|\varepsilon|$ gain from the price rise (below-average exposure suffices only when $|\varepsilon| \le 1$); farms with $\vartheta_j > \bar{\vartheta}/|\varepsilon|$ lose. Figure 3 plots both expressions. Two scope conditions follow. Incidence reversal requires a downward-sloping residual demand: for a crop traded at a world price the regional $|\varepsilon|$ is effectively infinite and producers bear the full loss, so the sign of producer incidence is a property of the crop's market scale, not of pollination as such. Within the season, beekeeper surplus is held fixed by assumption: fees are set by contract before bloom, and other beekeeping revenues and costs are taken as unaffected by the crop shock, so the incidence on beekeepers runs through the renegotiation of the next season's contract terms, which (2) and (5) make endogenous. The empirical literature is consistent with this timing without establishing it on its own: fees respond to beekeepers' cost shocks, to colony strength and to demand growth, and the crop's own price was not a statistically significant determinant in the sample of Rucker et al. (2012) (see also Goodrich, 2019). Result 3 is Proposition 4 and the reason Module D reports incidence by group rather than a single surplus total.

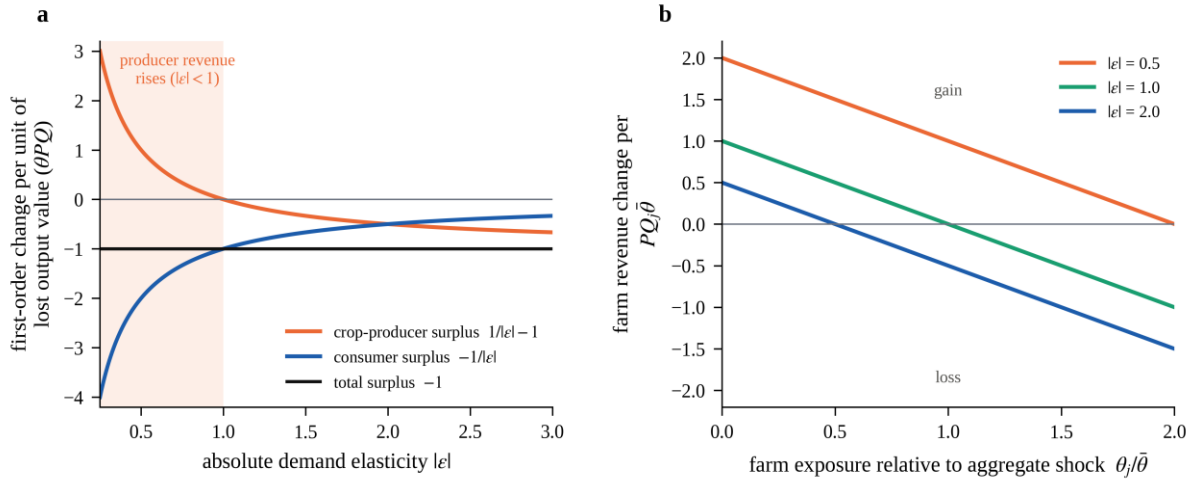


Fig. 3. Incidence of a proportional pollination shock (Result 3). (a) First-order changes in crop-producer surplus, consumer surplus and total surplus per unit of lost output value ϑPQ, equation (13), as a function of the absolute demand elasticity. Producers gain in the shaded region $|\varepsilon| < 1$; total surplus falls by exactly one unit everywhere. (b) Revenue change of an individual farm per $PQ_j\bar{\vartheta}$, equation (15), as a function of its exposure relative to the aggregate shock, for three elasticities. Analytical expressions.

4.4 Result 4: when a diversified pollination portfolio is preferred

Consider two symmetric service sources—for instance a managed-colony contract and a wild-pollinator habitat measure—each delivering one unit of service unless it fails, with the same failure probability p and pairwise failure correlation ρ (for Bernoulli failures, $\rho \ge -p/(1-p)$). The concentrated portfolio buys two units of one source; the diversified portfolio buys one of each. Downside cost is convex in the shortfall, $L = c(2-S)^{\kappa}$ with $\kappa \ge 1$, as it is under the threshold option (4b). Writing $p_{11} = p^2 + \rho p(1-p)$ for the joint-failure probability, the expected-loss and tail-loss differences are

$$E[L_{con}] - E[L_{div}] = c\,p(1-p)(1-\rho)(2^{\kappa}-2) \quad (16)$$

$$CVaR_p[L_{con}] - CVaR_p[L_{div}] = c(1-p)(1-\rho)(2^{\kappa}-1) \quad (17)$$

(with $\alpha = p$). The tail level matters: for $\alpha \le p_{11}$ the worst α mass of both portfolios consists entirely of joint failure and the tail difference is exactly zero; it is positive for $\alpha > p_{11}$, largest at $\alpha = p$, and for $\kappa = 1$ vanishes again once $\alpha \ge 2p - p_{11}$. Diversification therefore protects the intermediate tail, not the extreme tail in which both sources fail. Three properties of (16)–(17) are immediate: with a linear downside ($\kappa = 1$) diversification is neutral in expectation and pays only through the tail term; with a concave downside it loses in expectation; and both advantages vanish as failures become perfectly correlated ($\rho \to 1$). Now let the concentrated portfolio have a mean advantage $b \ge 0$—an expected welfare advantage measured gross of the shortfall losses L, for instance because managed capacity yields more in normal states, net of any ecological depreciation it causes—so that

expected net welfare for each portfolio is its gross expected welfare minus its expected loss. Under (7) with η = 0 the diversified portfolio is preferred if and only if

$$b \le c(1-p)(1-\rho)[p(2^{\kappa}-2)+\lambda(2^{\kappa}-1)] \qquad (18)$$

or, solving for the failure correlation, if and only if $\rho \le \rho^{*}(\kappa;\lambda)$, where

$$\rho^{*}(\kappa;\lambda) = 1 - \frac{b}{c(1-p)[p(2^{\kappa}-2)+\lambda(2^{\kappa}-1)]} \qquad (19)$$

(If the advantage is measured net of expected losses, $\tilde{b} = b - (\mathrm{E}[L_{\mathrm{con}}] - \mathrm{E}[L_{\mathrm{div}}])$, the condition reads $\tilde{b} \le \lambda c(1-p)(1-\rho)(2^{\kappa}-1)$; the two statements are equivalent.) The switch curve $\rho^{*}(\kappa;\lambda)$ rises in loss convexity and in tail-risk aversion and falls in the mean advantage of concentration (Fig. 4). Two conditions underlie (18)–(19). First, the tail term is evaluated at $\alpha = p$, the level at which (17) holds; for any other tail level α the diversified portfolio is preferred if and only if $b \le cp(1-p)(1-\rho)(2^{\kappa}-2) + \lambda D(\alpha)$, where $D(\alpha)$ denotes the CVaR of the concentrated portfolio minus that of the diversified portfolio at tail level α; this difference is zero for $\alpha \le p_{11}$, so that below the joint-failure probability only the expected-loss advantage of diversification remains, and with p = 0.10, ρ = 0, κ = 2 and c = 1 it falls from 2.70 at α = 0.10 to 0.72 at α = 0.25. The threshold and the switch curve are therefore specific to the reported tail level, and (19) is their $\alpha = p$ case. Second, the loss L of this section coincides with the shortfall in (7) when the reference level is the common no-failure welfare and the advantage of concentration accrues in its non-failure states, as when managed capacity yields more in normal seasons: the two portfolios then have the same gross welfare in failure states and the tail is computed on L alone. If the advantage instead accrues in every state, the concentrated portfolio's shortfall below the common reference falls by b in its failure state and the condition tightens to $b(1+\lambda) \le c(1-p)(1-\rho)[p(2^{\kappa}-2) + \lambda(2^{\kappa}-1)]$: that is, b in the numerator of (19) is replaced by $(1+\lambda)b$, which lowers ρ^{*} without changing its comparative statics. Result 4 makes precise the sense in which the insurance value of a diverse pollinator portfolio (Baumgärtner, 2007; Baumgärtner and Quaas, 2010; Engström et al., 2020) is an empirical quantity: it is positive only when failures are imperfectly correlated and the downside is convex, and it exceeds the mean advantage of concentration only below the switch curve. An expected-value criterion (λ = 0) and the Ω criterion rank the two portfolios differently exactly when b lies between the right-hand sides of (16) and (18); evidence that crop diversity acts as natural insurance (Di Falco and Chavas, 2009) that pollinator communities show response diversity, a mechanism expected to stabilise crop visitation (Winfree and Kremen, 2009), and that the stability of visitation falls with isolation from natural habitat (Garibaldi et al., 2011) suggests that this region is not empty. This is Proposition 5.

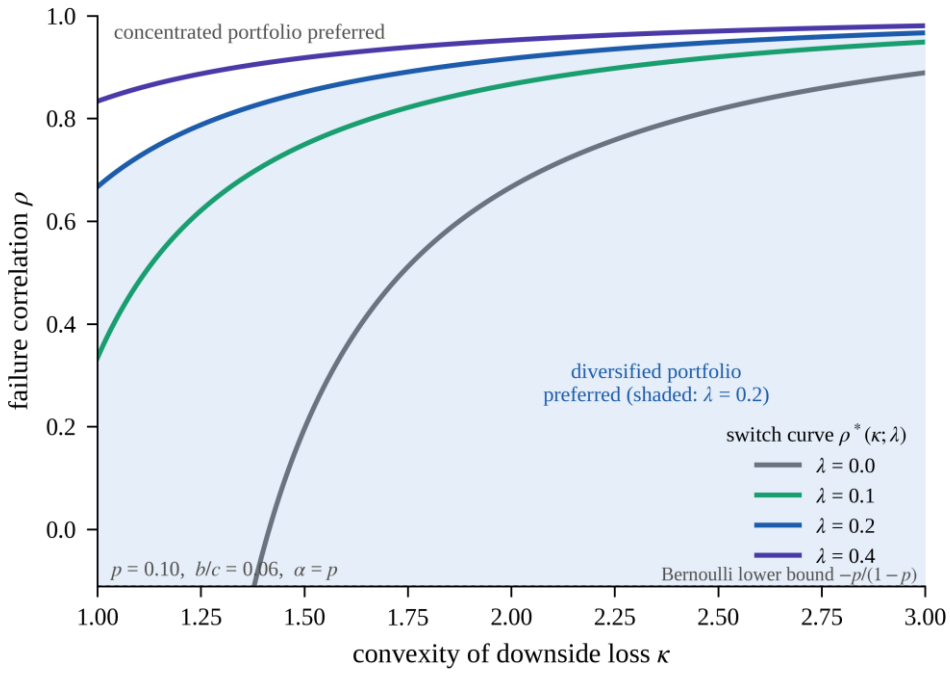


Fig. 4. Switch curve for portfolio diversification (Result 4). Below each curve the diversified portfolio is preferred under the mean–CVaR criterion (7) for the indicated tail-risk weight λ; above it the concentrated portfolio is preferred. The curves plot $\rho^{*}(\kappa;\lambda)$ from equation (19) for failure probability p = 0.10 and a gross-of-loss mean

advantage of concentration equal to 6% of the unit loss scale (b/c = 0.06), with $\alpha = p$, the tail level at which the tail advantage of diversification is largest; the shaded area is the diversified region for λ = 0.2. The dashed line at $-p/(1-p) = -0.11$ is the lower bound of the failure correlation for Bernoulli failures; the curves are drawn only over the admissible range.

5. REFUTABLE PROPOSITIONS AND DIAGNOSTIC INDICATORS

Table 2 states five propositions in conditional form, records the result each follows from and names the observation that would refute it. Propositions 1, 4 and 5 are quantitative predictions with a sign or a threshold; Propositions 2 and 3 are joint predictions about two estimable objects, which a single observation can contradict. None is an existence claim.

Table 2. Propositions, their derivation, the refuting observation and the minimum empirical design.

Proposition	Derived from	Refutable prediction	Refuted if	Minimum empirical design
P1 Stock–flow non-equivalence	Result 1; eqs (8)–(10)	Conditional on the mean stock (and, to first order, mean service) and with positive headroom ($\bar{W} > W^*$), the probability and persistence of shortage decrease in $r - \bar{\mu}$ over $0 < r - \bar{\mu} < 1$.	Shortage persistence is unrelated to estimated net renewal, or stock variables add nothing once lagged flow is included.	Panel of stocks and delivered service; survival or transition model for shortage spells.
P2 Procurement substitution under a binding target	Result 2; eqs (11)–(12)	Where $\sigma < 1$ is estimated, managed-colony demand per hectare falls with observed wild service at interior solutions, more steeply the better farmers' information (a local prediction for moderate dispersion of wild service).	A non-negative procurement response in $\sigma < 1$ systems, or a response invariant to information quality.	Factorial field data for σ; matched procurement records; instruments for wild service (habitat share, foraging weather, randomised habitat enhancement); a measure of information (monitoring, extension, own counts); a test that the target binds.
P3 Contract bottleneck	Eq. (5): delivered q = min(demand, access-rationed supply)	Conditional on biological capacity and crop demand, lower contract accessibility predicts lower realised service and larger shortfalls, especially for small or credit-constrained farms.	CAC has no conditional predictive power for realised service or shortfalls.	Supplier–farmer matched data with requests, refusals, timing, farm size, credit and outcomes.
P4 Incidence reversal	Result 3; eqs (13)–(15)	To first order, a negative shock raises aggregate crop-producer revenue iff $\lvert\varepsilon\rvert < 1$ by (13)—for a finite shock with linear demand iff $\lvert\varepsilon_0\rvert < 1 - \vartheta$ by (14)—while total surplus falls by $\approx \vartheta PQ$; farms with $\vartheta_j < \bar{\vartheta}/\lvert\varepsilon\rvert$ gain by (15).	The estimated revenue response has the sign opposite to that implied by the estimated elasticity.	Market panel or structural demand–supply model linked to crop-specific shocks; farm-level exposure data.
P5 Portfolio ranking reversal	Result 4; eqs (16)–(19)	For two symmetric sources with convex loss, given estimated (p, ρ, κ, b, λ) at the tail level $\alpha = p$, the diversified portfolio outperforms on a realised	An independently determined ranking—out-of-sample mean–CVaR performance, or Ω computed from observed loss	Joint failure model for instruments; loss-curvature estimates from crop response;

	mean–CVaR criterion iff $\rho \le \rho^*(\kappa; \lambda)$ by (19); for any other α, the threshold uses the general tail-loss difference D(α), defined in Section 4.4, which is zero for $\alpha \le p_{11}$; with $\kappa \le 1$ or $\rho = 1$ it never pays in expectation, and with $\alpha \le p_{11}$ never in the tail.	distributions—contradicts the sign predicted by (18)–(19) at the estimated parameters.	policy cost data; out-of-sample performance records for both portfolio types.

The propositions locate failures at module level, but a failed test is first a reason to re-examine the module's assumptions, measurement and identification, not a licence to delete it. If P1 fails after those checks, the stock variables add no predictive content beyond the lagged flow and the renewal account can be reported without a dynamic stock model. If P2 and P3 both fail, the procurement and access channels do not explain realised service and Module C reduces to a descriptive access indicator. If P4 fails, the sign of producer revenue is not the one the elasticity implies; the incidence accounts remain necessary, because consumer and producer effects still differ, but the market model that links them must be re-specified. If P5 fails, the closed-form threshold does not describe real instrument pairs; the risk term in (7) would be shown decision-irrelevant only by the separate finding that Ω and expected-value rankings coincide for every policy pair, which is not a refutation of Result 4. No single failure refutes the framework; the integration claim survives only if the stock, access and risk modules each add explanatory content relative to the neighbouring models of Section 8.2.

The integration claim is itself made refutable by a pre-registrable comparative test. For a declared set of crop–region–seasons, the full PSS specification must improve out-of-sample prediction of shortage events and of stakeholder-level welfare changes relative to two benchmarks—a flow-only valuation that conditions on realised service, and a market model without the stock and access modules—by a margin fixed at pre-registration and set either from a decision analysis—the smallest improvement that would change the recommended portfolio for the declared decision-maker—or from a power calculation; a 10% reduction in the Brier score of shortage forecasts or in decision regret over the (λ, η) grid is an illustration, not a general threshold. All compared models must use the same forecast horizon and the same information set available at the forecast origin. If the margin is not met, the conclusion is confined to what was tested: in the evaluated context and against the pre-specified benchmarks, no additional predictive or decision value has been demonstrated, whatever the fate of the individual propositions.

Table 3 defines the five indicators that make the modules observable. They are intentionally non-interchangeable: a high SSR with low portfolio diversity may be productive but fragile (Result 4), and a region can have low mismatch and low accessibility when suppliers serve only large farms (P3). A composite PSS index should be built only for a stated decision rule; otherwise weights obscure the mechanism that policy must address.

Table 3. Diagnostic indicators of Pollination Service Security.

Indicator	Definition	Diagnostic question	Minimum evidence
Service Sufficiency Ratio (SSR)	$S_{i,t} / S^*_i$	Does delivered service reach the crop-specific target?	Repeated visitation and effectiveness observations; crop-response data for S^*.
Spatiotemporal Mismatch Index (SMI)	$1 - \int\int \min\{s(t, \ell), d(t, \ell)\}\, d\ell\, dt$, where d is the density of receptive flowers of the crop and s the density of delivered service (visits or colony-days) over the season t and the locations ℓ of the unit, each normalised to integrate to one; the time-only version measures temporal mismatch alone	Is capacity present at the wrong place or time?	Bloom phenology, pollinator activity and colony arrival/departure dates.
Pollinator Portfolio Diversity (PPD_{bio}, PPD_{con})	$1 - \Sigma_j s_j^2$, computed separately over biological guilds (PPD_{bio}: s_j the share of effective service from guild j) and over contractual suppliers (PPD_{con}: s_j the share of managed service from	How concentrated is effective service across guilds, and managed service across suppliers?	Guild-specific contribution shares; supplier and contract shares; failure

	supplier or contract *j*); the two are not pooled because their mechanisms and data differ		correlation across sources for Result 4.
Contract Accessibility Coverage (CAC)	$\Sigma_i a_i q_i^{\text{timely}} / \Sigma_i q_i^{\text{req}}$: colony-days delivered within the receptive window to units with contract access, divided by colony-days requested by all units with positive crop demand (CAC_{req}); where requests are unobserved the denominator is the agronomically recommended quantity and the indicator is reported as CAC_{rec}; the two are named separately so that studies are not compared across denominators	Does biological capacity reach the farms that need it?	Contract requests, fulfilment, timing, refusals and prices.
Risk-Weighted Welfare Loss (RWL): an indicator family under a declared weight scenario	$(NW^{\text{ref}} - \mathrm{E}[NW]) + \lambda\, \mathrm{CVaR}_\alpha(L)$, with CVaR_α the expected shortfall over the worst α mass; equals a constant minus Ω when $\eta = 0$, so the same λ carries the same weight in both; not comparable across studies without its scenario, so it is reported together with $NW^{\text{ref}} - \mathrm{E}[NW]$, $\mathrm{CVaR}_\alpha(L)$ and the (NW^{ref}, α, λ) used	How large are expected and tail welfare losses relative to the benchmark?	Joint ecological, production, price and cost distributions; pre-specified NW^{ref} and α.

Note: the renewal dimension of Table 1 is reported alongside these five flow indicators as an asset-condition account—the estimated net renewal rate $r - \bar{\mu}$ and the trend in habitat or carrying capacity from Module A—rather than as a sixth composite indicator, because it is the parameter combination that governs the stock dynamics of equation (1)—the state variable being the stock *W* itself—rather than a ratio of flows; Proposition 1 is its test.

6. FROM DIAGNOSIS TO POLICY

6.1 Instruments and a decision protocol

The relevant policy choice is usually a portfolio rather than a single intervention. Habitat measures act slowly on ecological capital; pesticide rules alter mortality and external cost; managed-service contracts respond quickly but depend on capacity and logistics; monitoring improves information; and insurance reallocates residual risk but does not create pollination. Table 4 lists the instruments with the channel each acts on and the data each requires; the circled numbers link the instruments to Fig. 1.

Table 4. Policy instruments, the model channel each acts on, response speed, principal risk and the minimum data required to evaluate it.

Instrument	Channel (eq.)	Speed	Principal risk	Minimum data for evaluation
① Habitat restoration and incentives	*W*, *H*, *K*, diversity (1)	Slow	Land-use displacement; delayed response	Habitat and pesticide-exposure time series (not a one-time land-cover snapshot); guild-specific observations.
② Pesticide risk reduction	μ in (1), δ in (2)	Medium	Pest losses or substitution to other chemicals	Exposure records with toxicity and timing weights; pollinator response; crop-protection outcomes.
③ Managed-colony contracting support	*q*, CAC, *S* (3), (5)	Fast	Crowding, disease movement, supplier power	Colony requests and offers, delivered colony-days, arrival/departure dates, fees, transport distance, colony health.
③ Cooperative procurement and contract standards	CAC, fee, timing (5)	Fast	Administrative cost; inflexibility	Participation, fees, rationing and disputes; farm size and credit attributes for incidence.

④ **Monitoring and early warning**	SMI, information in (12)	Medium	Measurement error; weak response protocol	Bloom onset, peak and duration; pollinator activity; weather; documented observation protocol.
⑤ **Index insurance or contingency fund**	Stakeholder-level losses L_k in (7a); aggregate L in (7) only through external risk transfer	Fast after trigger	Basis risk with index products (Barnett et al., 2008); moral hazard with indemnity products (Chambers, 1989); does not raise S	Yield and quality at the same spatial unit; trigger quality; stakeholder incidence.

A robust decision protocol follows five steps: diagnose whether the binding constraint is stock, mismatch, access or risk-bearing (Table 3); identify the smallest set of instruments that act on it (Table 4); compare portfolios across plausible ecological and market states, not only a central forecast; report separate stakeholder accounts and ecological depreciation; and pre-specify monitoring and an adaptive rule—which observation triggers expansion, redesign or withdrawal. The steps change interpretation: subsidising hive rental is poorly targeted if the constraint is temporal mismatch, habitat investment cannot meet an immediate flowering-season emergency, and insurance protects incomes but leaves the service deficit untouched. Practical guidance on managing wild pollinators on farms (Garibaldi et al., 2014) belongs to the first row of Table 4 and is evaluated against the stock it is intended to renew.

Insurance needs one clarification. Indemnities paid within the accounting boundary are transfers: they reshape the stakeholder-level loss distributions L_k and lower the tail risk borne by farmers, but they leave the aggregate loss L in (7) unchanged unless risk is ceded outside the boundary, as with reinsurance, or the resource cost of risk-bearing is counted. A risk-neutral aggregate ledger therefore understates the value of insurance; its effect is read from the stakeholder-level extension (7a), not from (7) itself, and it does not raise S.

Valuation methods populate the modules without being pooled: production-function and attributable-net-income estimates value output attributable to service; replacement cost is a benefit measure only where replacement would rationally occur, and Result 2 shows when it would not; avoided damage feeds L and $CVaR$; stated preference captures non-use components and is not pooled with farm profit; a contract fee is a transfer that may reflect market power; and a natural-capital account keeps an annual flow from being mistaken for asset value, the stock being priced as natural capital (Fenichel and Abbott, 2014). Synthesis occurs within a common estimand, not in an arithmetic mean.

6.2 Identification levels and evidence tiers

Identification proceeds in levels, and analysts should not claim a higher level from lower-level data. Level 1 is descriptive accounting: SSR, SMI, PPD and CAC with uncertainty intervals. Level 2 estimates the crop–service response with experiments, quasi-experiments or a defensible structural strategy. Level 3 models supply and allocation of managed service, including selection into contracts. Level 4 links production shocks to prices and welfare. Level 5 estimates stock dynamics and evaluates multi-period policies. Staggered habitat interventions support difference-in-differences only if timing and parallel trends are credible; weather or phenological variation is not automatically exogenous to yield; randomised placement or encouragement designs can estimate local service effects; and supplier–farmer matching data can reveal rationing. Observation error should be propagated into S, predictions validated out of sample, and expected welfare, tail loss and incidence presented separately before normative weights are applied.

The dataset implied by Table 4 is a data-rich research design, not an entry requirement. A data-poor application should reduce the claim before it substitutes proxies, and the framework therefore uses three evidence tiers: Tier 0 is a screening dashboard that cannot estimate causal effects or welfare; Tier 1 supports a bounded diagnosis of likely bottlenecks; Tier 2 supports model estimation and policy comparison. Moving up a tier requires new information, not statistical sophistication. Each construct has a low-cost proxy with a stated limit on the inference it permits: distance-weighted habitat share for wild capacity (Lonsdorf et al., 2009), reported as low/medium/high rather than as a population estimate; cooperative rosters and farmer recall of hive-days for managed delivery, triangulated across supplier and farmer reports; timed counts at peak bloom and fruit set on open versus bagged sentinel flowers for effective service, reported as a sufficiency band; bloom dates with weather-based foraging days for mismatch; a rapid farmer–beekeeper survey with both request and fulfilment denominators for access; and a partial budget with historical stress years for financial exposure, which is not social welfare. A minimum field module combines three to five observation rounds during bloom, open remote-sensing habitat cover, a short matched farmer–beekeeper survey, yield or fruit set and a partial budget, sampled

across farm size and distance to habitat. Missing constructs remain missing—imputation cannot create an unmeasured counterfactual, a contract refusal, consumer surplus or ecological depreciation; absent parameters take externally sourced ranges with transportability caveats, partial-identification bounds (Manski, 2003) and value-of-information analysis. Tier-0 decisions should favour low-regret monitoring or reversible actions; irreversible land-use changes, large recurrent subsidies and claims about optimal contract prices require Tier-2 evidence.

7. A TRANSPARENT SYNTHETIC CALCULATION CHECK

This section is a calculation check, not an empirical application: every number is hypothetical, and in arbitrary welfare units. Its purpose is to show what the framework computes and to display the decision rule as a map over the normative weights rather than as a single point. With three policies, three states and a criterion linear in λ, any pair of policies whose expected-value and tail-loss rankings disagree must cross at some λ; the informative object is the location of the boundary in the (λ, η) plane and the margin by which the winner leads elsewhere.

Table 5 gives the inputs and outputs. Panel A lists net welfare by state and policy. Panel B gives the expected change in each stakeholder account relative to the status quo; the accounts sum to the change in expected net welfare, and the minimum entry in each column is the group term in (7). The pattern is illustrative but not arbitrary: managed-capacity emphasis raises producer and beekeeper surplus through output and fees but displaces habitat, so the ecological account is negative; the diversified portfolio spreads smaller gains across all accounts. Panel C reports the decision statistics with $NW^{ref} = 100$ and $\alpha = 0.10$.

Table 5. Synthetic calculation check: inputs, stakeholder incidence and decision statistics. All values are hypothetical and in arbitrary welfare units.

	Probability	Status quo	Managed-capacity emphasis	Diversified portfolio
A. Net welfare by state				
Normal	0.70	100	130	110
Timing mismatch	0.20	50	85	85
Compound shock	0.10	−20	−50	35
B. Expected change by group relative to status quo				
Crop producers		0	+20.0	+7.0
Beekeepers		0	+12.0	+4.0
Consumers		0	+1.0	+4.5
Ecological account		0	−8.0	+4.0
Sum = ΔE[*NW*]		0	+25.0	+19.5
C. Decision statistics				
E[*NW*]		78.0	103.0	97.5
$CVaR_{0.10}$ of shortfall below 100 (worst 10% of mass)		120	150	65
Minimum group change		0	−8.0	+4.0
Ω at $\lambda = 0.2$, $\eta = 0.5$		−24.0	−9.0	+8.5
Ω − Ω(status quo)		0	+15.0	+32.5

Notes: $CVaR_{0.10}$ is the mean shortfall below the reference level in the worst 10% of probability mass; because the compound-shock state carries exactly 10% mass, it equals that state's shortfall here.[6] In Ω the expected-welfare and group terms are changes relative to the status quo while the tail term is a level, so the status quo scores −0.2 × 120 = −24.0 rather than zero; the last row normalises the scores to the status quo, and adding E[$NW(\pi_0)$] = 78.0 to the expected-change term converts it to a level. Neither operation changes a ranking. Panel B entries are illustrative constructions consistent with Panel A; Section 7 reports the ranking with and without the ecological account in k.

[6]With a discrete state space the α-tail generally cuts through a state; $CVaR_\alpha$ is then the probability-weighted mean of the worst α mass with the boundary state split (Rockafellar and Uryasev, 2002). For $\alpha = 0.25$ the values would be 78, 69 and 35, and the ranking of the three portfolios is unchanged. With a continuous loss distribution *CVaR* does not reduce to a single state's shortfall.

Expected welfare alone selects managed capacity. With $\lambda = 0.2$ and $\eta = 0.5$, equation (7) selects the diversified portfolio, and the status quo is dominated everywhere. The managed and diversified portfolios are ranked equally on the line $85\lambda + 12\eta = 5.5$, which gives $\lambda^* = 0.065$ at $\eta = 0$ and $\eta^* = 0.46$ at $\lambda = 0$. Figure 5 maps the winning policy and its margin over the (λ, η) plane: the managed portfolio wins only in a small corner near the expected-value criterion, and the diversified portfolio's margin grows steadily away from it, so the ranking is robust to the exact weights over most of the admissible set. This is the sensitivity surface that Section 3.5 asks for. Because η re-weights the ecological account (Section 3.5), the ranking is also reported without it in k: the minimum group changes become 0, +1.0 and +4.0, the indifference line becomes $85\lambda + 3\eta = 5.5$, and the point $\lambda = 0.2$, $\eta = 0.5$ still selects the diversified portfolio. It is not evidence that diversification is generally optimal; the inputs were constructed to expose the decision rule, and an empirical application would replace every entry with observed or identified quantities, attach uncertainty and validate predictions out of sample.

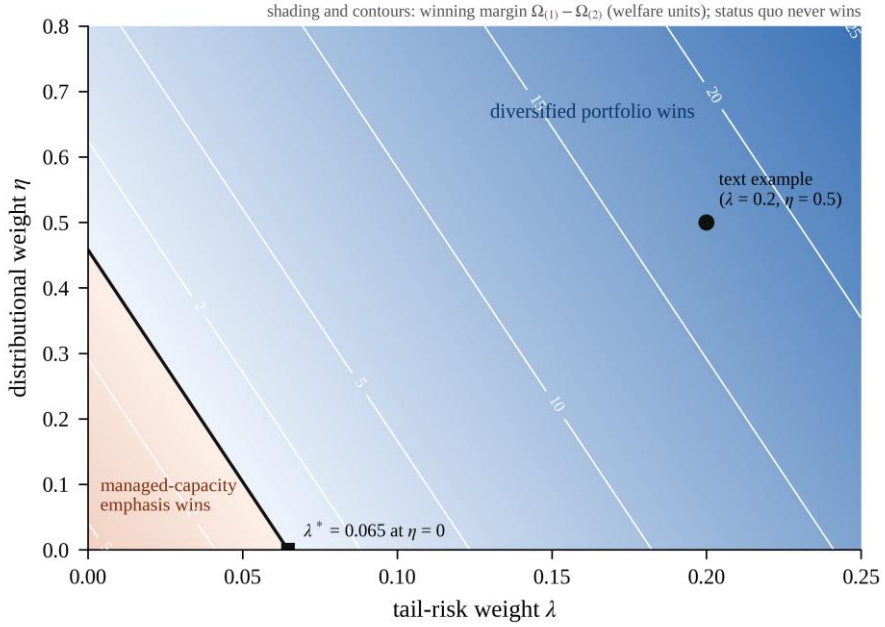


Fig. 5. Winning policy over the normative-weight plane for the synthetic example of Table 5. Colour identifies the policy with the highest Ω under equation (7); shading and white contours give its margin over the second-ranked policy in welfare units. The black line is the indifference boundary $85\lambda + 12\eta = 5.5$ between the managed-capacity and diversified portfolios; the square marks the switch point $\lambda^* = 0.065$ at $\eta = 0$ and the circle the (λ, η) pair used in the text. The status quo never wins. Synthetic inputs.

8. DISCUSSION

8.1 Conceptual Shifts of the Framework

Consider two crop regions with the same observed mean fruit set. Region A relies on a diverse wild-pollinator portfolio supported by habitat but has no organised response to an early bloom; Region B relies on contracted colonies supplied by a few mobile operators. A production-value account ranks them as equivalent; PSS does not. In Region A stock and diversity are adequate (high PPD, high net renewal) but service may miss the receptive window in a warm spring (high SMI), so monitoring and adaptive timing have high value. In Region B current SSR may be high, yet contract concentration, disease exposure and correlated transport disruption create tail risk (low PPD, high failure correlation in the sense of Result 4), so cooperative procurement, health safeguards and contingency capacity may dominate a further increase in hive density. Equal observed output does not imply equal capital condition, access, failure probability or policy need.

PSS reframes pollination as an infrastructure-like service generated by living capital. The analogy is useful but limited—wild pollinators reproduce, move and interact with landscape management, managed colonies are both biological assets and mobile commercial inputs, and service quality is jointly produced with weather, crop phenology and farmer practices—which is why neither abundance nor spending alone measures security (Result 1). The framework does not presume that managed and wild pollinators are substitutes or complements—σ in

(3) is a parameter to estimate—and Result 2 adds that, under a binding sufficiency target, the negative sign of the farm-level procurement response alone does not identify the elasticity of substitution, which reconciles evidence that wild pollinators enhance fruit set independently of honey-bee abundance (Garibaldi et al., 2013) with the observation that growers treat hired colonies as the substitute they can buy. Ecological trade-offs caution against optimising one service in isolation (Saunders et al., 2016); the ecological account in (6) is where they are recorded.

For agricultural economics the central gain is the welfare ledger. Dependency-ratio or gross-value calculations communicate exposure but do not determine net benefit or incidence; Result 3 shows that a shock which lowers social welfare can raise the revenue of the very producers whose crops depend on the service, so policy responding to producer complaints alone will be poorly targeted. Replacement cost is informative only when a technically equivalent and socially rational substitute exists, and under complementarity it may not exist at all. Contract price is a transfer between farmer and beekeeper, whereas transport, labour and colony losses are real resource costs; keeping these categories separate prevents double counting. A security objective also makes tail events visible: a mean-preserving increase in variability reduces policy value even when expected service is unchanged, which is why (7) includes downside risk explicitly and why Result 4 expresses the value of diversification in failure correlation and loss convexity that can, in principle, be measured.

8.2 Conceptual Shifts of the Framework

No isolated module is new. Lee et al. (2019) model feedback between almond and honey-bee markets; Bauer and Sue Wing (2016) study catastrophic decline at macroeconomic scale; Kleftodimos et al. (2021) integrate pollination into farm decisions; Engström et al. (2020) model bumble-bee and solitary-bee stocks with explicit transition equations under stochastic temperature and value diversity as resilience; the insurance-value literature formalises why a risk-averse manager values natural insurance—through biodiversity (Baumgärtner, 2007; Baumgärtner and Quaas, 2010), ecosystem resilience (Baumgärtner and Strunz, 2014), natural rather than financial insurance (Quaas and Baumgärtner, 2008) and a larger natural-capital stock (Quaas et al., 2019); and Hahn et al. (2023) argue that ecosystem resilience is worth more than individual risk preferences capture. Relative to the canonical cascade, PSS isolates as a measurable state the allocation stage that cascade extensions and the co-production literature treat generically (Spangenberg et al., 2014; Palomo et al., 2016; Woodhead et al., 2025); relative to the pollination-market literature, it embeds the contract in a stock-dependent service function with a threshold crop response; relative to the insurance-value literature, it states the diversification threshold in observable failure correlation, loss convexity and mean advantage rather than a utility parameter alone, and connects it to the ecological evidence on response diversity and visitation stability (Winfree and Kremen, 2009; Garibaldi et al., 2011); and relative to food-security measurement (Barrett, 2010; HLPE, 2020), it supplies indicators for each pillar—and for the sustainability of the asset—of a service rather than a commodity. Whether the integration improves prediction or policy choice is an empirical question, captured by Propositions 1–5.

Table 6 places PSS against the closest integrative frameworks by the six elements the framework combines. Rows were selected by two rules: the framework or model family supplies at least one PSS module in the literatures reviewed in Sections 1–2 and has been used as a basis for valuation, assessment or policy rather than for a single empirical estimate; grey literature enters only where it defines pollination security itself. A family row is coded by the strongest treatment among the works cited in it; a work whose treatment differs materially from its family is listed on its own row, which is why the dynamic two-stock model of Engström et al. (2020) is separated from the insurance-value literature it also belongs to. Two separate checks underlie the positioning. The first concerns uses of the term: Crossref bibliographic and title searches for the exact phrases 'pollination service security', 'pollination security' and 'pollinator security' (searched 2026-09-28) returned no journal article carrying the phrases in its title, and a general web search returned three grey-literature uses—a research output that names pollination security and resilience as a management objective (Hort Innovation, 2021), a project titled on biodiversity as a provider of pollination security (FiBL, 2021) and the national status assessment of the Wheen Bee Foundation (2026)—none of which formalises the concept or contains a welfare, allocation or tail-risk analysis; the search is confined to these sources and no priority over the term is claimed. The second concerns the originality of Results 2 and 4, which is assessed against the method literature rather than against uses of the term: Result 2 against conditional factor demand under a CES technology and the pollination-market and bioeconomic studies of Table 6 (Rucker et al., 2012; Champetier et al., 2015; Goodrich, 2019; Lee et al., 2019), none of which states that, under a binding sufficiency target, the negative sign of the procurement response alone does not identify the elasticity of substitution; Result 4 against the insurance-value literature

(Baumgärtner, 2007; Quaas and Baumgärtner, 2008; Baumgärtner and Quaas, 2010; Quaas et al., 2019) and the coherent-risk results it draws on (Rockafellar and Uryasev, 2000; Pflug, 2000; Acerbi and Tasche, 2002), none of which states the switch curve (19) in (p, ρ, κ, b, λ). Both claims are confined to these literatures.

Table 6. Elements of PSS present in the closest integrative frameworks and models.

Framework or model family	Stock renewal	Matched service	Contract allocation	Market incidence	Tail risk	Identification
Ecosystem-service cascade and extensions (Haines-Young and Potschin, 2010; Spangenberg et al., 2014)	○	○	○	–	–	–
SEEA Ecosystem Accounting (United Nations et al., 2021)	○	○	–	○	–	–
Landscape pollination models (Lonsdorf et al., 2009; Kennedy et al., 2013)	○	●	–	–	–	●
Production-function and attributable-net-income valuation (Kremen et al., 2002; Winfree et al., 2011; Breeze et al., 2016)	–	●	○	○	–	●
Pollination-market economics (Rucker et al., 2012; Goodrich, 2019; Goodrich et al., 2019)	○	–	●	○	–	●
Bioeconomic colony management (Champetier et al., 2015)	●	–	○	–	–	–
Integrated crop–pollinator market and economy-wide models (Lee et al., 2019; Bauer and Sue Wing, 2016; Feuerbacher et al., 2025)	○	–	○	●	○	–
Insurance value of biodiversity and natural capital (Baumgärtner, 2007; Baumgärtner and Quaas, 2010; Quaas et al., 2019)	○	–	–	–	●	–
Dynamic bioeconomic model of two pollinator groups (Engström et al., 2020)	●	○	–	–	○	○
National pollination-security assessment (Wheen Bee Foundation, 2026)	○	○	–	–	○	–
PSS (this article)	●	●	●	●	●	○

● modelled as a state, derived or estimated; ○ present descriptively, qualitatively or as a scenario; – absent. Stock renewal: a pollinator or bee stock with explicit transition dynamics (● only in that case; general asset accounting or a managed stock that adjusts through market supply alone is coded ○). Matched service: effective service matched to the receptive window and location. Contract allocation: hive-rental contracts or access modelled as a stage. Market incidence: crop-price effects and distribution across groups. Tail risk: an explicit downside or tail-risk measure. Identification: an empirical estimation or testing design. PSS supplies propositions and minimum designs but no estimation, hence ○ in the last column.

8.3 Limitations, scope conditions and the next step

The analytical results hold under stated simplifications: a single unit with fixed managed delivery, Gaussian additive mortality shocks, a linearised stock, positive headroom and a net renewal rate below one (Result 1); a binding sufficiency target, cost-minimising procurement and an interior solution (Result 2); sunk season costs, a

competitive crop market and first-order or linear-demand approximations (Result 3); and two symmetric Bernoulli sources with a power-form downside, the tail level $\alpha = p$ (other levels through $D(\alpha)$), an advantage of concentration that accrues outside its failure states and a gross-of-loss definition of the mean advantage (Result 4). Each can be generalised—to stochastic renewal, profit-maximising procurement with an interior solution, supply response and trade, or many sources with a copula—at the cost of closed forms. The equations simplify species interactions, disease transmission, farmer adaptation and product-market structure, and the data demands are substantial: effective service is harder to observe than colony counts, contract refusals may be commercially sensitive, ecological depreciation is difficult to price, *CVaR* depends on the quality of the joint loss distribution and the distributional term in (7) contains an explicit ethical choice. These are reasons to report assumptions and partial identification, not to replace missing observations with invented precision.

The natural next step is a partial empirical implementation. Public secondary data for California almonds—county-level acreage, yield and value; the cost-of-pollination and honey-bee-colony surveys; pesticide-use reports; gridded bloom-season weather; and land-cover layers—support a Tier-1 application that can test P1 in proxy form (colony inventories and losses as stock, yield shortfalls as flow), P4 (market panel with elasticity estimates) and the ranking sensitivity of P5, but cannot identify S^*, contract refusals or consumer surplus without a small primary survey of colony requests, deliveries, timing and prices. Such an application would be a partial implementation, not a validation. The article's contribution is correspondingly bounded: the disciplined integration of renewable capital, matched service, contract accessibility, welfare incidence and tail risk around the PSS construct, the four results that follow from it and the five refutable propositions they generate.

9. CONCLUSION

Pollination valuation should not begin and end with a single monetary total. A secure system must preserve the living stocks that generate the service, deliver a well-timed flow during peak crop demand, allocate managed colony capacity to the farms that need it, and manage residual welfare risks. The PSS(Pollination Service Security) framework makes these requirements explicit by transferring the pillars of food security to a service produced by living capital, isolating a contract-allocation stage within the ecosystem-service cascade and deriving from a minimal model four results that a single-season, single-total valuation cannot see: equal mean service can hide unequal shortage risk; procurement substitution coexists with biological complementarity; a welfare-reducing shock can enrich exposed producers; and, for two symmetric sources with convex loss, diversification pays only inside a boundary defined by failure correlation, loss convexity and risk aversion, in closed form when the tail level equals the failure probability. The practical implication is a change of question. Instead of asking only how much pollination is worth, analysts should ask which ecological–commercial portfolio supplies it, where the bottleneck lies, who bears the downside and whether today's output is financed by tomorrow's loss of capacity. Answering these questions requires newly linked data. Until those data exist, a transparent conceptual model with refutable implications is scientifically stronger than a numerical result without provenance.

REFERENCES

Acerbi, C., Tasche, D., 2002. On the coherence of expected shortfall. Journal of Banking & Finance 26 (7), 1487–1503. https://doi.org/10.1016/S0378-4266(02)00283-2

Aizen, M.A., Garibaldi, L.A., Cunningham, S.A., Klein, A.M., 2009. How much does agriculture depend on pollinators? Lessons from long-term trends in crop production. Annals of Botany 103 (9), 1579–1588. https://doi.org/10.1093/aob/mcp076

Aizen, M.A., Harder, L.D., 2009. The global stock of domesticated honey bees is growing slower than agricultural demand for pollination. Current Biology 19 (11), 915–918. https://doi.org/10.1016/j.cub.2009.03.071

Allsopp, M.H., de Lange, W.J., Veldtman, R., 2008. Valuing insect pollination services with cost of replacement. PLoS ONE 3 (9), e3128. https://doi.org/10.1371/journal.pone.0003128

Artzner, P., Delbaen, F., Eber, J.-M., Heath, D., 1999. Coherent measures of risk. Mathematical Finance 9 (3), 203–228. https://doi.org/10.1111/1467-9965.00068

Barnett, B.J., Barrett, C.B., Skees, J.R., 2008. Poverty traps and index-based risk transfer products. World Development 36 (10), 1766–1785. https://doi.org/10.1016/j.worlddev.2007.10.016

Barrett, C.B., 2010. Measuring food insecurity. Science 327 (5967), 825–828. https://doi.org/10.1126/science.1182768

Bartomeus, I., Ascher, J.S., Wagner, D., Danforth, B.N., Colla, S., Kornbluth, S., Winfree, R., 2011. Climate-associated phenological advances in bee pollinators and bee-pollinated plants. Proceedings of the National Academy of Sciences 108 (51), 20645–20649. https://doi.org/10.1073/pnas.1115559108

Bauer, D.M., Sue Wing, I., 2010. Economic consequences of pollinator declines: A synthesis. Agricultural and Resource Economics Review 39 (3), 368–383. https://doi.org/10.1017/S1068280500007371

Bauer, D.M., Sue Wing, I., 2016. The macroeconomic cost of catastrophic pollinator declines. Ecological Economics 126, 1–13. https://doi.org/10.1016/j.ecolecon.2016.01.011

Baumgärtner, S., 2007. The insurance value of biodiversity in the provision of ecosystem services. Natural Resource Modeling 20 (1), 87–127. https://doi.org/10.1111/j.1939-7445.2007.tb00202.x

Baumgärtner, S., Quaas, M.F., 2010. Managing increasing environmental risks through agrobiodiversity and agrienvironmental policies. Agricultural Economics 41 (5), 483–496. https://doi.org/10.1111/j.1574-0862.2010.00460.x

Baumgärtner, S., Strunz, S., 2014. The economic insurance value of ecosystem resilience. Ecological Economics 101, 21–32. https://doi.org/10.1016/j.ecolecon.2014.02.012

Baylis, K., Lichtenberg, E.M., Lichtenberg, E., 2021. Economics of pollination. Annual Review of Resource Economics 13 (1), 335–354. https://doi.org/10.1146/annurev-resource-101420-110406

Boyd, J., Banzhaf, S., 2007. What are ecosystem services? The need for standardized environmental accounting units. Ecological Economics 63 (2–3), 616–626. https://doi.org/10.1016/j.ecolecon.2007.01.002

Breeze, T.D., Vaissière, B.E., Bommarco, R., Petanidou, T., Seraphides, N., Kozák, L., Scheper, J., Biesmeijer, J.C., Kleijn, D., Gyldenkærne, S., et al., 2014. Agricultural policies exacerbate honeybee pollination service supply-demand mismatches across Europe. PLoS ONE 9 (1), e82996. https://doi.org/10.1371/journal.pone.0082996

Breeze, T.D., Gallai, N., Garibaldi, L.A., Li, X.S., 2016. Economic measures of pollination services: shortcomings and future directions. Trends in Ecology & Evolution 31 (12), 927–939. https://doi.org/10.1016/j.tree.2016.09.002

Burkle, L.A., Marlin, J.C., Knight, T.M., 2013. Plant-pollinator interactions over 120 years: loss of species, co-occurrence, and function. Science 339 (6127), 1611–1615. https://doi.org/10.1126/science.1232728

Castro Mercado, L., Bravo Bastidas, J.J., Osorio Gómez, J.C., 2024. Operational risk assessment for the pollination service with Apis mellifera bees in cashew crops in Vichada, Colombia. International Journal of Forestry Research 2024, 8804848. https://doi.org/10.1155/2024/8804848

Chambers, R.G., 1989. Insurability and moral hazard in agricultural insurance markets. American Journal of Agricultural Economics 71 (3), 604–616. https://doi.org/10.2307/1242016

Champetier, A., Sumner, D.A., Wilen, J.E., 2015. The bioeconomics of honey bees and pollination. Environmental and Resource Economics 60 (1), 143–164. https://doi.org/10.1007/s10640-014-9761-4

Chavas, J.-P., 2004. Risk Analysis in Theory and Practice. Elsevier Academic Press, San Diego.

Cherp, A., Jewell, J., 2014. The concept of energy security: Beyond the four As. Energy Policy 75, 415–421. https://doi.org/10.1016/j.enpol.2014.09.005

Cheung, S.N.S., 1973. The fable of the bees: An economic investigation. Journal of Law and Economics 16 (1), 11–33. https://doi.org/10.1086/466753

Clapp, J., Moseley, W.G., Burlingame, B., Termine, P., 2022. Viewpoint: The case for a six-dimensional food security framework. Food Policy 106, 102164. https://doi.org/10.1016/j.foodpol.2021.102164

Cook, C., Bakker, K., 2012. Water security: Debating an emerging paradigm. Global Environmental Change 22 (1), 94–102. https://doi.org/10.1016/j.gloenvcha.2011.10.011

Dasgupta, P., 2021. The Economics of Biodiversity: The Dasgupta Review. HM Treasury, London.

Daw, T., Brown, K., Rosendo, S., Pomeroy, R., 2011. Applying the ecosystem services concept to poverty alleviation: the need to disaggregate human well-being. Environmental Conservation 38 (4), 370–379. https://doi.org/10.1017/S0376892911000506

Di Falco, S., Chavas, J.-P., 2009. On crop biodiversity, risk exposure, and food security in the highlands of Ethiopia. American Journal of Agricultural Economics 91 (3), 599–611. https://doi.org/10.1111/j.1467-8276.2009.01265.x

Engström, G., Gren, Å., Li, C.-Z., Krishnamurthy, C.K.B., 2020. Valuing biodiversity and resilience: an application to pollinator diversity in the Stockholm region. Spatial Economic Analysis 15 (3), 238–261. https://doi.org/10.1080/17421772.2020.1784988

FAO, 1996. Rome Declaration on World Food Security and World Food Summit Plan of Action. Food and Agriculture Organization of the United Nations, Rome.

FAO, 2006. Food Security. Policy Brief, Issue 2. Food and Agriculture Organization of the United Nations, Rome.

Fenichel, E.P., Abbott, J.K., 2014. Natural capital: from metaphor to measurement. Journal of the Association of Environmental and Resource Economists 1 (1/2), 1–27. https://doi.org/10.1086/676034

Fenton, M., Goodrich, B.K., Penn, J., 2025. Measuring beekeepers' economic value of contract enhancements in almond pollination agreements. Ecological Economics 227, 108351. https://doi.org/10.1016/j.ecolecon.2024.108351

Feuerbacher, A., Kempen, M., Steidle, J.L.M., Wieck, C., 2025. The economic, agricultural, and food security repercussions of a wild pollinator collapse in Europe. Nature Communications 16, 9892. https://doi.org/10.1038/s41467-025-65414-7

FiBL, 2021. Biodiversity provides pollination security: honeybees and wild bees in (Swiss) agriculture. Project 25106 (2021–2025). Research Institute of Organic Agriculture FiBL, Frick. https://www.fibl.org/en/themes/projectdatabase/projectitem/project/2052 (accessed 28 September 2026)

Fisher, J.A., Patenaude, G., Giri, K., Lewis, K., Meir, P., Pinho, P., Rounsevell, M.D.A., Williams, M., 2014. Understanding the relationships between ecosystem services and poverty alleviation: A conceptual framework. Ecosystem Services 7, 34–45. https://doi.org/10.1016/j.ecoser.2013.08.002

Forrest, J.R.K., 2015. Plant–pollinator interactions and phenological change: what can we learn about climate impacts from experiments and observations? Oikos 124 (1), 4–13. https://doi.org/10.1111/oik.01386

Gallai, N., Salles, J.-M., Settele, J., Vaissière, B.E., 2009. Economic valuation of the vulnerability of world agriculture confronted with pollinator decline. Ecological Economics 68 (3), 810–821. https://doi.org/10.1016/j.ecolecon.2008.06.014

Garibaldi, L.A., Steffan-Dewenter, I., Kremen, C., Morales, J.M., Bommarco, R., Cunningham, S.A., Carvalheiro, L.G., Chacoff, N.P., Dudenhöffer, J.H., Greenleaf, S.S., et al., 2011. Stability of pollination services decreases with isolation from natural areas despite honey bee visits. Ecology Letters 14 (10), 1062–1072. https://doi.org/10.1111/j.1461-0248.2011.01669.x

Garibaldi, L.A., Steffan-Dewenter, I., Winfree, R., Aizen, M.A., Bommarco, R., Cunningham, S.A., Kremen, C., Carvalheiro, L.G., Harder, L.D., Afik, O., et al., 2013. Wild pollinators enhance fruit set of crops regardless of honey bee abundance. Science 339 (6127), 1608–1611. https://doi.org/10.1126/science.1230200

Garibaldi, L.A., Carvalheiro, L.G., Leonhardt, S.D., Aizen, M.A., Blaauw, B.R., Isaacs, R., Kuhlmann, M., Kleijn, D., Klein, A.M., Kremen, C., et al., 2014. From research to action: enhancing crop yield through wild pollinators. Frontiers in Ecology and the Environment 12 (8), 439–447. https://doi.org/10.1890/130330

Goodrich, B.K., 2019. Do more bees imply higher fees? Honey bee colony strength as a determinant of almond pollination fees. Food Policy 83, 150–160. https://doi.org/10.1016/j.foodpol.2018.12.008

Goodrich, B.K., Williams, J.C., Goodhue, R.E., 2019. The great bee migration: Supply analysis of honey bee colony shipments into California for almond pollination services. American Journal of Agricultural Economics 101 (5), 1353–1372. https://doi.org/10.1093/ajae/aaz046

Grey, D., Sadoff, C.W., 2007. Sink or swim? Water security for growth and development. Water Policy 9 (6), 545–571. https://doi.org/10.2166/wp.2007.021

Hahn, T., Sioen, G.B., Gasparatos, A., Elmqvist, T., Brondízio, E., Gómez-Baggethun, E., Folke, C., Setiawati, M.D., Atmaja, T., Arini, E.Y., et al., 2023. Insurance value of biodiversity in the Anthropocene is the full resilience value. Ecological Economics 208, 107799. https://doi.org/10.1016/j.ecolecon.2023.107799

Haines-Young, R., Potschin, M., 2010. The links between biodiversity, ecosystem services and human well-being. In: Raffaelli, D.G., Frid, C.L.J. (Eds.), Ecosystem Ecology: A New Synthesis. Cambridge University Press, Cambridge, pp. 110–139. https://doi.org/10.1017/CBO9780511750458.007

Hanley, N., Breeze, T.D., Ellis, C., Goulson, D., 2015. Measuring the economic value of pollination services: Principles, evidence and knowledge gaps. Ecosystem Services 14, 124–132. https://doi.org/10.1016/j.ecoser.2014.09.013

Hegland, S.J., Nielsen, A., Lázaro, A., Bjerknes, A.-L., Totland, Ø., 2009. How does climate warming affect plant–pollinator interactions? Ecology Letters 12 (2), 184–195. https://doi.org/10.1111/j.1461-0248.2008.01269.x

HLPE, 2020. Food Security and Nutrition: Building a Global Narrative towards 2030. A report by the High Level Panel of Experts on Food Security and Nutrition of the Committee on World Food Security, Rome.

Hort Innovation, 2021. Securing pollination for productive agriculture: guidelines for effective pollinator management and stakeholder adoption. Final report, project PH16004, 31 March 2021. Hort Innovation, Sydney. https://www.horticulture.com.au/growers/help-your-business-grow/research-reports-publications-fact-sheets-and-more/ph16004/ (accessed 28 September 2026)

IPBES, 2016. The Assessment Report of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services on Pollinators, Pollination and Food Production. Potts, S.G., Imperatriz-Fonseca, V.L., Ngo, H.T. (Eds.). Secretariat of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services, Bonn. https://doi.org/10.5281/zenodo.3402856

Kennedy, C.M., Lonsdorf, E., Neel, M.C., Williams, N.M., Ricketts, T.H., Winfree, R., Bommarco, R., Brittain, C., Burley, A.L., Cariveau, D., et al., 2013. A global quantitative synthesis of local and landscape effects on wild bee pollinators in agroecosystems. Ecology Letters 16 (5), 584–599. https://doi.org/10.1111/ele.12082

Klatt, B.K., Holzschuh, A., Westphal, C., Clough, Y., Smit, I., Pawelzik, E., Tscharntke, T., 2014. Bee pollination improves crop quality, shelf life and commercial value. Proceedings of the Royal Society B: Biological Sciences 281 (1775), 20132440. https://doi.org/10.1098/rspb.2013.2440

Kleftodimos, G., Gallai, N., Rozakis, S., Képhaliacos, C., 2021. A farm-level ecological-economic approach of the inclusion of pollination services in arable crop farms. Land Use Policy 107, 105462. https://doi.org/10.1016/j.landusepol.2021.105462

Kleijn, D., Winfree, R., Bartomeus, I., Carvalheiro, L.G., Henry, M., Isaacs, R., Klein, A.-M., Kremen, C., M'Gonigle, L.K., Rader, R., et al., 2015. Delivery of crop pollination services is an insufficient argument for wild pollinator conservation. Nature Communications 6, 7414. https://doi.org/10.1038/ncomms8414

Klein, A.-M., Vaissière, B.E., Cane, J.H., Steffan-Dewenter, I., Cunningham, S.A., Kremen, C., Tscharntke, T., 2007. Importance of pollinators in changing landscapes for world crops. Proceedings of the Royal Society B: Biological Sciences 274 (1608), 303–313. https://doi.org/10.1098/rspb.2006.3721

Kremen, C., Williams, N.M., Thorp, R.W., 2002. Crop pollination from native bees at risk from agricultural intensification. Proceedings of the National Academy of Sciences 99 (26), 16812–16816. https://doi.org/10.1073/pnas.262413599

Kudo, G., Ida, T.Y., 2013. Early onset of spring increases the phenological mismatch between plants and pollinators. Ecology 94 (10), 2311–2320. https://doi.org/10.1890/12-2003.1

Lautenbach, S., Seppelt, R., Liebscher, J., Dormann, C.F., 2012. Spatial and temporal trends of global pollination benefit. PLoS ONE 7 (4), e35954. https://doi.org/10.1371/journal.pone.0035954

Lee, H., Sumner, D.A., Champetier, A., 2019. Pollination markets and the coupled futures of almonds and honey bees: Simulating impacts of shifts in demands and costs. American Journal of Agricultural Economics 101 (1), 230–249. https://doi.org/10.1093/ajae/aay063

Lempert, R.J., Groves, D.G., Popper, S.W., Bankes, S.C., 2006. A general, analytic method for generating robust strategies and narrative scenarios. Management Science 52 (4), 514–528. https://doi.org/10.1287/mnsc.1050.0472

Lonsdorf, E., Kremen, C., Ricketts, T., Winfree, R., Williams, N., Greenleaf, S., 2009. Modelling pollination services across agricultural landscapes. Annals of Botany 103 (9), 1589–1600. https://doi.org/10.1093/aob/mcp069

Manski, C.F., 2003. Partial Identification of Probability Distributions. Springer-Verlag, New York. https://doi.org/10.1007/b97478

Meade, J.E., 1952. External economies and diseconomies in a competitive situation. The Economic Journal 62 (245), 54–67. https://doi.org/10.2307/2227173

Memmott, J., Craze, P.G., Waser, N.M., Price, M.V., 2007. Global warming and the disruption of plant–pollinator interactions. Ecology Letters 10 (8), 710–717. https://doi.org/10.1111/j.1461-0248.2007.01061.x

Palomo, I., Felipe-Lucia, M.R., Bennett, E.M., Martín-López, B., Pascual, U., 2016. Disentangling the pathways and effects of ecosystem service co-production. Advances in Ecological Research 54, 245–283. https://doi.org/10.1016/bs.aecr.2015.09.003

Pflug, G.Ch., 2000. Some remarks on the value-at-risk and the conditional value-at-risk. In: Uryasev, S.P. (Ed.), Probabilistic Constrained Optimization: Methodology and Applications. Kluwer Academic Publishers, Dordrecht, pp. 272–281. https://doi.org/10.1007/978-1-4757-3150-7_15

Porto, R.G., de Almeida, R.F., Cruz-Neto, O., Tabarelli, M., Viana, B.F., Peres, C.A., Lopes, A.V., 2020. Pollination ecosystem services: A comprehensive review of economic values, research funding and policy actions. Food Security 12 (6), 1425–1442. https://doi.org/10.1007/s12571-020-01043-w

Potschin, M.B., Haines-Young, R.H., 2011. Ecosystem services: Exploring a geographical perspective. Progress in Physical Geography 35 (5), 575–594. https://doi.org/10.1177/0309133311423172

Potts, S.G., Biesmeijer, J.C., Kremen, C., Neumann, P., Schweiger, O., Kunin, W.E., 2010. Global pollinator declines: trends, impacts and drivers. Trends in Ecology & Evolution 25 (6), 345–353. https://doi.org/10.1016/j.tree.2010.01.007

Potts, S.G., Imperatriz-Fonseca, V., Ngo, H.T., Aizen, M.A., Biesmeijer, J.C., Breeze, T.D., Dicks, L.V., Garibaldi, L.A., Hill, R., Settele, J., et al., 2016. Safeguarding pollinators and their values to human well-being. Nature 540 (7632), 220–229. https://doi.org/10.1038/nature20588

Quaas, M.F., Baumgärtner, S., 2008. Natural vs. financial insurance in the management of public-good ecosystems. Ecological Economics 65 (2), 397–406. https://doi.org/10.1016/j.ecolecon.2007.07.004

Quaas, M.F., Baumgärtner, S., De Lara, M., 2019. Insurance value of natural capital. Ecological Economics 165, 106388. https://doi.org/10.1016/j.ecolecon.2019.106388

Reilly, J.R., Artz, D.R., Biddinger, D., Bobiwash, K., Boyle, N.K., Brittain, C., Brokaw, J., Campbell, J.W., Daniels, J., Elle, E., et al., 2020. Crop production in the USA is frequently limited by a lack of pollinators. Proceedings of the Royal Society B: Biological Sciences 287 (1931), 20200922. https://doi.org/10.1098/rspb.2020.0922

Ricketts, T.H., Regetz, J., Steffan-Dewenter, I., Cunningham, S.A., Kremen, C., Bogdanski, A., Gemmill-Herren, B., Greenleaf, S.S., Klein, A.M., Mayfield, M.M., et al., 2008. Landscape effects on crop pollination services: are there general patterns? Ecology Letters 11 (5), 499–515. https://doi.org/10.1111/j.1461-0248.2008.01157.x

Rockafellar, R.T., Uryasev, S., 2000. Optimization of conditional value-at-risk. Journal of Risk 2 (3), 21–41. https://doi.org/10.21314/JOR.2000.038

Rockafellar, R.T., Uryasev, S., 2002. Conditional value-at-risk for general loss distributions. Journal of Banking & Finance 26 (7), 1443–1471. https://doi.org/10.1016/S0378-4266(02)00271-6

Rucker, R.R., Thurman, W.N., Burgett, M., 2012. Honey bee pollination markets and the internalization of reciprocal benefits. American Journal of Agricultural Economics 94 (4), 956–977. https://doi.org/10.1093/ajae/aas031

Rucker, R.R., Thurman, W.N., Burgett, M., 2019. Colony collapse and the consequences of bee disease: market adaptation to environmental change. Journal of the Association of Environmental and Resource Economists 6 (5), 927–960. https://doi.org/10.1086/704360

Saunders, M.E., Peisley, R.K., Rader, R., Luck, G.W., 2016. Pollinators, pests, and predators: Recognizing ecological trade-offs in agroecosystems. Ambio 45 (1), 4–14. https://doi.org/10.1007/s13280-015-0696-y

Savage, L.J., 1951. The theory of statistical decision. Journal of the American Statistical Association 46 (253), 55–67. https://doi.org/10.1080/01621459.1951.10500768

Slepian, D., 1962. The one-sided barrier problem for Gaussian noise. Bell System Technical Journal 41 (2), 463–501. https://doi.org/10.1002/j.1538-7305.1962.tb02419.x

Smith, M.R., Singh, G.M., Mozaffarian, D., Myers, S.S., 2015. Effects of decreases of animal pollinators on human nutrition and global health: a modelling analysis. The Lancet 386 (10007), 1964–1972. https://doi.org/10.1016/S0140-6736(15)61085-6

Sovacool, B.K., Mukherjee, I., 2011. Conceptualizing and measuring energy security: A synthesized approach. Energy 36 (8), 5343–5355. https://doi.org/10.1016/j.energy.2011.06.043

Spangenberg, J.H., von Haaren, C., Settele, J., 2014. The ecosystem service cascade: Further developing the metaphor. Integrating societal processes to accommodate social processes and planning, and the case of bioenergy. Ecological Economics 104, 22–32. https://doi.org/10.1016/j.ecolecon.2014.04.025

Sritongchuay, T., Wayo, K., Orr, M.C., Hughes, A.C., 2021. Insufficient native pollinators during artificially induced early flowering decrease yield and long-term economic viability of a tropical fruit crop. Journal of Applied Ecology 58 (1), 80–91. https://doi.org/10.1111/1365-2664.13787

Turo, K.J., Reilly, J.R., Fijen, T.P.M., Magrach, A., Winfree, R., 2024. Insufficient pollinator visitation often limits yield in crop systems worldwide. Nature Ecology & Evolution 8 (9), 1612–1622. https://doi.org/10.1038/s41559-024-02460-2

United Nations, European Commission, FAO, IMF, OECD, World Bank, 2021. System of Environmental-Economic Accounting—Ecosystem Accounting (SEEA EA). White cover publication, pre-edited text subject to official editing. United Nations, New York.

Vezzani, L., Schipper, A.M., Thuiller, W., Verburg, P.H., Smith, H.G., Marques, A., 2025. Global relationships between crop yield and pollinator abundance. Journal of Applied Ecology 62 (6), 1498–1508. https://doi.org/10.1111/1365-2664.70042

Wheen Bee Foundation, 2026. Pollination Security Status Report 2026. Wheen Bee Foundation, Australia. https://www.wheenbeefoundation.org.au/wp-content/uploads/2026/06/Pollination-Security-Status-Report-2026.pdf (accessed 28 September 2026)

Winfree, R., Kremen, C., 2009. Are ecosystem services stabilized by differences among species? A test using crop pollination. Proceedings of the Royal Society B: Biological Sciences 276 (1655), 229–237. https://doi.org/10.1098/rspb.2008.0709

Winfree, R., Gross, B.J., Kremen, C., 2011. Valuing pollination services to agriculture. Ecological Economics 71, 80–88. https://doi.org/10.1016/j.ecolecon.2011.08.001

Woodhead, A.J., Kenter, J.O., Thomas, C.D., Stringer, L.C., 2025. How ecosystem services are co-produced: a critical review identifying multiple research framings. Ecosystem Services 71, 101694. https://doi.org/10.1016/j.ecoser.2024.101694

Türkiye'de Sermaye Piyasasında Faaliyet Gösteren Portföy Yönetim Şirketleri ve Yatırım Fonlarının Risk ve Getiri Açısından Değerlendirilmesi: 28 Ağustos 2026 Kararının Piyasalara Olası Etkileri

Prof. Dr. Erdal Arslan[1] **Safiye Bora[2]**

[1] Selçuk Üniversitesi, İktisadi ve İdari Bilimler Fakültesi, İktisat Bölümü, erdalarslan@selcuk.edu.tr, ORCID: 0000-0003-4892-2963

[2] Selçuk Üniversitesi, Sosyal Bilimler Enstitüsü, İktisat Anabilim Dalı Yüksek Lisans Öğrencisi, safiyebora0@gmail.com, ORCID: 0009-0006-8209-0274

Özet: Genel tanımıyla portföy, bir kişinin ya da kuruluşun sahip olduğu varlıkların tümü olarak tanımlanmaktadır. Daha dar tanımıyla portföy, para ve sermaye piyasası araçları ile kıymetli madenlerden oluşan varlık grubu olarak ifade edilmektedir. Portföy yöneticiliği; sermaye piyasası araçları, para piyasası araç ve işlemleri, vadeli işlemler ve opsiyonlar, nakit, döviz ile mevduattan oluşan portföylerin tasarruf sahibinin veya portföy yöneticisinin belirleyeceği risk-getiri tercihi doğrultusunda yönetilmesidir. Portföy yönetim şirketi, ana faaliyet konusu fon kurmak ve yönetmek olan, anonim ortaklık şeklinde kurulmuş bir sermaye piyasası kurumudur. Yatırım fonları ise portföy yönetim şirketleri tarafından kurulan ve yönetilen sermaye piyasası kurumlarıdır. Bu çalışmada, ülkemiz sermaye piyasalarının kurumsal yapısında kritik öneme sahip olan portföy yönetim şirketleri ve yatırım fonları; 6362 Sayılı Sermaye Piyasası Kanunu (SPKn), Borsa İstanbul (BİST) düzenlemeleri ve güncel mevzuat değişiklikleri çerçevesinde incelenmektedir. Çalışmanın odağını, yatırım fonlarının risk ve getiri dengesi oluşturmakta olup Sermaye Piyasası Kurulu'nun (SPK) 28.08.2026 tarihli Kurul kararlarını içeren 29 Ağustos 2026 tarihli ve 2026/54 sayılı SPK Bülteni ile duyurduğu değişikliklerin portföy yönetim şirketlerine ve yatırım fonlarına etkisi değerlendirilmektedir. Bu doğrultuda çalışma, yeni düzenlemelerin piyasa derinliği, şeffaflık ve yatırımcıyı koruma mekanizmaları üzerindeki olası etkilerini ortaya koymayı amaçlamaktadır.

Anahtar Kelimeler: Sermaye Piyasası Kurumları, Portföy Yönetim Şirketleri, Yatırım Fonları, Sermaye Piyasası Araçları

Abstract: In general terms, a portfolio is defined as the entirety of assets owned by an individual or an organization; specifically, it refers to a group of assets comprising money and capital market instruments, as well as precious metals. Portfolio management is defined as the activity of managing portfolios, consisting of capital market instruments, money market instruments and transactions, futures and options, cash, foreign currency, and deposits, in alignment with the risk-return preferences determined by the investor or the portfolio manager. A portfolio management company is a capital market institution established as a joint-stock company, whose primary purpose is setting up and managing funds. Similarly, investment funds are capital market institutions founded and managed by these portfolio management companies. This study examines portfolio management companies and investment funds, which are of critical importance to within the institutional structure of the country's capital markets, within the framework of Capital Markets Law No. 6362, Borsa Istanbul regulations, and recent legislative amendments. The study primarily focuses on the risk-return balance of investment funds, evaluating the impacts of the changes announced in the Capital Markets Board (CMB) bulletin dated August 29, 2026 (No. 2026/54) on portfolio management companies and investment funds. Ultimately, the study aims to shed light on the potential effects of these new regulations on market depth, transparency, and investor protection mechanisms.

Keywords: Capital Market Institutions, Portfolio Management Companies, Investment Funds, Capital Market Instruments

1. GİRİŞ

Yatırım, genel olarak sermaye ve/veya servet birikimine ilave yapmak amacıyla gerçekleştirilen her türlü faaliyet olarak tanımlanmaktadır. Portföy, genel tanımıyla bir kişi ya da kuruluşun sahip olduğu varlıkların tümünü ifade eder ve servetin oluşturulma şeklidir. Daha spesifik bir tanımla portföy; para ve sermaye piyasası araçları ile kıymetli madenlerden oluşan varlık grubuna denir. Portföy yöneticiliği; sermaye piyasası araçları, para piyasası araç ve işlemleri, vadeli işlemler ve opsiyonlar, nakit, döviz ve mevduattan oluşan portföylerin, tasarruf sahibinin veya portföy yöneticisinin belirleyeceği risk-getiri tercihi doğrultusunda yönetilmesidir. Portföy yönetim şirketi, ana faaliyet konusu fonların kurulması ve yönetimi olan ve anonim ortaklık şeklinde kurulan sermaye piyasası kurumudur. Sermaye piyasasında faaliyette bulunan portföy yönetim şirketleri, tasarruf sahiplerine faizsiz sermaye piyasası yatırımı olarak katılım fonları sunmaktadırlar. Yatırım fonları ise portföy yönetim şirketleri tarafından kurulan ve yönetilen sermaye piyasası kurumlarıdır.

Bu çalışma, ülkemiz sermaye piyasalarının kurumsal yapısında kritik öneme sahip olan portföy yönetim şirketlerini ve yatırım fonlarını 6362 Sayılı Sermaye Piyasası Kanunu (SPKn), Borsa İstanbul (BİST) düzenlemeleri ve güncel mevzuat değişiklikleri çerçevesinde incelemektedir. Çalışmada, SPK'nın 28.08.2026 tarihli Kurul kararlarını içeren 29 Ağustos 2026 tarihli ve 2026/54 sayılı SPK Bülteni ile duyurduğu değişikliklerin portföy

yönetim şirketlerine ve yatırım fonlarına etkisi değerlendirilmektedir. Bu doğrultuda çalışma, yeni düzenlemelerin piyasa derinliği, şeffaflık ve yatırımcıyı koruma mekanizmaları üzerindeki olası etkilerini ortaya koymayı amaçlamaktadır.

2. SERMAYE PİYASASI KURUMLARI VE FAALİYETLERİ

2.1. Sermaye Piyasası Kurumları

6362 sayılı SPKn'nın (2012) 35. maddesinde sermaye piyasası kurumları, açıkça sayılmıştır. İlgili kanun maddesi uyarınca sermaye piyasası kurumları şunlardır: Yatırım kuruluşları (Aracı kurumlar ve yatırım hizmeti sunan bankalar), Kolektif yatırım kuruluşları (Yatırım fonları ve yatırım ortaklıkları), Sermaye piyasasında faaliyette bulunacak bağımsız denetim, değerleme ve derecelendirme kuruluşları, Portföy yönetim şirketleri, İpotek finansmanı kuruluşları, Konut finansmanı ve varlık finansmanı fonları, Varlık kiralama şirketleri, Merkezî takas kuruluşları (Takasbank), Merkezî saklama kuruluşları (Merkezi Kayıt Kuruluşu, MKK), Veri depolama kuruluşları ve SPK tarafından belirlenen diğer kurumlar. Bu çalışmanın konusu portföy yönetim şirketleri ve yatırım fonları olması sebebiyle sadece portföy yönetim şirketi ve yatırım fonlarının tanımı verilmiştir.

Sermaye piyasası faaliyetlerinden en az biri için yetki belgesi almış aracı kurum ve bankalar, aracı kuruluşları oluşturur. Aracı kurumlar, SPKn (2012) hükümlerine tabidirler. Kendi menkul kıymetlerini halka arz eden bankalar ile sermaye piyasasında faaliyette bulunan bankalar, bu faaliyetleri ile sınırlı olmak üzere SPKn (2012) hükümlerine tabi olurlar (İMKB, 1999: 59). Aracı kurumların ticaret unvanlarında sermaye piyasası faaliyetlerini yansıtması amacıyla "menkul değerler" veya "menkul kıymetler" ibarelerinden birinin yer alması şarttır.

2.2. Sermaye Piyasası Faaliyetleri

Mevzuata göre sermaye piyasası faaliyetleri, 6362 sayılı SPKn'nın (2012) 34. maddesinde genel çerçevesiyle tanımlanmıştır. Kanuna göre sermaye piyasası faaliyetleri; sermaye piyasası kurumlarının kanun kapsamındaki faaliyetleri, yatırım hizmetleri ve faaliyetleri ile bunlara ek olarak sunulan yan hizmetlerden oluşur. Bu faaliyetler içerisinde en temel ve kapsamlı grubu oluşturan yatırım hizmet ve faaliyetleri şu şekilde sıralanmaktadır (SPKn, 2012, Madde 37): emir iletimi, emir gerçekleştirme, kendi hesabından alım satım, portföy yöneticiliği, yatırım danışmanlığı, halka arza aracılık, saklama hizmetleri ve çok taraflı alım satım sistemlerinin işletilmesi.

2.3. Portföy Yönetim Şirketi

Portföy yönetim şirketi, ana faaliyet konusu fonların kurulması ve yönetimi olan ve anonim ortaklık şeklinde kurulan sermaye piyasası kurumudur. Portföy yönetim şirketleri ana faaliyet konularına ek olarak, SPK'dan yetki belgesi almak koşuluyla yatırım danışmanlığı faaliyetinde de bulunabilmektedirler. Bunun yanı sıra gerekli özsermaye şartına sahip olan portföy yönetim şirketleri, SPK'ya bildirimde bulunarak sermaye piyasaları ile ilgili danışmanlık hizmetleri sunabilir; yatırım hizmetleri ve faaliyetleri ile sınırlı olarak kredi ya da ödünç verebilir, döviz hizmetleri sunabilir, sermaye piyasası araçlarına ilişkin işlemlerle ilgili yatırım araştırması ve finansal analiz yapabilir veya genel tavsiyede bulunabilir (SPK, 2026b). Ayrıca portföy yönetim şirketlerinin aşağıdaki amaçlarla kurulması da mümkündür:

- Münhasıran payları yurt dışında yerleşik kişilere pazarlanacak yabancı kolektif yatırım kuruluşu kurmak, yönetmek ve yurt dışında yerleşik kişilere portföy yönetim hizmeti vermek,
- Münhasıran girişim sermayesi yatırım fonu kurmak ve yönetmek,
- Münhasıran gayrimenkul yatırım fonu kurmak ve yönetmek,
- Gayrimenkul ve girişim sermayesi yatırım fonunu birlikte kurmak ve yönetmek.

Faaliyetleri sınırlı olan bu tür portföy yönetim şirketleri için ilgili mevzuatta sermaye ve organizasyon yapılarına ilişkin birtakım istisnalar tanınmıştır. Portföy yönetim şirketlerinin girişim sermayesi veya gayrimenkul yatırım fonlarını kurmak ve yönetmek üzere kurulması hâlinde, faaliyet alanlarına göre ticaret unvanlarında "girişim sermayesi portföy yönetim şirketi", "gayrimenkul portföy yönetim şirketi" veya "gayrimenkul ve girişim sermayesi portföy yönetim şirketi" ibaresi yer alır. Portföy yönetim şirketleri aracılık faaliyetlerinde bulunamaz; sermayesinin %10'undan fazlasına sahip olan ortaklıklarda ve yöneticilerinin ayrı ayrı veya birlikte sermayesinin %25'inden fazlasına sahip oldukları ortaklıklarda pay sahibi olamazlar.

2.4. Portföy Yönetimine Konu Araç ve İşlemler

Portföy yönetimine konu araçlar; menkul kıymetler, türev araçlar, yatırım sözleşmeleri SPK tarafından belirlenen diğer sermaye piyasası araçlarından oluşur. Bunlardan menkul kıymetler; paylar, pay benzeri diğer kıymetler ile söz konusu paylara ilişkin depo sertifikaları, borçlanma araçları veya menkul kıymetleştirilmiş varlık ve gelirlere dayalı borçlanma araçları ile bu kıymetlere ilişkin depo sertifikalarıdır. Diğer sermaye piyasası araçları ise menkul kıymetler dışında kalan, şartları SPK tarafından belirlenen evrak ile para piyasası araç ve işlemleri, vadeli işlemler ve opsiyonlar, nakit, döviz, mevduat ve Kurulca uygun görülen diğer varlık ve işlemlerden oluşmaktadır (SPK, 2026b).

2.5. Yatırım Fonları

Yatırım fonları, halktan katılma belgeleri karşılığında toplanan paralarla, belge sahipleri hesabına, riskin dağıtılması ilkesi ve inançlı mülkiyet esaslarına göre, ortaklık payı, tahvil gibi sermaye piyasası araçlarından ve kıymetli madenlerden oluşan portföyü işletmek amacıyla kurulan mal varlığına denir. Her bir yatırımcı fonun sahip olduğu portföyün bir kısmını temsil eden katılma payını alarak fon portföyüne ortak olur. Katılma payı, yatırımcının fon portföyüne kaç adet payla ortak olduğunu gösterir (SPK, 2026a).

2.5.1. Yatırım Fonları Temel İlkeleri

Yatırım fonlarına hakim olan temel ilkeler (SPK, 2026a): Riskin Dağıtılması İlkesi, Profesyonel Yönetim, Menkul Kıymet Portföyü İşletme, İnançlı Mülkiyet, Mal Varlığının Korunması olarak sayılabilmektedir.

Riskin dağıtılması ilkesi: Bu ilke sayesinde yatırım fonlarının, bireylerin kendi imkanları ile sağlayamayacakları ölçüde riski dağıtmaları mümkündür. Yatırım fonları çok sayıda tasarruf sahibinden para toplayarak, parasal olarak büyük miktarlı portföyler oluşturabilmektedir. Bu sayede çok daha fazla sayıda ortaklık payına sahip olarak çeşitli yatırım araçlarına yatırım yapması sebebiyle ortaklık payı fiyatlarındaki herhangi bir düşüş riskini en aza indirebilmektedir.

Profesyonel yönetim: Menkul kıymet piyasaları nitelikleri itibariyle belirli bir bilgi birikimini gerektiren teknik piyasalar olup, bu piyasada oluşan gelişmelerin yakından takip edilmesi gerekir. Tasarruf sahiplerinin bireysel olarak böyle bir takibi düzenli olarak yapmaları ve bu piyasalarda oluşan gelişmelerin menkul kıymet fiyatlarına etkilerini tahmin edip ona göre zamanında tavır alabilmeleri daha fazla zaman ve para ayırmalarına yol açabilecektir. Yatırım fonları, çok fazla sayıda kişiden para toplamak suretiyle yüksek miktarlarda portföyler oluşturduklarından, gerekli donanıma ve menkul kıymet piyasalarıyla ilgili yetişmiş elemanlara sahip olurlar. Bu sayede tasarruf sahipleri bireysel olarak yaptıkları yatırıma göre daha az zaman ve para harcayarak, piyasalarda gözlemlenen hareketlerin ne anlama geldiğini sürekli bir şekilde takip ederek gerekli alım-satım işlemlerini gerçekleştirebileceklerdir.

Menkul kıymet portföyü işletme: Yatırım fonları, bazı kısıtlamalar içerisinde birçok varlığa yatırım yapabilmekle beraber, temel amaçları menkul kıymet alıp satmak ve alım satımlar arasında oluşan olumlu fark ile bu menkul kıymetlerin kar payları ve faizlerinden gelir sağlamak olan kuruluşlardır.

İnançlı mülkiyet: Yatırım fonları inançlı mülkiyet esasına dayanmaktadır. İnançlı mülkiyet esasında fona inançlı olarak fon kurucusu sahiptir ve tasarruf sahipleri fonla ilgili işlemleri yapma yetkisini fon kurucusuna vermektedirler. Bu yetki devri fon içtüzüğü ile gerçekleşmektedir. Fon kurucusu, fonu içtüzük çerçevesinde ve tasarruf sahiplerinin haklarını koruyarak yönetmek/yönettirmek zorundadır.

Mal varlığının korunması: Fon tüzel kişilik sahibi olmamakla beraber fonun mal varlığı kurucudan ayrıdır. Ayrıca SPKn (2012) uyarınca, fon malvarlığı rehnedilemez, teminat gösterilemez ve üçüncü kişiler tarafından haczedilemez. Fon malvarlığının korunması kanun ile güvence altına alınmıştır.

2.5.2. Yatırım Fonlarının Yatırım Yaptığı Finansal Araçlar

SPK'nın düzenlemeleri çerçevesinde yatırım fonlarının yatırım yapabileceği araçlar şunlardır (SPK, 2026a):

• Özelleştirme kapsamına alınanlar dahil Türkiye'de kurulan ihraççılara ait paylar, özel sektör ve kamu borçlanma araçları,

• Türk Parasının Kıymetini Koruma Hakkında 32 sayılı Karar hükümleri çerçevesinde alım satımı yapılabilen yabancı özel sektör ve kamu borçlanma araçları ile ihraççı payları,

• 12 aydan uzun vadeli olmamak üzere vadeli mevduat, katılma hesabı ve mevduat sertifikaları,

• Borsada işlem görmeleri kaydıyla; altın ve diğer kıymetli madenler ile bu madenlere dayalı olarak ihraç edilen sermaye piyasası araçları,

• Fon katılma payları,

• Repo ve ters repo işlemleri,

• Kira sertifikaları,

• Gayrimenkul sertifikaları,

• Varantlar ve sertifikalar,

• Takasbank para piyasası işlemleri,

• Türev araç işlemlerinin nakit teminatları ve primleri,

• Kurulca uygun görülen özel tasarlanmış yabancı yatırım araçları ve ikraz iştirak senetleri,

• Kurulca uygun görülen diğer yatırım araçları.

2.5.3. Yatırım Fonu Türleri

Yatırım fonları, sadece bir sermaye piyasası kurumu olan Portföy Yönetim Şirketleri tarafından kurulabilmektedir. Portföy yönetim şirketlerinin, öncelikle bir içtüzük ile mevzuatta belirtilen "Şemsiye Fon" türlerinden birini kurması gerekir. Kurulan şemsiye fonlar, katılma payları tek bir içtüzük kapsamında ihraç edilen tüm fonları kapsayan yatırım fonları olmaktadır. Bu çerçevede herhangi bir varlığa sahip olmamaktadır (SPK, 2024).

Şemsiye fon türleri, portföye alınacak menkul kıymetler göz önünde bulundurularak oluşturulmaktadır. Şemsiye fon türleri şu şekilde gruplandırılmaktadır (SPK, 2024): borçlanma araçları şemsiye fonu, hisse senedi şemsiye fonu, kıymetli madenler şemsiye fonu, fon sepeti şemsiye fonu, para piyasası şemsiye fonu, katılım şemsiye fonu, değişken şemsiye fon, serbest şemsiye fon, garantili şemsiye fon, koruma amaçlı şemsiye fon ve karma şemsiye fon. Bunlardan,

Borçlanma araçları şemsiye fonu, fon toplam değerinin en az %80'i devamlı olarak yerli ve/veya yabancı kamu ve/veya özel sektör borçlanma araçlarına yatırılan yatırım fonudur.

Hisse senedi şemsiye fonu, fon toplam değerinin en az %80'i devamlı olarak yerli ve/veya yabancı ihraççıların paylarına yatırılan yatırım fonudur.

Kıymetli madenler şemsiye fonu, borsada işlem gören altın ve diğer kıymetli madenler ile kıymetli madenlere dayalı sermaye piyasası araçlarına yatırılan yatırım fonudur.

Fon sepeti şemsiye fonu, diğer fonların ve borsa yatırım fonlarının katılma paylarından oluşan yatırım fonudur.

Para piyasası şemsiye fonu, portföyünün tamamı devamlı olarak, vadesine en fazla 184 gün kalmış likiditesi yüksek para ve sermaye piyasası araçlarından oluşan ve portföyünün günlük olarak hesaplanan ağırlıklı ortalama vadesi en fazla 45 gün olan yatırım fonudur.

Katılım şemsiye fonu, portföyünün tamamı devamlı olarak, kira sertifikaları, katılma hesapları, ortaklık payları, altın ve diğer kıymetli madenler ile SPK tarafından uygun görülen diğer faize dayalı olmayan para ve sermaye piyasası araçlarından oluşan yatırım fonudur.

Değişken şemsiye fon, portföy sınırlamaları itibarıyla diğer yatırım fonları grubuna dahil olmayan yatırım fonlarıdır.

Serbest şemsiye fon, katılma payları sadece nitelikli yatırımcılara satılmak üzere kurulmuş olan yatırım fonudur.

Garantili şemsiye fon, yatırımcının başlangıç yatırımının belirli bir bölümünün, tamamının ya da başlangıç yatırımının üzerinde belirli bir getirinin bilgilendirme dokümanlarında belirlenen esaslar çerçevesinde belirli vade ya da vadelerde yatırımcıya geri ödenmesi uygun bir yatırım stratejisine ve garantör tarafından verilen garantiye dayanılarak taahhüt edilen fonları kapsayan yatırım fonudur.

Koruma amaçlı şemsiye fon, yatırımcının başlangıç yatırımının belirli bir bölümünün, tamamının ya da başlangıç yatırımının üzerinde belirli bir getirinin bilgilendirme dokümanlarında belirlenen esaslar çerçevesinde belirli vade

veya vadelerde yatırımcıya geri ödenmesi uygun bir yatırım stratejisine dayanılarak en iyi gayret esası çerçevesinde amaçlanan fonları kapsayan yatırım fonudur.

Karma şemsiye fon, fon portföyünün tamamı para ve sermaye piyasası araçlarından oluşan ve ortaklık payları, borçlanma araçları, kira sertifikaları, altın ve diğer kıymetli madenler ile bu madenlere dayalı olarak ihraç edilen sermaye piyasası araçlarının en az ikisinin ayrı ayrı fon toplam değerine oranı asgari %20, birlikte fon toplam değerine oranı ise asgari %80 olan fonları kapsayan yatırım fonudur.

2.5.4. Yatırım Fonlarının Risk ve Getiri Profilleri

Portföy yatırımında risk, bir yatırımın beklenen sonucu vermemesi, yatırımdan beklenen getirinin gerçekleşmeme ihtimali olarak tanımlanmaktadır. Bu tanıma göre risk, sadece para kaybetmek anlamına gelmemekte, beklenen getirinin elde edilememesi veya gerçekleşen getirinin beklenen getiriden sapması nedeniyle satın alma gücünün düşmesi anlamına gelmektedir. Portföy yatırımında getiri, sermaye kazancı, kâr payı, temettü, fon performans artışı veya kira sertifikalarından elde edilen kazanç olarak tanımlanabilmektedir (Golden Global Portföy, t.y.).

2.5.4.1 Yatırım Fonlarında Risk Değeri Hesaplaması

Yatırım fonlarında risk seviyeleri, SPK tarafından belirlenen standart bir değerlendirme sistemine göre hesaplanır. Bu süreçte fonun geçmiş fiyat hareketleri, portföy yapısı ve piyasa koşullarına verdiği tepkiler analiz edilir. Hesaplama yapılırken öne çıkan temel kriterler şunlardır (SPK, 2014; Kuveyt Türk Portföy, t.y.): standart sapma (volatilite analizi), portföy yapısı, piyasa ve getiri dalgalanmaları, likidite özellikleri.

Standart sapma (volatilite analizi), yatırım fonunun fiyatının geçmiş dönemlerde ne kadar değiştiğini ölçen en önemli göstergedir. Değer yüksekse fiyat dalgalanmalarının da yüksek olduğu anlaşılır. Bu analiz yapılırken fiyat verileri incelenir, ortalamadan sapmalar hesaplanır ve sonuç belirli bir risk seviyesine karşılık gelir.

Portföy yapısı, yatırım fonunun yatırım yaptığı varlık sınıfları risk değerini önemli ölçüde etkiler. Hisse senedi ağırlığı yüksek fonlarda volatilite yükselirken, para piyasası veya borçlanma araçlarından oluşan fonlarda risk seviyesi daha sınırlı olabilir. Portföy dağılımı ve fon stratejisi risk değerinin belirlenmesinde temel kriterdir.

Piyasa ve getiri dalgalanmaları, yatırım fonunun farklı piyasa koşullarındaki performansı değerlendirilir. Ekonomik gelişmeler, küresel hareketler ve jeopolitik riskler fonun değerine doğrudan yansıyabilir. Bu nedenle fonun geçmiş dönemlerdeki tepki davranışı analiz edilerek risk seviyesine dahil edilir.

Likidite özellikleri, yatırım fonlarının alım-satım kolaylığı ve işlem hacmi de değerlendirme kapsamındadır. Likiditenin düşük olduğu fonların fiyat hareketleri daha hassas olabileceğinden risk değeri buna göre şekillenir.

2.5.4.2 Yatırım Fonlarının Risk Değerinin Sınıflandırılması

Yatırım fonlarında risk değeri 1 ile 7 arasında sınıflandırılmaktadır. Bu değerlendirme, Avrupa Birliği standartlarında kullanılan *SRRI (Synthetic Risk and Reward Indicator-Sentetik Risk ve Getiri Göstergesi)* sistemine dayanmakta ve tüm yatırımcı bilgi formlarında yer almaktadır. Bu sistemde, ölçekte seviye yükseldikçe fiyat dalgalanmaları ve piyasa duyarlılığı artmaktadır. Risk sınıflandırması, yatırımcıların fonların risk düzeylerini kolayca karşılaştırabilmesini ve kendi yatırım profilleriyle uyumlu ürünleri belirleyebilmesini sağlamaktadır. Risk sınıflandırması şu şekildedir (Kuveyt Türk Portföy, t.y.):

1. Seviye (Çok Düşük Risk): Bu gruptaki fonlar piyasa hareketlerinden en sınırlı düzeyde etkilenir. Portföyde genellikle kısa vadeli para piyasası araçları ve düşük volatiliteye sahip enstrümanlar bulunur.

2. Seviye (Düşük Risk): Fiyat değişimleri kontrollü olup değer hareketleri daha stabil seyredebilir. Kamu borçlanma araçları ve likit ürünlere sıkça yer verilir.

3. Seviye (Orta-Düşük Risk): Düşük riskli fonlara göre daha geniş bir varlık dağılımı bulunur ancak volatilite halen sınırlıdır. Alternatif ürün çeşitliliği görülebilir.

4. Seviye (Orta Risk): Farklı varlık sınıflarıyla dengeli bir portföy yapısı sunar. Hem sabit getirili araçlar hem hisse senedi veya katılım finans ürünleri yer alabilir.

5. Seviye (Orta-Yüksek Risk): Piyasa dalgalanmalarına daha duyarlıdır. Küresel ekonomik hareketler fon değerini daha hızlı etkileyebilir.

6. Seviye (Yüksek Risk): Volatilitenin belirgin olduğu fonlardır. Hisse senedi ve tematik fonlar bu kategoride sıkça yer alır. Fiyat hareketleri kısa vadede daha keskin olabilir.

7. Seviye (Çok Yüksek Risk): En yüksek risk sınıfıdır. Portföy yapısı sektör veya tema yoğunlaşması içerebilir ve küresel piyasalara duyarlılık yüksektir.

2.5.4.3 Yatırım Fonlarının Türlerine Göre Risk Seviyeleri

Yatırım fonlarının risk seviyeleri, portföylerinde ağırlık verilen varlık sınıflarına göre değişiklik göstermektedir. Bu fonlar, farklı piyasa koşullarına ve risk profillerine göre çeşitlenmektedir. Yatırım fonlarının risk seviyeleri şu şekilde sınıflandırılabilmektedir (Kuveyt Türk Portföy, t.y.):

Hisse senedi fonları, piyasa koşullarına en duyarlı fon türleri arasında yer almaktadır. Risk seviyeleri çoğunlukla 5, 6 veya 7 düzeyindedir. Ekonomik gelişmelere ve global piyasa hareketlerine hızlı tepki verebilmektedir.

Altın ve kıymetli maden fonları, altın, gümüş ve benzeri kıymetli madenlere dayalı portföy yapısı nedeniyle risk seviyeleri genellikle 5, 6 veya 7 düzeyindedir. Küresel fiyatlar ve döviz kuru hareketleri bu fonların değerine doğrudan yansıyabilmektedir.

Borçlanma araçları fonları, fiyat değişimlerinin daha öngörülebilir olması nedeniyle genellikle 2 veya 3 risk düzeyindedir. Bu tür fonlarda devlet tahvili, özel sektör tahvili ile kamu ve özel sektör kira sertifikaları bulunabilmektedir.

Para piyasası ve kısa vadeli fonlar, kısa vadeli ve yüksek likiditeye sahip portföy yapısı nedeniyle risk seviyeleri çoğunlukla 1 veya 2 düzeyindedir. Bu tür fonlar piyasa dalgalanmalarından daha sınırlı etkilenmektedirler.

Çoklu varlık ve değişken fonlar, hem hisse senedi, hem kira sertifikası hem de emtia gibi farklı varlık sınıflarını içeren portföy yapısına sahiptir. Stratejiye göre risk seviyesi 2–5 düzeyinde yer alır.

Yabancı ve tematik fonlar, yurt dışı piyasalara, endekslere veya belirli temalara (enerji, teknoloji, sürdürülebilirlik gibi) odaklanan fonlardır. Risk seviyeleri çoğunlukla 4–7 düzeyindedir. Portföy yapısı küresel ekonomik gelişmelerden ve döviz kuru hareketlerinden etkilenebilmektedir.

3. 28 AĞUSTOS 2026 KARARININ PİYASALARA OLASI ETKİLERİ

3.1. 28 AĞUSTOS 2026 Kararı Öncesi Süreç

SPK, piyasadaki riskleri azaltmak, yatırımcıları korumak, şeffaflığı ve likidite güvenliğini artırmak amacıyla 28 Ağustos 2026 tarihli 52/1589 sayılı kararı ile Yatırım Fonlarına İlişkin Rehber'de kapsamlı değişiklikler yapmıştır (SPK, 2026e). Yapılan kapsamlı değişikliklerin temel gerekçeleri; finansal piyasalardaki riskleri azaltmak, yatırımcıları korumak, fon piyasasında yapay fiyat hareketlerini engellemek ve sektörün sağlıklı büyümesini sağlamaktır. Süreç, 2025 yılı son çeyreğinde, yatırım fonları içerisinde, bilhassa serbest yatırım fonları ve para piyasası fonları vasıtasıyla, belirli portföy yönetim şirketlerine ait fonların, fiili dolaşım oranı düşük olan paylarda ekonomik gerçeklik ve şirket temel finansal büyüklükleri ile açıklanamayacak şekilde fiyat hareketlerine neden olduğu gözlemlenmesiyle başlamıştır. 2 Aralık 2025 tarihli Finansal İstikrar Komitesi'nde bu konu gündeme getirilmiş ve 3 Aralık 2025 tarihinde, SPK bünyesinde Çalışma Grubu oluşturulmuştur. İlk olarak, 18 Aralık 2025 tarihinde, SPK tarafından nitelikli yatırımcı şartlarında aranan 1 milyon TL olan finansal varlıklar toplamı tutarı 10 milyon TL'ye çıkarılmıştır. 15 Aralık 2025 tarihinde Yatırım Fonlarına İlişkin Rehber Taslağı ile ilgili BİST A.Ş. ve İstanbul Takas ve Saklama Bankası A.Ş.'nin (Takasbank) görüş ve değerlendirmeleri talep edilmiştir. İki Kurumun görüşü alınarak revize edilen Yatırım Fonlarına İlişkin Rehber Taslağı 28 Ocak 2026 tarihinde Hazine ve Maliye Bakanlığına sunulmuş, Bakanlık tarafından, 11 Şubat 2026 tarihinde Taslağa ilişkin sektör görüşleri alındıktan sonrası Taslağın yürürlüğe alınması bildirilmiştir. Yatırım Fonlarına İlişkin Rehber Taslağı 13 Şubat 2026 tarihli yazı ile Türkiye Sermaye Piyasaları Birliği'ne gönderilerek tüm sektörün görüşüne açılmış, 18 Şubat 2026 tarihinde Merkezi Kayıt Kuruluşu A.Ş.'den görüş talep edilmiştir. Süreç içerisinde, Türkiye Sermaye Piyasaları Birliği ve Takasbank tarafından; Türkiye Elektronik Fon Alım Satım Platformu'nun (TEFAS) işleyişine ilişkin muhtelif konularda değişiklik yapılmasının; özellikle, TEFAS Uygulama Esaslarının mevcut netleştirme, takas ve alacak dağıtım esaslarının, Yatırım Fonlarına İlişkin Rehber'in yayımlanmasından önce, kapsamlı şekilde değiştirilmesi talep edilmiştir. Bu kapsamda; TEFAS'ın takas yapısına ilişkin Türkiye Sermaye Piyasaları Birliği ile Takasbank tarafından ortak bir çalışma yapılarak SPK'ya sunulmasına karar verilmiştir. Mayıs 2026 tarihinde SPK Başkanlığında yaşanan değişimden sonra Yatırım Fonlarına İlişkin Rehber Taslağı çalışmaları devam etmiştir.

TEFAS Uygulama Esasları 17 Haziran 2026 tarihinde SPK tarafından onaylanarak, 20 Temmuz 2026 tarihinde Takasbank tarafından uygulamaya alınmıştır. Ayrıca, yatırım fonu portföylerine dahil edilen Borsa'da işlem gören Gayrimenkul Yatırım Fonu ve/veya Girişim Sermayesi Yatırım Fonu katılma paylarının, fon portföyünde Borsa fiyatı yerine, net aktif değer ile değerlenmesi uygulamasına 23 Temmuz 2026 tarihli SPK kararı ile 31 Temmuz 2026 tarihinden sonra geçilmiştir. Bu düzenleme ile bazı fonların net aktif değeri üzerinde değerleme yapması engellenmiş ve söz konusu fonların değerinin fiktif olarak hesaplanmasına izin verilmemiştir. Süreç sonunda Yatırım Fonlarına İlişkin Rehber 28 Ağustos 2026 tarihinde kamuya duyurulmuştur. Yatırım Fonlarına İlişkin Rehber, yatırım fonu sektöründe, özellikle para piyasası fonları ile hisse senedi serbest fonların, ilişkili taraflar arasında teminatsız borçlanma ve Borsa'da olağandışı fiyat hareketleri yoluyla oluşturdukları sistemik riskin finansal istikrara etkisini önlemek için hayata geçirilmiştir. Yapılan düzenleme, yatırımcı tasarrufunu korumaya ve güveni sağlamaya, fonlar üzerinden manipülasyon imkanının sınırlandırılmasına ve şeffaflığın artırılmasına yönelik düzenlemeler içermektedir.

Karar, serbest fonların sağladığı esnekliğin bazı çevrelerce düşük halka açıklığa sahip hisselerde fiyat manipülasyonu ve yapay piyasa oluşturmak amacıyla kullanılması, şirket ortaklarının borsa dışı yöntemlerle hisselerini bu fonlara park ederek küçük yatırımcı aleyhine pozisyon alması, Sığ piyasalarda olası bir çöküşte fonların nakde dönememe (itfa/likidite) riski taşıması sebebiyle alınmıştır.

Bu çerçevede kararın alınma sebepleri şu şekilde özetlenebilir:

Suni Fiyatlamaların Engellenmesi: Fon likiditesinin sığ (dolaşımı düşük) hisselere yönlendirilerek şirket temelleriyle uyuşmayan yapay fiyat hareketleri yaratılmasını durdurmak.

Gerçekçi Değerleme: Portföylerdeki GYF/GSYF paylarının manipülasyona açık borsa fiyatı yerine Net Aktif Değer (NAD) ile değerlenmesini sağlayarak fiktif varlık şişkinliğini önlemek.

Sistemik Riskin Sınırlandırılması: Fonların, ilişkili şirketler veya taraflar arasında bankacılık dışı, teminatsız bir kredi/borçlanma kanalı olarak kullanılmasının önüne geçmek.

Yatırımcının Korunması: Enflasyonla aşınan nitelikli yatırımcı limitini 1 milyon TL'den 10 milyon TL'ye çıkararak, riski yönetemeyecek yatırımcıları karmaşık fonlardan uzak tutmak.

Altyapı ve Takas Güvenliği: TEFAS altyapısındaki netleştirme ve alacak dağıtım boşluklarını gidererek operasyonel temerrüt risklerinin tüm piyasaya yayılmasını engellemek.

3.2. 28.08.2026 Tarih ve 52/1589 Sayılı Karar ve Getirdikleri

SPK Karar Organı'nın i-SPK 52.4.an (28/08/2026 tarihli ve 52/1589 s.k.) sayılı İlke Kararı ile: SPK'nın i-SPK.52.4 (20.06.2014 tarih ve 19/614 s.k.) sayılı İlke Kararı olarak kabul edilen Yatırım Fonlarına İlişkin Rehber'in "Tanımlar" başlıklı bölümü ile (1.2.), (2.), (4.2.3.), (4.2.5.1.), (4.2.5.2.), (4.3.), (4.4.), (4.9.), (6.1.), (6.8.), (9.5.), (12.5.) maddelerinde değişiklik yapılmış ve Yatırım Fonlarına İlişkin Rehber'e (4.2.10.), (4.10.), (6.12.), (9.8.) maddeleri eklenmiştir (SPK, 2026d). Bu düzenlemelerin konuları şu şekildedir: Madde (1.2.)'de Aynı Türdeki Şemsiye Fona Bağlı Olarak İhraç Edilecek Fon Sayısının Belirlenmesine İlişkin Esaslar ile ilgili düzenleme yapılmış, Madde (2.)'de Fon Unvanı ile ilgili düzenleme yapılmış, Madde (4.2.3.)'te Repo, Ters Repo İşlemleri, Taahhütlü İşlemler ve Vaad Sözleşmeleri ile ilgili düzenleme yapılmış, Madde (4.2.5.1.)'de Fon Portföyünden Ödünç Verilmesi ile ilgili düzenleme yapılmış, Madde (4.2.5.2.)'de Fon Portföyüne Ödünç Alınması ile ilgili düzenleme yapılmış, Madde (4.2.10.) ile Murabaha İşlemleri ile ilgili madde eklenmiş, Madde (4.3.)'te Serbest Fonlara İlişkin Esaslar ile ilgili düzenleme yapılmış, Madde (4.4.)'te Portföy Yönetimine İlişkin Esaslar ile ilgili düzenleme yapılmış, Madde (4.9.)'da Unvanında "Para Piyasası" ve "Kısa Vadeli" İbareleri Yer Alan Fonlara İlişkin Esaslar ile ilgili düzenleme yapılmış, Madde (4.10.) ile Yurt İçi Organize Para Piyasası İşlemleri ve Serbest Fonların Takasbank Para Piyasası İşlemleri ile ilgili madde eklenmiş, Madde (6.1.)'de Satılacak Katılma Payı Adedine İlişkin Üst Limit Belirlenmesi ile ilgili düzenleme yapılmış, Madde (6.8.)'de TEFAS ile ilgili düzenleme yapılmış, Madde (6.12.) ile Fon Katılma Paylarının Satış Başlangıç Tarihi ile ilgili madde eklenmiş, Madde (9.5.)'te Serbest Fonların Kamuyu Aydınlatma Esasları ile ilgili düzenleme yapılmış, Madde (9.8.) ile Fonlara İlişkin Diğer Açıklamalar ile ilgili madde eklenmiş ve Madde (12.5.)'te Yatırım Fonları Tarafından Ortaklık Payları ile İlgili Yapılan İşlemlere İlişkin Esaslar ile ilgili düzenleme yapılmıştır.

3.3. 28.08.2026 Tarih ve 52/1589 Sayılı Kararın Ortaya Çıkaracağı Etkiler

Kararın ortaya çıkarabileceği başlıca etkiler şu şekilde sıralanabilir:

Sığ Hisseler ve Yan Tahtalara Etkisi: SPK, portföylerdeki hisse yoğunlaşmalarının kademeli olarak (Ekim, Kasım, Aralık sonlarında 1/3 oranında) eritilmesi için 2026 sonuna kadar süre tanımıştır. Bu durum, fiili dolaşımı düşük sığ hisselerde fon kaynaklı ciddi bir satış baskısı, likidite daralması ve fiyat dalgalanması oluşturacaktır.

BIST 30 Hisselerine Yönelim: Düzenlemede BIST 30 payları kademeli sınırlamalardan muaf tutulmuştur. Dolayısıyla sığ hisselerden çıkmak zorunda kalan fonların bu likiditeyi BIST 30 gibi derinliği yüksek, kurumsal paylara kaydırması beklenmektedir. Bu durumda büyük hisselerin ve endeksin olumlu etkilenmesi beklenebilmektedir.

Portföy Yönetim Sektöründe Konsolidasyon (Birleşmeler): Şirketlere getirilen 250 milyon TL ve 500 milyon TL asgari özsermaye şartı ile bir yöneticinin en fazla 7 fon yönetebilmesi kuralı, küçük ve butik Portföy Yönetim Şirketlerini mali açıdan zorlayacaktır. Sektörde birleşmeler artabilecek ve lisanslı portföy yöneticisi ihtiyacı önemli bir maliyet kalemi haline gelebilecektir.

Haftalık portföy bildiriminin şeffaflık ve denetim üzerindeki temel etkileri değerlendirildiğinde ortaya çıkabilecek etkiler şu şekilde sıralanabilir:

Vitrin Süslemesinin Önlenmesi: Yöneticilerin sadece aylık raporlama dönemlerinde riskli varlıkları elden çıkarıp güvenli varlıklara geçerek fonun gerçek riskini gizleme davranışı engellenebilecektir.

Strateji İhlallerinin Erken Tespiti: İzahnamede belirtilen yatırım stratejisinden ve risk eşiğinden sapmalar bir ay beklenmeden hızla fark edilebilecektir.

Sığ Hisse Yığılmalarının Deşifresi: Likiditesi düşük, satılması zor ve manipülasyona açık varlıklarda oluşan gizli yoğunlaşmalar tespit edilerek olası likidite krizlerinin önüne geçilebilecektir.

Çapraz Finansman Ağlarının Yakalanması: Fonların birbirleri üzerinden dolaylı yoldan kendi ilişkili grup şirketlerini finanse ettiği karmaşık işlemler görünür hale gelebilecektir.

Karşı Taraf Riskinin Sınırlandırılması: Fon varlıklarının tek bir bankada veya kurumda toplanmasıyla oluşan çeşitlendirme ihlalleri anında tespit edilebilecektir.

Murabaha işlemlerinin serbest fonlara açılmasının temel etkileri şu şekilde sıralanabilir:

Kısa Vadeli Nakit Yönetimi: Katılım esaslı fonlara, kullanamadıkları geleneksel repo ve vadeli mevduat yerine atıl nakitlerini değerlendirebilecekleri hızlı ve varlığa dayalı bir alternatif sunacaktır.

Yatırım Aracı Çeşitliliği: Sadece kira sertifikası (sukuk) ve katılım hesaplarına sıkışan faizsiz finans piyasasına yeni bir varlık sınıfı ekleyerek portföy riskini dağıtabilecektir.

Reel Sektöre Kurumsal Finansman: Katılım bankaları ve faizsiz Bireysel Emeklilik Sistemi fonlarındaki büyük kurumsal sermayeyi toplayarak, ticari alım-satımlar üzerinden reel sektörün işletme sermayesi ihtiyacını karşılayabilecektir.

Yabancı Sermaye Çekimi: Uluslararası İslami finans standartlarına uygun bir altyapı sunarak, özellikle Körfez bölgesindeki kurumsal yatırımcıların Türkiye piyasasına girişini kolaylaştırabilecektir.

4. SONUÇ

Portföy, bir gerçek veya tüzel kişinin sahip olduğu para, sermaye piyasası araçları, kıymetli madenler, mevduat ve diğer finansal varlıkların oluşturduğu toplam varlık bileşimidir. Portföy yöneticiliği, sermaye piyasası araçları, para piyasası araç ve işlemleri, vadeli işlem ve opsiyonlar gibi türev araçlar, nakit ve mevduattan oluşan portföylerin, tasarruf sahibinin risk-getiri tercihleri doğrultusunda ve vekalet ilişkisi çerçevesinde profesyonelce yönetilmesidir. Portföy Yönetim Şirketi, 6362 sayılı SPKn (2012) uyarınca ana faaliyet konusu yatırım fonları kurmak ve yönetmek olan, anonim ortaklık biçiminde kurulmuş yetkili sermaye piyasası kurumlarıdır. Yatırım fonları, tasarruf sahiplerinden toplanan fonlarla, hesabına hareket edilen portföyün işletilmesi amacıyla kurulan, tüzel kişiliği bulunmayan ancak mal varlığı kurucusunun mal varlığından ayrı olan sermaye piyasası yapılarıdır.

SPK, 28 Ağustos 2026 tarihinde piyasalardaki şeffaflığı ve likidite güvenliğini artırmak, riskleri azaltmak ve yatırımcıları korumak amacıyla Yatırım Fonlarına İlişkin Rehber'de kapsamlı değişiklikler yapmıştır. Bu değişiklik çerçevesinde, özellikle serbest fonların küçük ve sığ hisselerdeki yoğunlaşmalarına kademeli sınırlamalar getirilmiş, TEFAS bildirimleri haftalık periyotlara çekilmiştir. Bu kararın alınma sebepleri olarak: suni fiyatlamaların engellenmesi, gerçekçi değerleme, sistemik riskin sınırlandırılması, yatırımcının korunması ile altyapı ve takas güvenliği sayılabilmektedir.

Kararın ortaya çıkarabileceği başlıca etkiler şu şekilde sıralanabilir: Sığ Hisseler ve Yan Tahtalara Etkisi: SPK, portföylerdeki hisse yoğunlaşmalarının kademeli olarak (Ekim, Kasım, Aralık sonlarında 1/3 oranında) eritilmesi için 2026 sonuna kadar süre tanımıştır. Bu durum, fiili dolaşımı düşük sığ hisselerde fon kaynaklı ciddi bir satış baskısı, likidite daralması ve fiyat dalgalanması oluşturacaktır. BIST 30 Hisselerine Yönelim: Düzenlemede BIST 30 payları kademeli sınırlamalardan muaf tutulmuştur. Dolayısıyla sığ hisselerden çıkmak zorunda kalan fonların bu likiditeyi BIST 30 gibi derinliği yüksek, kurumsal paylara kaydırması beklenmektedir. Bu durumda büyük hisselerin ve endeksin olumlu etkilenmesi beklenebilmektedir. Portföy Yönetim Sektöründe Konsolidasyon (Birleşmeler): Şirketlere getirilen 250 milyon TL ve 500 milyon TL asgari özsermaye şartı ile bir yöneticinin en fazla 7 fon yönetebilmesi kuralı, küçük ve butik Portföy Yönetim Şirketlerini mali açıdan zorlayacaktır. Sektörde birleşmeler artabilecek ve lisanslı portföy yöneticisi ihtiyacı önemli bir maliyet kalemi haline gelebilecektir.

Haftalık portföy bildiriminin şeffaflık ve denetim üzerindeki temel etkileri değerlendirildiğinde ortaya çıkabilecek etkiler şu şekilde sıralanabilir: Vitrin Süslemesinin Önlenmesi: Yöneticilerin sadece aylık raporlama dönemlerinde riskli varlıkları elden çıkarıp güvenli varlıklara geçerek fonun gerçek riskini gizleme davranışı engellenebilecektir. Strateji İhlallerinin Erken Tespiti: İzahnamede belirtilen yatırım stratejisinden ve risk eşiğinden sapmalar bir ay beklenmeden hızla fark edilebilecektir. Sığ Hisse Yığılmalarının Deşifresi: Likiditesi düşük, satılması zor ve manipülasyona açık varlıklarda oluşan gizli yoğunlaşmalar tespit edilerek olası likidite krizlerinin önüne geçilebilecektir. Çapraz Finansman Ağlarının Yakalanması: Fonların birbirleri üzerinden dolaylı yoldan kendi ilişkili grup şirketlerini finanse ettiği karmaşık işlemler görünür hale gelebilecektir. Karşı Taraf Riskinin Sınırlandırılması: Fon varlıklarının tek bir bankada veya kurumda toplanmasıyla oluşan çeşitlendirme ihlalleri anında tespit edilebilecektir.

Murabaha işlemlerinin serbest fonlara açılmasının temel etkileri şu şekilde sıralanabilir: Kısa Vadeli Nakit Yönetimi: Katılım esaslı fonlara, kullanamadıkları geleneksel repo ve vadeli mevduat yerine atıl nakitlerini değerlendirebilecekleri hızlı ve varlığa dayalı bir alternatif sunacaktır. Yatırım Aracı Çeşitliliği: Sadece kira sertifikası (sukuk) ve katılım hesaplarına sıkışan faizsiz finans piyasasına yeni bir varlık sınıfı ekleyerek portföy riskini dağıtabilecektir. Reel Sektöre Kurumsal Finansman: Katılım bankaları ve faizsiz Bireysel Emeklilik Sistemi fonlarındaki büyük kurumsal sermayeyi toplayarak, ticari alım-satımlar üzerinden reel sektörün işletme sermayesi ihtiyacını karşılayabilecektir. Yabancı Sermaye Çekimi: Uluslararası İslami finans standartlarına uygun bir altyapı sunarak, özellikle Körfez bölgesindeki kurumsal yatırımcıların Türkiye piyasasına girişini kolaylaştırabilecektir.

Alınan kararların olumlu etkisinin görülebilmesi, birincil ve asli sorumlu SPK'nın, ikinci sorumlu anlık piyasa gözetim mekanizmasıyla donatılmış olan BİST'in yasa ve yönetmeliklerle kendilerine verilen görevleri eksiksiz yerine getirmelerine bağlıdır. Birincil ve asli sorumlu SPK, 6362 sayılı SPKn'nin (2012) 1. ve 107. Maddelerine göre, sermaye piyasalarının güven, açıklık ve kararlılık içinde işlemesini sağlamak ve piyasa dolandırıcılığını önlemekten sorumludur. Özellikle portföy yönetim şirketlerinin tek bir sığ hissede yoğunlaşmasına, tebliğlerdeki limitleri dolaylı yollarla aşmasına ve fiyatları sahte işlemlerle şişirmesine müdahale etmesi gerekmektedir. SPK'nın Piyasa Gözetimi Dairesi, elindeki algoritmik erken uyarı sistemleriyle ortaya çıkabilecek anormallikleri önceden tespit etmekle yükümlüdür. Bu yükümlülüklerin yerine getirilmemesi sonucunda ortaya çıkabilecek likidite problemi ve portföy yönetim şirketlerinin iflası açık bir denetim zafiyeti olarak görülebilecektir. İkinci sorumlu olan BİST Yönetimi, anlık piyasa gözetim mekanizmasıyla donatılmıştır. Sığ tahtalarda dönen karşılıklı eşleşmeleri, yapay hacimleri ve şüpheli emir hareketlerini anında tespit edip Volatilite Bazlı Tedbir Sistemi'ni, brüt takası veya tek fiyat uygulamasını devreye sokmak BİST Yönetiminin asli görevidir. Bu asli görevin yerine getirilmemesi sermaye piyasalarında önemli olumsuz sonuçlar ortaya çıkarabilecektir.

Sonuç olarak, SPK'nın yapmış olduğu düzenlemeyle sığ hisselerden çıkışı zorunlu kılmasıyla fon likiditesinin BIST 30 gibi derinliği yüksek kurumsal paylara kayması beklenebilmektedir. Bu durum büyük şirketlerde aşırı yoğunlaşma, yan tahtalarda likidite kuruması, serbest fon pazarında daralma ve sermayenin denetim dışı yapılara yönelmesi gibi riskleri barındırmaktadır. Söz konusu riskleri yönetebilmek için şirketlerin fiili dolaşım oranlarını artırıcı teşviklerin hayata geçirilmesi, portföy uyum süreçlerinin piyasayı sarsmayacak şekilde kademeli yürütülmesi, bireysel yatırımcıları korumak adına Borsa Yatırım Fonlarının desteklenmesi ve fiktif fiyatlamalara karşı bağımsız değerleme standartlarının katılaştırılması büyük önem taşımaktadır.

KAYNAKÇA

6362 sayılı Sermaye Piyasası Kanunu. (2012). T.C. Resmî Gazete (28513 sayılı, 30 Aralık 2012).

Golden Global Portföy. (t.y.). Risk ve getiri ilişkisi nedir?, goldenglobalportfoy.com.tr

Homaio Invest. (t.y.). Glossary. homaio.com

İstanbul Menkul Kıymetler Borsası. (1999). Sermaye piyasası ve borsa temel bilgiler kılavuzu. İMKB Eğitim Yayınları.

Kuveyt Türk Portföy. (t.y.). Yatırım fonları risk değerleri nelerdir? Kapsamlı ve öğretici rehber. kuveytturkportfoy.com.tr

Sermaye Piyasası Kurulu [SPK]. (2014). Yatırım fonlarına ilişkin rehber (İlke Kararı i-SPK.52.4, 20.06.2014 tarih ve 19/614 s.k., Md. 9.3.2.1. 6 nolu alt bend). spk.gov.tr

Sermaye Piyasası Kurulu [SPK]. (2024). Yatırım fonları.

Sermaye Piyasası Kurulu [SPK]. (2026a). Menkul kıymet yatırım fonları tanıtım rehberi. spk.gov.tr

Sermaye Piyasası Kurulu [SPK]. (2026b). Portföy yönetim şirketleri tanıtım rehberi. spk.gov.tr

Sermaye Piyasası Kurulu [SPK]. (2026c). Portföy yönetim şirketleri. https://spk.gov.tr

Sermaye Piyasası Kurulu [SPK]. (2026d). Sermaye Piyasası Kurulu bülteni (20/08/2026 tarih ve 2026/54 sayılı).

Sermaye Piyasası Kurulu [SPK]. (2026e). Yatırım fonlarına ilişkin rehber düzenleme sürecine ilişkin açıklama [Basın duyurusu]. spk.gov.tr

Türkiye'de Katılım Sigorta Şirketlerinin Kârlılık ve Verimlilik Analizi: 2020-2025 Dönemi

Prof. Dr. Erdal Arslan[1] **Dr. Öğr. Üyesi Ali Bora[2]**

[1] Selçuk Üniversitesi, İktisadi ve İdari Bilimler Fakültesi, İktisat Bölümü, erdalarslan@selcuk.edu.tr, ORCID: 0000-0003-4892-2963

[2] Selçuk Üniversitesi, Sosyal Bilimler Meslek Yüksekokulu, Finans Bankacılık ve Sigortacılık Bölümü, ali.bora@selcuk.edu.tr, ORCID: 0000-0002-1766-0123

Özet: Katılım sigortacılığı; dayanışma, yardımlaşma ve risk paylaşımı gibi katılım ilkeleri kapsamında yürütülen; faiz, belirsizlik ve haksız kazanç gibi unsurları içermeyen sigortacılık faaliyetidir. Katılım sigortacılığı, katılımcıların kendileri ile diğer katılımcıların tazminat ve/veya birikim ödemelerine ilişkin taleplerinin karşılanmasını teminen, katılım finans ilkelerine uygun olarak faaliyet göstermektedir. Ülkemizde katılım sigortacılığı faaliyetlerine ilk defa 2009 yılında başlanmış olsa da bu alanın yasal çerçevesi, 19.12.2020 tarihinde yayımlanarak yürürlüğe giren "Katılım Esasları Çerçevesinde Sigortacılık ve Bireysel Emeklilik Faaliyetlerine İlişkin Yönetmelik" ile çizilmiştir. Bu yönetmelik uyarınca, katılım sigortacılığı alanında faaliyet gösterecek şirketlerin bir Danışma Komitesi oluşturması ve bu Komitenin aldığı kararlara uygun hareket etmesi zorunlu kılınmıştır. Ayrıca mevzuat gereği şirket bünyesinde kurulacak Katılım Uyum Birimleri aracılığıyla kararların doğru uygulanması ve denetlenmesi sağlanarak muhtemel risklerin önüne geçilmesi hedeflenmiştir. Türkiye Sigorta Birliği istatistikleri dikkate alındığında, 2014 yılından itibaren yalnızca iki şirketle yürütülen katılım sigortacılığı faaliyetleri, 2021 yılı sonu itibarıyla pencere usulü ve tam katılım modelini uygulayan 12 şirkete ulaşmıştır. Pencere usulü sistemle yürütülen katılım sigortacılığı faaliyetlerinin 2021 yılında sonlandırılmasının ardından, katılım sigortacılığı şirket faaliyetleri 2023 yılından itibaren tamamen tam katılım esasına göre devam etmiştir. Bu çalışmada, ülkemizde katılım sigortacılığı alanında faaliyet gösteren sigorta şirketlerinin 2020-2025 dönemi faaliyetleri kârlılık ve verimlilik açısından incelenmektedir. Şirketlerin kârlılık ölçütleri olarak aktif kârlılığı ve özsermaye kârlılığı; verimlilik ölçütü olarak da hasar/prim oranı ve gider/prim oranının toplamından oluşan birleşik rasyo dikkate alınmaktadır. Çalışma sonucunda, katılım sigortacılığı sektörünün 2020 yılında %98,2 olan birleşik rasyosunu 2025 yılında %90,2 seviyesine çekerek operasyonel verimliliğini artırdığı, buna paralel olarak özsermaye kârlılığını da %18,5'ten %36'ya yükselttiği görülmüştür.

Anahtar Kelimeler: Katılım Finans Sistemi, Katılım Sigortacılığı, Tekâfül, Katılım Havuzu, Katkı Payı

Abstract: Participation insurance is an insurance activity conducted within the scope of participation principles, such as solidarity, mutual assistance, and risk sharing, that excludes elements like interest, uncertainty, and unjust gain. It operates in accordance with participation finance principles to meet the demands of participants regarding compensation and/or savings payouts for themselves and other participants. Although participation insurance activities first began in Türkiye in 2009, the formal framework for the sector was established by the Regulation on Insurance and Individual Pension Activities within the Framework of Participation Principles, which entered into force on December 19, 2020. This Regulation aims to mitigate potential risks by requiring companies to establish an Advisory Committee and conduct their operations in accordance with its decisions. Furthermore, it mandates the establishment of Participation Compliance Units within companies to ensure the correct implementation and oversight of these decisions. According to data published by the Insurance Association of Türkiye since 2014, the sector initially operated with only two companies; however, the number of companies generating business through both the window method and full participation models reached 12 by the end of 2021. Following the termination of the window method in 2021, participation insurance operations have continued exclusively as full participation activities since 2023. This study examines the activities of insurance companies operating in the Turkish participation insurance sector during the 2020–2025 period, focusing on profitability and efficiency. Return on assets and return on equity are utilized as profitability metrics, while the combined ratio, comprising the sum of the loss/premium ratio and the expense/premium ratio, is used as the efficiency metric. The study reveals that the participation insurance sector improved its operational efficiency by reducing its combined ratio from 98.2% in 2020 to 90.2% in 2025, while the return on equity concurrently rose from 18.5% to 36%.

Keywords: Participation Finance System, Participation Insurance, Takaful, Participation Pool, Contribution

1. GİRİŞ

Katılım sigortacılığı, karşılıklı yardımlaşma ve dayanışma ilkelerine dayanan, toplanan primlerin ve elde edilen kârların katılım finans kurallarına uygun finansal enstrümanlarda değerlendirildiği alternatif bir risk yönetim modelidir. Türkiye'de atılan kurumsal adımlar ve Türkiye Sigorta Birliği (TSB) ile Sigortacılık ve Özel Emeklilik Düzenleme ve Denetleme Kurumu (SEDDK) tarafından yapılan mevzuat düzenlemeleri, katılım sigortacılığının ilerlemesine sağlamıştır.

Bir şirketinin kârlılık ve verimliliğini ölçmede kullanılan temel göstergelerden kârlılık için olanları; aktiflerin ne kadar kârlı kullanıldığını gösteren Aktif Kârlılığı (ROA) oranı ile şirket sahip ve ortaklarının yatırdığı sermayenin kârlılığını ölçen Özsermaye Kârlılığı (ROE) oranı; verimlilik için ise hasar ile komisyonlar, operasyon, personel ve genel giderlerin prim gelirlerine oranını ifade eden Birleşik Rasyo (Combined Ratio) oranıdır. Bu çalışma, Türk Katılım Sigortacılığı sektörünün 2020–2025 yılları arasındaki makroekonomik dalgalanmalara, enflasyonist baskılara ve mevzuat değişikliklerine karşı gösterdiği finansal performansı analiz etmeyi amaçlamaktadır.

2. KATILIM FİNANS SİSTEMİ

Katılım finans sisteminin temelinde paylaşım ve ortaklık olgusu yer almaktadır. Bu sistemde, paranın faizle ödünç verilmesi yerine emek ve sermayenin kâr-zarar ortaklığına giderek parayı kullanılması temel ilke olarak benimsenmiştir. Parasını değerlendirecek tasarruf sahibi, girişimciye ortak olmakta, bu ortaklık paranın kullanımından ortaya çıkacak kârı veya zararı kapsamaktadır. Bu işlemde, paranın kullanımı sonucu kâr garantisi bulunmamakta, girişimcinin zararına da ortaklık söz konusu olmaktadır. Zarara ortaklık, işlem başlangıcında parayı kullandıran tasarruf sahibi tarafından bilinmektedir. Kâr, paranın reel ekonomik faaliyetlerde kullanılması sonucu elde edilen bir artı değer olarak dikkate alındığında, kâr elde etmek için mutlaka ekonomik bir faaliyetin yapılması zorunluluğu ortaya çıkmaktadır (Karahan & Ersoy, 2016: 97).

Katılım finans sistemi, katılım bankacılığı, katılım sigortacılığı (tekafül), varlığa dayalı kira sertifikaları (sukuk) ve diğer katılıma dayalı yatırım araçlarından oluşmaktadır. Alternatif katılım finansın prensipleri kısaca: faiz alınmaması, helal olmayan ürünlerin ticaretinin yapılmaması, varlığa dayalı ve aşırı risk içermeyen finansal araçların kullanılması ve tarafların kâra ortak olduğu kadar zarara da ortak olması şeklinde sıralanabilir (Çelik, 2019: 20).

Katılım Finans Sisteminin çerçevesi Katılım Finans Strateji Belgesi'nde belirlenmiştir. Katılım Finans Strateji Belgesi, Bütüncül Dönüşüm dönemi olarak isimlendirilen 2022-2025 döneminde, katılım finans sisteminin finansal sistemde önemli yere ulaşmasını sağlayacak stratejik dönüşümü gerçekleştirmeye dönük somut adımları içermektedir. İstanbul Finans Merkezi projesinin iki temel ayağından bir tanesi olan katılım finans sisteminin ilke ve prensiplerine tam uyumlu biçimde faaliyet göstermesi, çeşitli yapısal sorunlarına uygulanabilir ve gerçekçi çözümler üretilmesi, finansal sistem içinde hak ettiği yere ulaşması ve İstanbul Finans Merkezi'nin küresel bir katılım finans merkezi olması amacıyla T.C. Cumhurbaşkanlığı Finans Ofisi tarafından 2021-2022 döneminde Katılım Finans Strateji Belgesi hazırlık çalışmaları yürütülmüştür. Katılım Finans Strateji Belgesi, katılım finans çatısı altında yer alan tüm sektörler, ürünler ve hizmetleri kapsayan ve katılım finansı bir bütün olarak geliştirmeye yönelik stratejik çerçevenin çizildiği bir belgedir. Katılım Finans Strateji Belgesi, 2022-2025 döneminde, katılım finansa yönelik hukuki, idari ve kurumsal altyapının oluşturulması yanında mevcut yapıda önemli bir dönüşümü gerçekleştirmeyi hedeflemiştir (T.C. Cumhurbaşkanlığı Finans Ofisi, 2022: 1).

Katılım finans kapsamında sekiz öncelikli alan belirlenmiş ve bu alanlara ilişkin çalışma grupları oluşturulmuştur. Bu çalışma grupları şunlardır (T.C. Cumhurbaşkanlığı Finans Ofisi, 2022: 2): i. Katılım finansman kuruluşları, ii. Katılım sermaye piyasaları, iii. Katılım sigortacılığı, iv. Katılım sosyal finans, v. Helal değer zinciri ile bütünleşme, vi. Katılım finans fıkhî yönetişim yapısı, vii. Beşerî sermaye, viii. Algı, farkındalık ve katılım finans okuryazarlığı. Katılım Finans Strateji Belgesi stratejik amaç ve hedeflerinin oluşturulmasında dört temel prensip benimsenmiştir. Bunlar: bütüncül yaklaşım, gaye odaklı ilkeler, reel sektör odaklılık ve Türkiye'ye özgülüktür. Katılım Finans Strateji Belgesinin 5 temel amacı ve her amaç altında da somut hedefler belirlenmiştir. Bu beş temel amaç şunlardan oluşmaktadır (T.C. Cumhurbaşkanlığı Finans Ofisi, 2022: 3): i. Kurumsal dönüşümü gerçekleştirmek, ii. Destekleyici mekanizmaları tesis etmek, iii. Bütüncül fıkhî yönetişim yapısını oluşturmak, iv. Beşerî sermayenin gelişmesini sağlamak, v. Olumlu algı, farkındalık ve katılım finans okuryazarlığını artırmak.

Katılım Finans Strateji Belgesinde yer alan amaç, hedef ve eylem maddelerinin hayata geçirilmesi ile katılım finansın toplam finansal sistem içindeki payının 2025 yılına kadar sürdürülebilir şekilde artırılması ve katılım finansın hanehalkı ve reel sektörün finansman ihtiyacının karşılanmasında önemli bir rol oynaması amaçlanmış, İstanbul Finans Merkezini bölgesel ve küresel olarak bir katılım finans merkezi hâline dönüştürülmesi hedeflenmiştir (T.C. Cumhurbaşkanlığı Finans Ofisi, 2022: 3).

Katılım Finans Strateji Belgesinde, reel sektör odaklı ve risk paylaşımına dayalı bir katılım finans sisteminin faizli finans sisteminin sunacağı faiz getirilerinin çok üzerinde getiri sunma potansiyeli olduğu halde faizsiz finans ifadesinin getiri sağlamayan bir finansal yapı algısına yol açabileceği belirtilerek faizsiz finans kavramı yerine "katılım finans" kavramının kullanılması tercih edilmiştir. Katılım finans ifadesi ile faizsiz finansa ilişkin olumlu

algının artması ve müşteri potansiyelinin gelişmesi beklentisi vurgulanmıştır (T.C. Cumhurbaşkanlığı Finans Ofisi, 2022: 7).

Katılım finans kavramı, katılım finans esaslarına göre faaliyet gösteren tüm sektörleri ve bu sektörler tarafından sunulan ürün, hizmet ve faaliyetleri kapsayan çatı bir kavram olarak tanımlanmıştır. Katılım finans sistemini oluşturan dört temel sektör; katılım finansman kuruluşları, katılım sermaye piyasaları, katılım sigortacılığı ve katılım sosyal finans sektörleridir. Buna ilave olarak, risk-paylaşım kavramı katılım finans açısından önem arz etmektedir (T.C. Cumhurbaşkanlığı Finans Ofisi, 2022: 7).

Katılım finans esasları, kurum, kuruluş, ürün, hizmet ve diğer faaliyetlerin katılım finans sisteminde yer alıp almayacağını belirleyen temel esaslardır. Katılım finans esasları, katılım finansa ilişkin yasak ve kısıtları belirleyerek katılım finans sisteminin sınırlarını çizmeyi amaçlamıştır (T.C. Cumhurbaşkanlığı Finans Ofisi, 2022: 8). Dünyada ve Türkiye'de genel olarak kabul edilen ve katılım finans esasları olarak değerlendirilebilecek temel ilke ve prensipler şu şekilde sayılabilmektedir: i. Faizsizlik, ii. Garar ve cehaletın olmaması, iii. Kumarın olmaması, iv. Riske ve sorumluluğa dayalı kazanç, v. Yasaklanmış faaliyetler

Katılım finans sistemi, katılım finans kuruluşları, katılım sermaye piyasaları, katılım sigortacılığı, katılım sosyal finans olarak sayılan dört temel sektörden ve her sektör altında yer alan piyasalar, kurumlar ve araçlardan oluşmaktadır (T.C. Cumhurbaşkanlığı Finans Ofisi, 2022: 10).

i. Katılım Finans Kuruluşları: Katılım finans kurumları (Katılım Finans Strateji Belgesinde mevcut "katılım bankası" isminin "katılım finans kurumu" olarak değiştirilmesi önerilmektedir), katılım esaslı kalkınma ve yatırım bankaları, tasarruf finansman şirketleri.

ii. Katılım Sermaye Piyasaları: Kira sertifikası piyasası, katılım esaslı para ve döviz piyasaları, katılım esaslı borsa ve pay senetleri piyasası, katılım esaslı yatırım fonları, katılım esaslı melek yatırımcılık, katılım esaslı girişim ve risk sermayesi, katılım esaslı kitle fonlaması.

iii. Katılım Sigortacılığı: Katılım sigortası şirketleri, katılım reasürans şirketleri, katılım esaslı gönüllü bireysel emeklilik sistemi, katılım esaslı otomatik katılım sistemi.

iv. Katılım Sosyal Finans: Vakıf (Katılım finans esaslarına göre çalışan), Zekât, Karz-ı hasen, Katılım esaslı mikrofinans.

2. KATILIM SİGORTACILIĞI

Katılım sigortacılığı, katılımcıların kendileri ile diğer katılımcıların tazminat ve/veya birikim ödemelerine ilişkin taleplerinin karşılanmasını teminen, katılım finans ilkelerine uygun olarak faaliyet gösteren sigorta türüdür. Dayanışma, yardımlaşma ve risk paylaşımı gibi ilkelere dayanan katılım sigortacılığı, faiz, belirsizlik ve haksız kazanç gibi unsurları içermeyen katılım finans prensiplerine dayanan bir sigortacılık sistemini ifade etmektedir. İlgili mevzuat kapsamında faaliyetlerin yürütülmesini sağlamak amacıyla Danışma Komitesi'nce ilgili hükümler esas alınarak tespit edilen usul ve esaslar kapsamındaki sigortacılık faaliyetlerini ifade etmektedir. Karşılıklı dayanışma temelinde olan katılım sigortacılığı sistemi, tüm faaliyetlerini katılım usul ve esaslara uygun şekilde yürütür. Bu nedenle iş süreci mümkün olduğunca açık ve şeffaf şekilde yürütülür. Tüm katılımcıların risk paylaşımı ve ortak garanti hususunda uzlaşmaları ve riske maruz kalan üyeye gerektiğinde yardım yapılacağı konusunda detaylı bir şekilde bilgilendirilir. Bu sayede sistemdeki her bir üyenin zarara sebebiyet veren olayın beklenmeyen olumsuz sonuçlarına karşı, diğer tüm katılımcıların katkılarıyla korunması sağlanmaktadır (Türkiye Katılım Sigorta A.Ş., Katılım Sigortacılığı).

Katılım sigortacılığı sektörü (T.C. Cumhurbaşkanlığı Finans Ofisi, 2022: 75);

- Katılım sigortası şirketleri,
- Katılım reasürans şirketleri,
- Katılım esaslı gönüllü bireysel emeklilik sistemi (BES),
- Katılım esaslı otomatik katılım sistemi (OKS)

bileşenlerinden oluşmaktadır.

Katılım sigortacılığı, yasal zorunlulukları bulunan ve bu kurallar çerçevesinde denetlenen belirli ilkelere bağlıdır. Katılım sigortacılığının esaslarını belirleyen genel ilkeler (Türkiye Katılım Sigorta A.Ş., Katılım Sigortacılığı): yardımlaşma amacı olması, primlerin toplandığı havuzun sigortalılara ait olması, işleten şirketin mülkiyeti

bulunmaması, uzman bir danışma komitesinden hizmet alınması, sermayedara ait varlıkların ve katkı primlerinin şirket danışma komitesi tarafından onay verilen katılım bankaları, kira sertifikası, BIST katılım endeksi, kıymetli metaller, döviz ve benzeri onay alınan kıymetler gibi yatırım araçlarında değerlendirilmesi, katılım sigortacılığı prensiplerine uygun olmayan iktisadi kıymetlere ve menfaatlere teminatı verilmemesi, primlerin ödendiği havuzda biriken toplam meblağ dönem sonunda fazla verdiğinde katılımları nispetinde sigortalılara geri ödenmesi şeklinde sayılabilmektedir.

Türkiye'de katılım sigortası ismiyle anılan tekâfül, yardımlaşma usulüyle yapılan karşılıklı sigorta olarak tanımlanmaktadır. Katılım sigortacılığı, farklı kişilerin bir araya gelerek, içlerinden zarara maruz kalan katılımcıların zararının tazmin edilmesi üzerine yaptıkları bir yardımlaşmadır. Bu sistemde toplanan paralar yardımlaşma sandığı ya da risk fonu olarak adlandırılan prim havuzunda birikir ve katılımcılardan (poliçe sahipleri) hasara uğrayanların zararları bu havuzdan tazmin edilir. Mevzuat bakımından tekâfül, katılımcıların kendileri ile diğer katılımcıların tazminat ödemelerine ilişkin taleplerinin karşılanmasını teminen oluşturulan risk fonuna katkıda bulundukları, söz konusu fonun sigortacılık faaliyeti yapmasına izin verilmiş bir sigorta şirketi tarafından katılım finans ilkelerine uygun olarak yönetildiği ve ortak risk paylaşımı ile dayanışma esaslarına dayanan sigorta türünü ifade etmektedir (Kuveyt Türk, Neova Katılım Sigorta).

Katılım sigortacılığı sisteminin temel ilkeleri şu şekilde sayılabilmektedir (Kuveyt Türk, Neova Katılım Sigorta): yardımlaşma unsurunun/amacının bulunması, primlerin toplandığı prim havuzunun poliçe sahiplerine ait olması, şirkete ait bir mülkiyetin bulunmaması, sermayedar ve sigortalılardan toplanan primlerin faiz dışı piyasa araçlarında değerlendirilmesi, sigorta teminatı verilen konularda dinen gayri ahlaki ya da meşru görülmeyen iktisadi kıymetler konusunda seçici davranılması, fıkıh alanında ihtisas sahibi bir danışma heyetinden hizmet alınması.

Türkiye'de Katılım sigortacılığına ilişkin ilk mevzuat düzenlemesi 20 Eylül 2017 tarihli Resmî Gazete'de yayımlanan "Katılım Sigortacılığı Çalışma Usul ve Esasları Hakkında Yönetmelik" ve 2017/22 Sayılı "Katılım Sigortacılığının Uygulanmasına İlişkin Genelge" ile olmuştur. Yönetmelikte, katılım sigortacılığı, katılım reasüransı, katılımcı yatırım fonu, mudârebe yönetim modeli, vekâlet yönetim modeli ve vekâlet/mudârebe karması (hibrit) model tanımlarına yer verilmiştir (T.C. Cumhurbaşkanlığı Finans Ofisi, 2022: 76).

Katılım sigortacılığı ve bireysel emeklilik faaliyetlerini birlikte düzenleyen 19 Aralık 2020 tarihli Resmî Gazete'de yayımlanan "Katılım Esasları Çerçevesinde Sigortacılık ve Bireysel Emeklilik Faaliyetlerine İlişkin Yönetmelik" ve 1 Nisan 2021 tarihli "Katılım Esaslı Sigortacılık ve Bireysel Emeklilik Faaliyetlerine İlişkin Genelge" ile katılım sigortacılığına ilişkin birtakım yenilikler getirilmiş ve 2017 tarihli Yönetmelik yürürlükten kaldırılmıştır (T.C. Cumhurbaşkanlığı Finans Ofisi, 2022: 77).

19.12. 2020 tarih ve 31339 sayılı Katılım Esasları Çerçevesinde Sigortacılık ve Bireysel Emeklilik Faaliyetlerine İlişkin Yönetmelik kapsamında şirketler faaliyetlerini SEDDK tarafından verilen ruhsatlar çerçevesinde sürdürmektedir. Bu kapsamda; hayat, sağlık, kaza, oto, yangın ve doğal afetler, nakliyat, mühendislik sigorta ürünlerini katılım esaslı sigortacılık çerçevesinde müşterilerin hizmetine sunabilmektedirler (Türkiye Katılım Sigorta A.Ş., Katılım Sigortacılığı). Bu mevzuat çerçevesinde katılım sigortacılığı faaliyetleri; danışma komitesi kurulması, dinen meşru olmayan konu ve risklerin teminat altına alınmaması ve finansal varlıkların katılım esasları çerçevesinde yönetilmesi olarak üç ana dayanak üzerine konumlandırılmıştır.

Katılım Esasları Çerçevesinde Sigortacılık ve Bireysel Emeklilik Faaliyetlerine İlişkin Yönetmelik ile katılım sigortacılığının çerçevesi çizilmiş, katılım sigortacılığı alanında faaliyet gösterecek sigorta şirketlerinin, "Danışma Komitesi" oluşturarak katılım prensipleri çerçevesinde komitenin aldığı kararlara uygun faaliyet göstermesi yeterli bulunarak, mevzuatı gereği şirket bünyesinde kurulacak Katılım Uyum Birimleri ile Danışma Komitesi tarafından alınan kararların katılım şirketinde doğru uygulanması ve denetlenmesi yapılarak, muhtemel risklerin önüne geçilmesi sağlanmıştır. Bu anlayışa göre düzenlenen şirketlere ait ürün tasarımları, şirketlerin teminat verdiği risk ve yatırım politikaları, katılım prensiplerine uygun kurgulanarak şirketlerin faaliyette bulunması, katılım sigortacılığı açısından yeterli görülmüştür (Türkiye Sigortalar Birliği, 2024: 2).

Katılım Sigortacılığı Sektöründe ihtiyaç duyulan reasürans kapasitelerinin sağlanması amacıyla Türk Reasürans A.Ş. çatısı altında Türk Katılım Reasürans A.Ş. kurularak Şubat 2022'de faaliyetlerine başlamıştır. Türk Katılım Reasürans A.Ş. Türkiye'de Katılım Reasüransı alanında faaliyet gösterecek ilk reasürans şirketi olmuştur (T.C. Cumhurbaşkanlığı Finans Ofisi, 2022: 78).

Türkiye'de 2014 yılından beri yayımlanan Türkiye Sigorta Birliği istatistiklerindeki rakamsal veriler dikkate alındığında iki şirket ile çıkılan yola 2021 yıl sonuna gelindiğinde pencere usulü ve tam katılım faaliyet türüyle üretim yapan şirket sayısı 12 şirkete kadar ulaşmıştır. Ancak SEDDK tarafından yayımlanan düzenleme gereği

pencere usulü sistemle yürütülen üretim faaliyetlerinin 2021 yılında sonlandırılmış, 2022 yılı buna bağlı olarak şirket devir ve ruhsat işlemleri ile geçmiş ve nihayetinde 2023 yılı katılım sigortacılığı şirket faaliyetleri tam katılım şirketi olarak devam etmişlerdir. Bu kapsamda pencere usulü faaliyetle yönetilen şirketler tamamen sonlanarak, aktif üretimde bulunan tam katılım şirketleri bu alanda 7 şirket olarak hayat ve hayat dışı alanında faaliyetlerine devam etmiştir. Bu şirketler; Bereket Sigorta A.Ş., Bereket Emeklilik ve Hayat A.Ş., HDI Katılım Sigorta A.Ş., Katılım Emeklilik ve Hayat A.Ş., Neova Katılım Sigorta A.Ş., Türkiye Katılım Hayat A.Ş. ve Türkiye Katılım Sigorta A.Ş.'dir (Türkiye Sigortalar Birliği, 2024: 2).

2023 yılında toplam 7 tam katılım şirketinin faaliyet gösterdiği katılım sigortacılığı sektörünün prim üretiminin yaklaşık %82'si ilk iki şirket tarafından üretilmiştir. Bu şirketler üretim sıralamasıyla Neova Katılım Sigorta A.Ş. ve Bereket Sigorta A.Ş.'dir. Şirket bazında prim üretiminin yoğunlaşmış olduğu sigorta branşlarına bakıldığında ise; Neova Sigorta A.Ş. üretiminin yaklaşık %67,22'sini kara araçları sorumluluk branşında, Bereket Sigorta A.Ş. üretiminin yaklaşık %75'ini genel zararlar branşında gerçekleştirmiştir. Katılım sigortacılığı prim üretiminin üretim kanalı bazında dağılımına bakıldığında ise, tıpkı önceki yıllarda olduğu gibi %47 pay ile acente/broker satış kanalının ilk sırada olduğu, bu payı %24,8'lik pay ile banka satış kanalının takip ettiği görülmektedir (Türkiye Sigortalar Birliği, 2024: 9).

Katılım sigortacılık alanında küresel standartların oluşmaması, denetim mekanizmalarının eksikliği, bu alana yönelik fıkhî tartışmalar ve fonların uygun getirili yatırımlara yöneltilmesi noktasında ürün çeşitliliği eksikliği, sektörün potansiyel büyüme hızına ulaşmasında diğer önemli engelleri teşkil etmektedir. Katılım sigortacılık sisteminin gelişmesine yönelik bir diğer önemli konu da ihtiyacı karşılayacak seviyede yeterli kapasiteye sahip re-tekafül şirketlerinin bulunmamasıdır (T.C. Cumhurbaşkanlığı Finans Ofisi, 2022: 79).

3. KATILIM SİGORTA ŞİRKETLERİNİN KÂRLILIK VE VERİMLİLİK ANALİZİ

3.1. Kârlılık ve Verimlilikte Kullanılan Temel Oranlar

Çalışmada, katılım sigortacılığını yansıtan 3 temel finansal gösterge kullanılmaktadır. Bunlar, kârlılık ölçütleri olarak Aktif Kârlılığı (ROA) ve Özsermaye kârlılığı (ROE); verimlilik ölçütü olarak ise Birleşik Rasyodur.

Kârlılık ölçütleri:

Aktif Kârlılığı (ROA): $Net\ Kâr\ /\ Toplam\ Aktifler$

Bu oran, katılım sigorta şirketlerinin aktiflerinin ne kadar kâr elde ettiğini gösteren göstergedir.

Özsermaye kârlılığı (ROE): $Net\ Kâr$ / $Özsermaye$

Bu oran katılım sigorta şirketlerinin özsermayelerinin ne kadar kâr elde ettiğini ortaya koymaktadır.

Verimlilik ölçütü:

Birleşik Rasyo (Combined Ratio): ($Hasar/Prim$) + ($Gider/Prim$)

oranlarının toplamıdır.

Bu oranın %100'ün altında olması, katılım sigorta şirketinin teknik olarak verimli çalıştığını ve sigortacılık faaliyetinden (mali gelirler hariç) kâr elde ettiğini gösterir. Katılım sigortacılığında bu rasyonun düşük olması, katılımcılara bakiye (revelan) iadesi yapılabilmesi açısından kritik öneme sahiptir.

Tablo 1: Katılım Sigorta Şirketlerinin Kârlılık ve Verimlilik Oranları, 2020-2025.

Oranlar (%)	2020	2021	2022	2023	2024	2025
Aktif Kârlılığı (ROA)	4,2	3,8	5,5	9,2	8,7	7,6
Özsermaye Kârlılığı (ROE)	28,5	26,1	38,2	71,5	64,0	52,4
Birleşik Rasyo	102,4	105,8	112,1	96,4	98,2	101,5

Kaynak: Türkiye Sigorta Birliği (t.y.-a, t.y.-b).

Tablo 1'e göre katılım sigorta şirketlerinin 2020-2025 dönemine ait kârlılık ve verimlilik oranlarındaki gelişmeler üç alt döneme ayrılarak incelenebilir. İlki, pandemi sonrası ve enflasyonist baskının hissedildiği 2020-2022 dönemidir. 2022 yılında döviz kuru ve asgari ücret artışları nedeniyle yedek parça ve bedeni hasar maliyetleri hızla yükselmiştir. Bu durum, katılım sigortacılığında da birleşik rasyonun %112,1'e kadar artışına yol açmıştır. Katılım sigortacılığının "altın yılı" olarak değerlendirilebilen 2023 döneminde ise SEDDK'nın tarifeleri düzenlemesi, prim artışları ve özellikle katılım kur korumalı mevduat ile sukuk gibi katılım esaslı finansal

enstrümanlardaki yüksek kâr payı gelirleri sayesinde mali kârlılık en üst düzeye ulaşmıştır. 2023 yılında özsermaye kârlılığı %71,5 seviyelerine ulaşırken, birleşik rasyo %96,4 ile %100 sınırının altına düşmüş ve sektör teknik kârlılığa geçmiştir. "Dengelenme dönemi" olarak adlandırılabilen 2024-2025 döneminde ise enflasyonun ve maliyet artışlarının devam etmesiyle birlikte hasar prim oranları yeniden yükselmiş; birleşik rasyo %101,5 ile başabaş noktası olan %100 sınırının bir miktar üzerine çıkmıştır. Yüksek baz etkisi ve artan sermaye ihtiyaçları nedeniyle özsermaye kârlılığında kademeli bir normalleşme görülmüştür.

4. SONUÇ

Katılım sigortacılığı sektörü, 2020–2025 döneminde makroekonomik dalgalanmalara ve mevzuat değişikliklerine karşı yüksek bir uyum kabiliyeti sergilemiştir. Ortaya çıkan veriler incelendiğinde temel sonuçlar şu şekilde değerlendirilebilmektedir: 2020-2022 dönemi teknik zarardan mali başarıya geçiş olarak ifade edilebilir. Sektörün hasar ve faaliyet giderlerinin prim gelirlerine oranını gösteren Birleşik Rasyo, 2022 yılında enflasyonist maliyet baskıları ve artan hasar maliyetleriyle %112,1 ile zirve yapmış ve teknik zarara işaret etmiştir. Ancak takip eden yıllarda alınan önlemler nedeniyle bu oran gerilemiş ve teknik kârlılık dengelenmiştir. 2023 yılı olağanüstü büyüme ve zirve dönemi olarak ifade edilebilir. Dönemin en dikkat çekici finansal sıçraması 2023 yılında yaşanmıştır. Sukuk, kâr payı gibi katılım esaslı finansal enstrümanlardaki yüksek getiriler ve prim ayarlamaları, özsermaye kârlılığını %71,5'e, aktif kârlılığını ise %9,2'ye taşıyarak önemli bir kârlılık düzeyine ulaştırmıştır. 2024-2025 normalleşme ve sürdürülebilirlik dönemi olarak ifade edilebilir. 2023 yılındaki olağanüstü baz etkisinin ardından, 2024 ve 2025 yıllarında kârlılık rasyolarında kademeli bir geri çekilme ve normalleşme trendi başlamıştır. Artan sermaye ihtiyaçları ve devam eden maliyet artışları sebebiyle birleşik rasyo yeniden, başabaş noktası olan %100'ün üzerine çıkarak %101,5 olmuş, özsermaye kârlılığı daha makul ve sürdürülebilir bir çizgi olan %52,4 düzeyinde gerçekleşmiştir.

KAYNAKÇA

Çelik, S. E. (2019). Türkiye'de finans sisteminin yapısı ve dönüşüm gereksinimi (SETA Analiz, Sayı: 290). Siyaset, Ekonomi ve Toplum Araştırmaları Vakfı.

Karahan, H. & Ersoy, H. (2016). Faizsiz finansın temel prensipleri ile Türkiye'de reel kesimde kullanılması. Maliye Finans Yazıları, (105), 93-114.

Kuveyt Türk. (2026). Neova Katılım Sigorta.https://www.kuveytturk.com.tr/hakkimizda/istiraklerimiz/neova-katilim-sigorta

T.C. Cumhurbaşkanlığı Finans Ofisi. (2022). Katılım finans strateji belgesi 2022-2025 bütüncül dönüşüm. T.C. Resmî Gazete (05.10.2022 tarih ve 31974 Sayılı).

Türkiye Katılım Sigorta A.Ş. & Türkiye Katılım Hayat A.Ş. (t.y.). Katılım sigortacılığı.https://turkiyekatilimsigorta.com.tr/katilim-sigortaciligi

Türkiye Sigorta Birliği. (t.y.-a). Katılım esaslı sigortacılık ve bireysel emeklilik sektör raporu 2020, 2021, 2022, 2023, 2024. https://www.tsb.org.tr/tr/yayin/katilim-sigortaciligi-sektor-raporu

Türkiye Sigorta Birliği. (t.y.-b). Mali tablolar ve istatistikler 2025. https://www.tsb.org.tr/tr/istatistik/finansal-tablolar/sirket-bazinda-mali-ve-teknik-tablolar

The Effect of Greenhushing on Consumer Responses: An Empirical Study on Demographic Differences

M.A. Student Aylin BAŞKAYA[1] **Prof. Dr. Fatih KOÇ[2]**

[1] Kocaeli University, Institute of Social Sciences, Department of Business Administration, aylin.baskaya@kocaeli.edu.tr, ORCID: https://orcid.org/0009-0006-0504-9323

[2] Kocaeli University, Faculty of Business Administration, Department of Business Administration, fatih.koc@kocaeli.edu.tr, ORCID: https://orcid.org/0000-0003-1305-9557

Abstract: Greenhushing, defined as the deliberate underreporting or non-disclosure of a firm's sustainability achievements to avoid public scrutiny, has emerged as a critical yet underexplored phenomenon in sustainable marketing. Understanding how consumers react to covert sustainability strategies is essential for organizations navigating complex stakeholder expectations and green skepticism. This study aims to examine whether consumer trust in the brand, brand image, purchase intention toward the campaign product, and word-of-mouth (WOM) intention differ across various demographic characteristics following exposure to a greenhushing scenario. An scenario-based experimental design was employed, and primary data were collected from a sample of 274 consumers via YouReply, a professional online research panel platform. Confirmatory Factor Analysis (CFA) conducted via IBM SPSS AMOS confirmed the construct validity and reliability of the measurement scales. Independent samples t-tests and one-way ANOVA analyses revealed that employment status yielded statistically significant differences across all dependent variables except purchase intention, with employed participants scoring higher means than unemployed individuals. Marital status demonstrated significant differences across all variables, with married participants exhibiting significantly higher mean scores than single participants. Although age and education levels showed no statistically significant differences across the variables, mean scores consistently increased as age and education levels rose. Finally, monthly income groups (low, medium, high) showed significant differences across all dependent variables, primarily driven by discrepancies between the high and low-income groups, with higher income levels corresponding to higher mean scores across all measures. Overall, the findings suggest that demographic segments with higher income, employment, and marital stability display higher resilience or favorable evaluations toward greenhushing brands, highlighting the need for targeted communication strategies in sustainable brand management.

Keywords: Greenhushing, Brand Trust, Brand Image, Purchase Intention, WOM, Demographic Differences

1. INTRODUCTION

In an era of heightened environmental awareness and intense stakeholder scrutiny, sustainability has evolved from a voluntary corporate gesture into a core competitive imperative. However, as firms face growing accusations of "greenwashing"—the exaggerated or misleading communication of environmental efforts—a contrasting strategic practice known as "greenhushing" has gained significant attention in both marketing literature and business practice (Cavusoglu et al., 2026; Font et al., 2017; Khan et al., 2026). Greenhushing refers to the deliberate underreporting, understated communication, or strategic withholding of a firm's genuine sustainability achievements and certification statuses (Carlos & Lewis, 2018; Ettinger et al., 2021; Font et al., 2017). Rather than reflecting an absence of environmental responsibility, greenhushing often functions as a proactive, risk-averse, and hypocritical-avoidance strategy designed to safeguard brand integrity, maintain communication authenticity, and manage complex stakeholder expectations without inviting unnecessary skepticism (Carlos & Lewis, 2018; Ettinger et al., 2021; Nguyen & Vy, 2026).

While corporate motives for enacting greenhushing are increasingly documented (Carlos & Lewis, 2018; Khan et al., 2026), consumer evaluations of such understated communication strategies remain remarkably complex and varied (Cavusoglu et al., 2026; Ettinger et al., 2021; Nguyen & Vy, 2026). Demographic characteristics play a pivotal role in shaping individual perceptions, cognitive processing, and behavioral responses toward subtle corporate communication tactics (Grunwald et al., 2026). Key socio-demographic indicators—such as age, education level, monthly income, employment status, marital status, and gender—fundamentally influence how consumers evaluate corporate integrity and process perceived communication risks (Witek & Kuzniar, 2021). For instance, socio-economic stability and income levels often dictate purchasing resilience and brand trust under subtle communication scenarios, while marital status and employment reflect distinct lifestyle commitments that shape brand loyalty and word-of-mouth tendencies. Furthermore, gender differences frequently account for variations in post-evaluative communication and brand advocacy behaviors (Jones et al. 2017).

Despite the growing prevalence of greenhushing in practice, empirical research examining how distinct demographic cohorts perceive and respond to understated sustainability disclosures remains fragmented

(Cavusoglu et al., 2026; Ettinger et al., 2021). Addressing this gap, the present study investigates consumer evaluations—specifically brand trust, brand image, purchase intention, and word-of-mouth (WOM)—across various demographic profiles following exposure to a greenhushing scenario.

This study contributes to the sustainable marketing literature in three key ways:

- Theoretical Expansion: It advances the emerging stream of greenhushing research (Cavusoglu et al., 2026; Ettinger et al., 2021; Font et al., 2017) by providing empirical insight into consumer-side outcomes, offering a balanced perspective on silent sustainability communication as a strategic brand management tool.
- Demographic Granularity: It provides a comprehensive demographic breakdown (age, education, income, employment, marital status, and gender), identifying which specific consumer segments demonstrate greater resilience, trust, or favorable behavioral outcomes toward understated environmental claims.
- Strategic Marketing Guidance: It equips brand managers with actionable managerial guidelines on how to tailor sustainability communications to distinct demographic cohorts without triggering skepticism or alienating key consumer segments (Ettinger et al., 2021; Nguyen & Vy, 2026).

2. LITERATURE REVIEW AND HYPOTHESES

2.1. Greenhushing and Corporate Sustainability

In response to the growing global imperative for environmental responsibility, corporate sustainability communication has become a central arena for strategic brand management. However, as widespread allegations of "greenwashing"—the practice of misleading or exaggerating environmental claims—have fueled heightened consumer skepticism, many organizations have adopted a contrasting strategy known as "greenhushing" (Carlos & Lewis, 2018; Cavusoglu et al., 2026; Font et al., 2017). Greenhushing is defined as the deliberate underreporting, understated communication, or intentional non-disclosure of a firm's legitimate sustainability achievements and certification statuses (Carlos & Lewis, 2018; Ettinger et al., 2021; Font et al., 2017). Rather than indicating a lack of environmental commitment, greenhushing functions as a risk-averse, hypocrisy-avoidance mechanism designed to protect brand integrity from public backlash, regulatory scrutiny, and cynicism (Carlos & Lewis, 2018; Ettinger et al., 2021; Khan et al., 2026; Nguyen & Vy, 2026).

From a consumer perspective, covert or understated communication strategies yield complex evaluations. Grounded in signaling theory (Connelly et al., 2011) and attribution theory (Heider, 1958), consumers interpret corporate communication cues to infer underlying organizational motives (Ellen et al., 2006). While explicit and exaggerated claims often trigger green skepticism and perceived risk (Chen & Chang, 2013), understated disclosures can enhance perceived authenticity and trust by signaling humility and intrinsic commitment (Alhouti et al., 2016; Ettinger et al., 2021). Consequently, consumer reactions to greenhushing manifest across critical evaluative and behavioral dimensions, including brand trust, brand image, purchase intention, and word-of-mouth (WOM) advocacy (Cavusoglu et al., 2026; Guerreiro & Pacheco, 2021; Nguyen & Vy, 2026).

2.2. Demographic Variables and Consumer Evaluations of Greenhushing

Demographic traits serve as fundamental lenses through which individuals process corporate communications, perceive ethical claims, and exhibit pro-environmental attitudes (Ajayi & Mmutle, 2021; Krystallis et al., 2021). Socio-demographic factors—such as age, education level, income, employment status, marital status, and gender—significantly moderate how consumers evaluate corporate social responsibility (CSR) policies, environmental disclosures, and corporate transparency (De Souza Barbosa et al., 2025; Rosati et al., 2018).

Demographic characteristics serve as critical explanatory factors in understanding how consumers process corporate social responsibility (CSR) initiatives, environmental disclosures, and understated communication tactics (Hojnik et al., 2020; Jones et al., 2017; Park et al., 2012; Rosati et al., 2018; Zeng et al., 2025). Individual socio-demographic backgrounds—specifically age, education level, monthly income, employment status, marital status, and gender—fundamentally shape cognitive information processing styles, ethical expectations, price sensitivity, and levels of environmental concern (Jones et al., 2017; Park et al., 2012; Rosati et al., 2018). For instance, age cohorts and educational backgrounds enhance cognitive capacity to decode subtle corporate

signals and evaluate institutional trust (Nguyen & Johnson, 2020; Park et al., 2012; Rosati et al., 2018), whereas income tiers and employment status dictate economic confidence, purchasing resilience, and utilitarian expectations toward sustainable products (Hojnik et al., 2020; Jones et al., 2017; Zeng et al., 2025). Furthermore, marital status and gender account for variations in long-term safety orientation, ethical sensitivity, and post-evaluative brand advocacy behaviors (Jones et al., 2017; Park et al., 2012).

Because consumers evaluate corporate silence and greenhushing practices through their distinct socio-demographic lenses, significant empirical variations in consumer brand perceptions and behavioral intentions are anticipated across demographic segments (Ettinger et al., 2020; Jones et al., 2017; Rosati et al., 2018; Yakın et al., 2026). Grounded in these theoretical considerations, the following hypotheses are proposed:

H1: *Age groups exhibit statistically significant differences in their evaluations of greenhushing in terms of (a) Brand Trust, (b) Brand Image, (c) WOM, and (d) Purchase Intention toward the featured product.*

H2: *Consumer responses to greenhushing—specifically regarding (a) Brand Trust, (b) Brand Image, (c) WOM, and (d) Purchase Intention toward the featured product—significantly vary across education levels*.

H3: *Consumer responses to greenhushing—specifically regarding (a) Brand Trust, (b) Brand Image, (c) WOM, and (d) Purchase Intention toward the featured product—significantly vary across income levels*.

H4: *Consumer responses to greenhushing—specifically regarding (a) Brand Trust, (b) Brand Image, (c) WOM, and (d) Purchase Intention toward the featured product—significantly vary based on employment status.*

H5: *Consumer responses to greenhushing—specifically regarding (a) Brand Trust, (b) Brand Image, (c) WOM, and (d) Purchase Intention toward the featured product—significantly vary based on marital status.*

H6: *Consumer responses to greenhushing—specifically regarding (a) Brand Trust, (b) Brand Image, (c) WOM, and (d) Purchase Intention toward the featured product—significantly vary based on gender*.

3. RESEARCH METHOD

3.1. Research Design and Scenario Strategy

To evaluate consumer responses to understated corporate sustainability communication, a scenario-based quantitative design was employed. Scenario-based experiments represent an established methodology for capturing realistic consumer evaluations of implicit communication strategies—such as greenhushing—while mitigating self-reporting bias (Perdue & Summers, 1986). To isolate greenhushing effects and avoid carryover effects or demand characteristics, participants were randomly assigned to evaluate scenarios featuring an understated sustainability communication strategy ("greenhushing").

To control for confounding variables such as pre-existing brand equity, corporate reputation, and prior purchasing experience, hypothetical firm names ("ABC Cleaning" and "XYZ Bank") were utilized. Textual descriptions, word counts, and visual layouts were strictly standardized across experimental conditions, with all firms participating in an identical marine conservation initiative titled the "Blue Future Project".

3.2. Pilot Study and Scenario Validation

A pilot study (N = 44) was conducted to evaluate scenario realism, verify text clarity. An Instructional Manipulation Check (IMC) was passed by 41 of the 44 participants, confirming high participant attentiveness and scenario validity.

3.3. Sampling and Data Collection

The target population consisted of adult consumers aged 18 and older residing in Türkiye who participate in household purchasing decisions. Data were collected (274) online via a professional panel service (YOUREPLY). Because this study specifically focuses on the subset of respondents exposed to the greenhushing condition, the sample size reflects this targeted allocation. All participants provided digital informed consent, and participation was fully voluntary and anonymous.

3.4. Measurement Instruments

The survey instrument comprised demographic questions, the greenhushing scenario text, and post-scenario dependent variable scales measured on a 5-point Likert scale ranging from 1 ("Strongly Disagree") to 5 ("Strongly Agree"). The primary dependent constructs were operationalized using validated scales from the existing literature:

- Brand Trust: Measured with 5 items adapted from Chen and Chang (2013).
- Brand Image: Measured with 5 items adapted from Chen (2010).
- Word of Mouth (WOM): Measured with 2 items adapted from Chen et al. (2014).
- Purchase Intention: Measured with 4 items adapted from Chen and Chang (2013) and Isac (2025).

4. FINDINGS

4.1. Demographic Characteristics

Among the 274 participants, females constituted 51.8% (n = 142) of the sample, while males accounted for 48.2% (n = 132). In terms of age distribution, the majority of participants were aged 25–34 (42.7%, n = 117), followed by those aged 35–44 (24.5%, n = 67) and 18–24 (21.2%, n = 58). Participants aged 45-55 represented the remaining 11.7% (32) of the sample. In terms of education, 65,69 % (180) of the respondents held a university degree, followed by 15,69% (43) with high school education or below, and 18.6% (51) with a postgraduate. When analyzing monthly income distribution, the largest segment was the low-income group at 38.3% (105), followed by middle-income respondents at 34.3% (94). High-income individuals constituted the remaining 27.4% (75) of the sample. Looking at the employment status of the sample, a significant majority of respondents were employed (64.2%, N= 176). Conversely, the remaining 35.8% (98) were unemployed. Concerning the marital status of the participants, 52.6% (144) were single and 47.4% (130) were married.

4.2. Measurement Model and Scale Validation

Table 1: Confirmatory Factor Analysis

Item and Variables			Estimate	S.E.	C.R.	P
Tru1	<---	TRUST	,866			
Tru2	<---	TRUST	,860	,043	22,940	***
Tru3	<---	TRUST	,858	,055	18,177	***
Tru5	<---	TRUST	,806	,062	16,428	***
BI1	<---	BR_IMA	,848			
BI2	<---	BR_IMA	,837	,056	17,609	***
BI3	<---	BR_IMA	,761	,059	15,106	***
BI4	<---	BR_IMA	,873	,051	18,945	***
BI5	<---	BR_IMA	,873	,053	18,951	***
WOM1	<---	WOM	,934			
WOM2	<---	WOM	,922	,038	25,415	***
PI2	<---	P_INT	,776			
PI3	<---	P_INT	,857	,081	14,557	***
PI4	<---	P_INT	,838	,086	13,230	***

To evaluate the construct validity of the measurement model, a Confirmatory Factor Analysis (CFA) was conducted using IBM SPSS AMOS (Arbuckle, 2019). Prior to the final analysis, items TRU4 and PI1 were removed from the scales due to low factor loadings (Hair et al., 2019). As presented in Table 1, all remaining standard factor loadings (Estimates) exceeded the recommended threshold of 0.50 and demonstrated statistical significance ($p < 0.001$) (Hair et al., 2019). Specifically, for the TRUST construct, factor loadings ranged between 0.806 (Tru5) and 0.866 (Tru1). The factor loadings for the Brand Image (BR_IMA) dimension ranged from a minimum of 0.761 (Bi3) to a maximum of 0.873 (Bi4 and Bi5). For the WOM scale, loadings were between 0.922 (WOM2) and 0.934 (WOM1). Finally, the Purchase Intention (P_INT) construct exhibited loadings ranging from

0.776 (PI2) to 0.857 (PI3). These findings indicate strong convergent validity and demonstrate that the items adequately represent their respective latent constructs (Hair et al., 2019).

The goodness-of-fit indices were evaluated to examine the overall fit of the proposed measurement model. The chi-square to degrees of freedom ratio was calculated as 2.979 (CMIN = 205.519, DF = 69, $p < 0.001$), which falls below the recommended threshold of 3.00, indicating an acceptable model fit (Kline, 2016). In addition, the Root Mean Square Residual (RMR) value was found to be 0.023, well below the 0.08 cutoff value. Absolute and incremental fit indices also demonstrated strong correspondence to the data, with the Goodness of Fit Index (GFI = 0.902) exceeding the 0.90 threshold and the Comparative Fit Index (CFI = 0.961) surpassing the 0.95 criterion for good fit (Hu & Bentler, 1999; Hair et al., 2019). Taken together, these results confirm that the measurement model exhibits a good fit with the empirical data.

Table 2: Measurement Model Reliability and Convergent Validity Results

Variables	Alpha	CR	AVE
TRUST	0,914	0,911	0,718
BR_IMA	0,922	0,922	0,714
WOM	0,925	0,925	0,861
P_INT	0,850	0,864	0,680

To assess the internal consistency reliability and construct validity of the measurement model, Cronbach's alpha (alpha), Composite Reliability (CR), and Average Variance Extracted (AVE) were evaluated. As shown in Table 2, all Cronbach's alpha values ranged from 0.850 to 0.925, and CR values ranged from 0.864 to 0.925, well exceeding the recommended threshold of 0.70 and demonstrating high internal consistency (Hair et al., 2019; Nunnally & Bernstein, 1994). Convergent validity was established as the AVE values for all constructs ranged between 0.680 and 0.861, significantly surpassing the minimum cutoff criterion of 0.50 (Fornell & Larcker, 1981; Hair et al., 2019). Furthermore, discriminant validity was confirmed using the Heterotrait-Monotrait ratio of correlations (HTMT); all calculated HTMT ratios remained below the strict threshold of 0.90 (with the highest value at 0.890), indicating that all constructs are empirically distinct from one another (Franke & Sarstedt, 2019; Henseler et al., 2015).

4.3. Testing Hypotheses

Differences in Constructs Across Age Groups

A one-way analysis of variance (ANOVA) was conducted to determine whether brand trust, brand image, word-of-mouth (WOM), and purchase intention toward the featured product significantly differed across age groups.

Table 3: Descriptive Statistics for Age

	Age Groups	N	Mean	Std. Deviation
Trust	18-24	58	3,7629	,74989
	25-34	117	3,8739	,76185
	35-44	67	3,8657	,72081
	45-55	32	3,9453	,72327
Brand Image	18-24	58	3,8517	,70642
	25-34	117	3,9932	,68779
	35-44	67	3,9970	,68622
	45-55	32	4,1000	,82852
Purchase Intention	18-24	58	3,9598	,87209
	25-34	117	4,0855	,63902
	35-44	67	4,0945	,63247
	45-55	32	4,1354	,77994

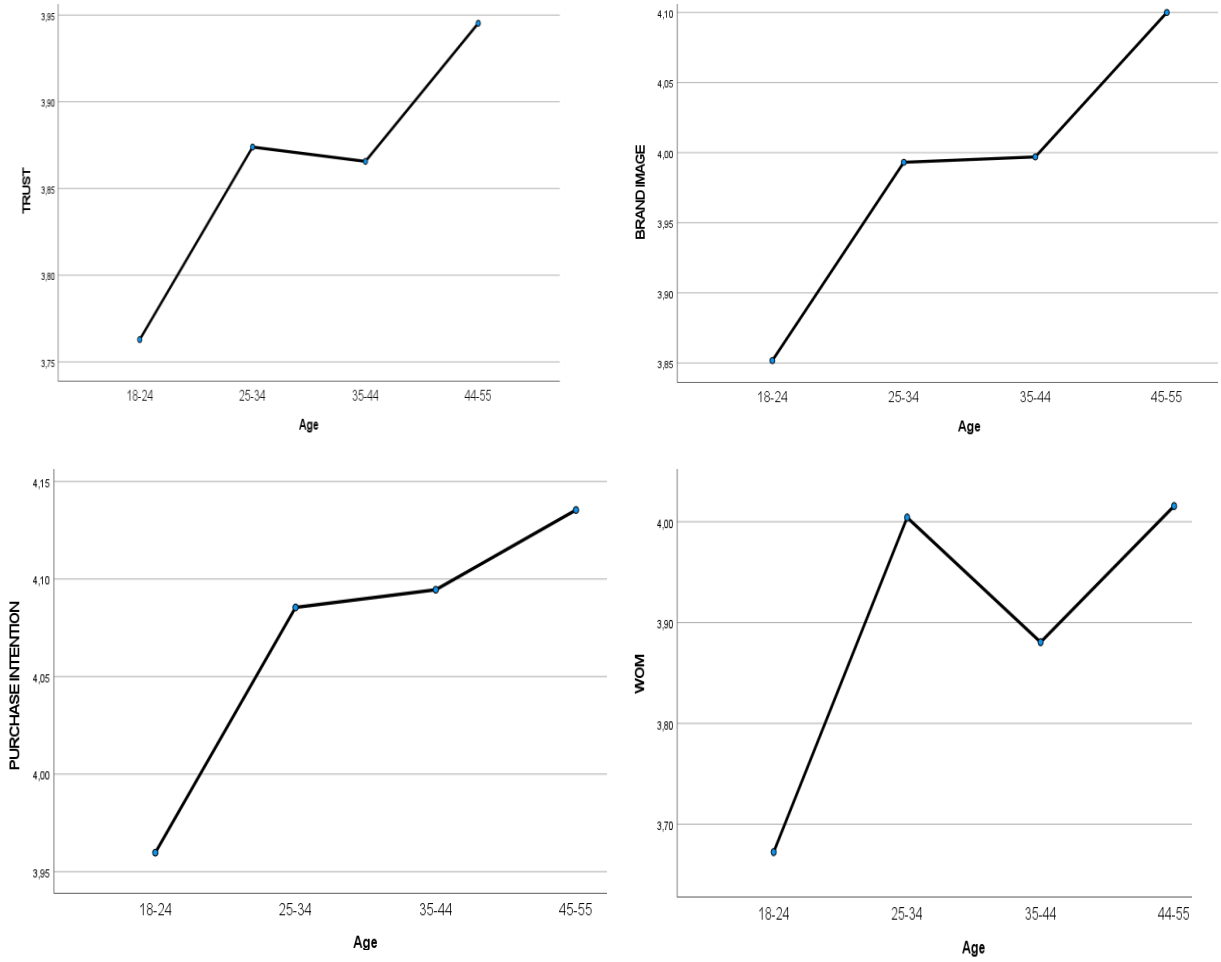
WoM	18-24	58	3,6724	,97581
	25-34	117	4,0043	,81340
	35-44	67	3,8806	,86203
	45-55	32	4,0156	,96290

Table 4: ANOVA for Age

	Sum of Squares	df	Mean Square	F	Sig.
Trust	,801	3	,267	,481	,696
BrandImage	1,452	3	,484	,963	,411
PurchaseIntention	,907	3	,302	,601	,615
WoM	4,722	3	1,574	2,035	,109

The results of the one-way ANOVA test indicated no statistically significant differences across age groups for any of the study constructs. Specifically, age had no significant effect on Trust ($F(3, 270) = 0.481$, $p = 0.696$), Brand Image ($F(3, 270) = 0.963$, $p = 0.411$), Purchase Intention ($F(3, 270) = 0.601$, $p = 0.615$), or WoM ($F(3, 270) = 2.035$, $p = 0.109$). Since none of the overall F-tests reached statistical significance ($p > 0.05$), post-hoc tests were not required or performed

Based on the one-way ANOVA results, no statistically significant differences were observed across age groups for Trust, Brand Image, WOM, or Purchase Intention ($p > 0.05$ for all variables). Consequently, H1a, H1b, H1c, and H1d were not supported.



Graphic 1: Mean Plots of Research Constructs Across Age Groups under the Greenhushing Scenario

Although the one-way ANOVA test revealed no statistically significant differences across age groups ($p > 0.05$), a visual examination of the mean plots indicates a consistent upward trend for all constructs—Trust, Brand Image, Purchase Intention, and Word-of-Mouth (WOM)—as age increases. Under the greenhushing scenario, younger participants (aged 18–24) exhibited relatively lower mean scores across all variables, whereas older age cohorts (particularly those aged 45–55) consistently reported the highest average ratings for brand trust, brand image, purchase intention, and positive recommendations.

Differences in Constructs Across Education Levels

Differences in consumer evaluations of greenhushing across education categories were examined using a one-way ANOVA for Brand Trust, Brand Image, WOM, and Purchase Intention toward the promoted product.

Table 5: Descriptive Statistics for Education

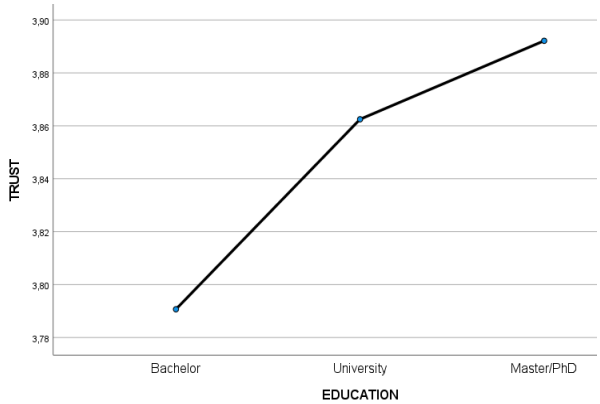
Variables	Education	N	Mean	Std. Deviation
Trust	Bachelor	43	3,7907	,76945
	University	180	3,8625	,72720
	Master/PhD	51	3,8922	,78622
Brand Image	Bachelor	43	3,9302	,78544
	University	180	3,9611	,71507
	Master/PhD	51	4,0706	,61816
Purchase Intention	Bachelor	43	3,9535	,82802
	University	180	4,0685	,69108
	Master/PhD	51	4,1569	,65778
WoM	Bachelor	43	3,8372	1,01607
	University	180	3,9111	,84753
	Master/PhD	51	3,9412	,90910

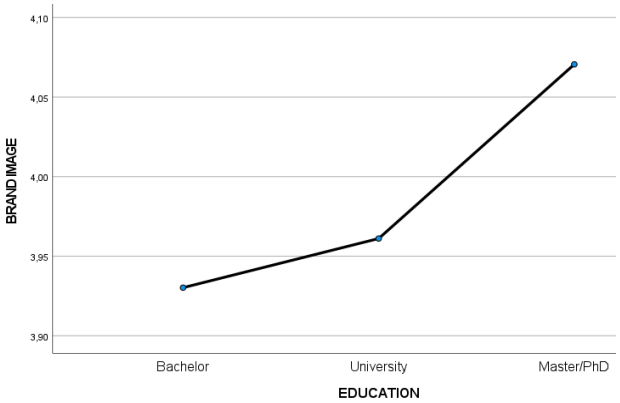
Table 6: ANOVA for Education

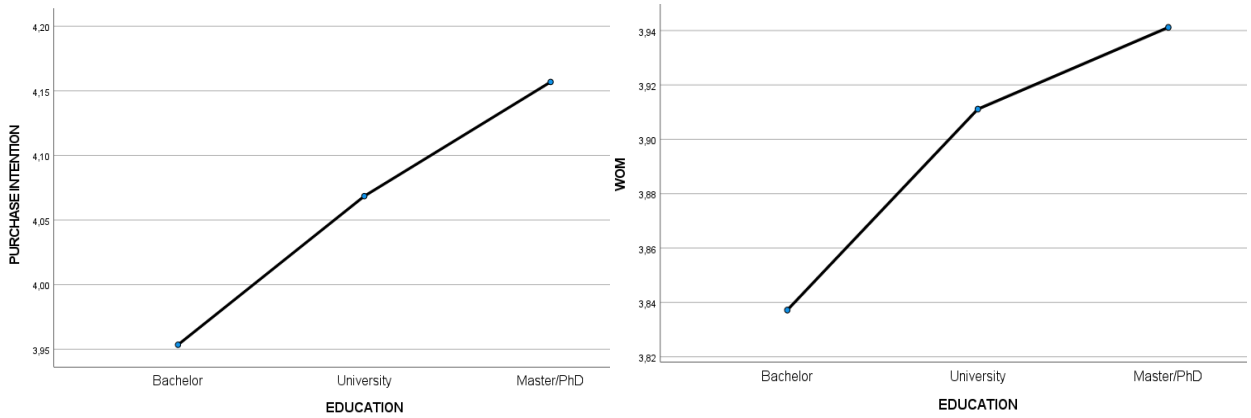
Variables	Sum of Squares	df	Mean Square	F	Sig.
Trust	,257	2	,129	,232	,793
Brand Image	,586	2	,293	,582	,560
Purchase Intention	,966	2	,483	,963	,383
WoM	,271	2	,136	,172	,842

The results of the one-way ANOVA indicated no statistically significant differences across education levels for any of the study constructs under the greenhushing scenario. Specifically, education level had no significant main effect on Trust ($p = 0.793$), Brand Image ($p = 0.560$), Purchase Intention ($p = 0.383$), or WoM ($p = 0.842$). Since none of the F-statistics reached statistical significance ($p > 0.05$), post-hoc comparisons were not performed.

Based on the one-way ANOVA results, no statistically significant differences were observed across education levels in participants' responses to the greenhushing scenario regarding Brand Trust, Brand Image, WOM, or Purchase Intention ($p > 0.05$ for all constructs). Consequently, H2a, H2b, H2c, and H2d were not supported.







Graphic 2: Mean Plots of Research Constructs Across Education Levels under the Greenhushing Scenario

Although the one-way ANOVA test revealed no statistically significant differences across education levels ($p > 0.05$), visual inspection of the mean plots demonstrates a consistent upward trend for all constructs—Brand Trust, Brand Image, Purchase Intention, and Word-of-Mouth (WOM)—as the level of education increases. Under the greenhushing scenario, participants with lower education levels (e.g., Bachelor/Undergraduate cohorts) recorded relatively lower mean scores across all variables, whereas highly educated participants (Master/PhD holders) consistently reported the highest average ratings for brand trust, brand image, purchase intention, and positive recommendations.

Differences in Constructs Across Income Levels

A one-way ANOVA was performed to assess whether income levels lead to significant variations in consumer evaluations of corporate greenhushing, focusing specifically on Brand Trust, Brand Image, WOM, and Purchase Intention toward the advertised product.

Table 7: Descriptive Statistics for Income

Variables	Income	N	Mean	Std. Deviation
Trust	Low	105	3,7286	,76908
	Med	94	3,8404	,72108
	High	75	4,0567	,69818
Brand Image	Low	105	3,8171	,76113
	Med	94	4,0170	,62263
	High	75	4,1493	,69523
Purchase Intention	Low	105	3,9111	,82076
	Med	94	4,1383	,60938
	High	75	4,1956	,61535
WoM	Low	105	3,7333	,92004
	Med	94	3,9840	,79126
	High	75	4,0467	,91597

Table 8: ANOVA for Income

Variables	Sum of Squares	df	Mean Square	F	Sig.
Trust	4,748	2	2,374	4,408	,013
Brand Image	5,061	2	2,531	5,193	,006
Purchase Intention	4,269	2	2,134	4,362	,014
WoM	5,187	2	2,593	3,373	,036

The results of the one-way ANOVA test revealed statistically significant differences across income groups for all study constructs under the greenhushing scenario. Specifically, income level exerted a significant main effect on Trust ($p = 0.013$), Brand Image ($p = 0.006$), Purchase Intention ($p = 0.014$), and WoM ($p = 0.036$). As evidenced by the descriptive statistics, mean scores across all four dimensions progressively increased from low to high income categories, with high-income participants consistently demonstrating the most favorable evaluations

regarding brand trust, brand image, purchase intention, and positive word-of-mouth recommendations toward the promoted product.

Based on the one-way ANOVA results, statistically significant differences were observed across income groups in participants' responses to the greenhushing scenario regarding Brand Trust (p = 0.013), Brand Image (p = 0.006), Purchase Intention (p = 0.014), and WOM (p = 0.036). Consequently, H3a, H3b, H3c, and H3d were fully supported. To identify which specific income groups significantly differed from one another, post-hoc comparisons were performed using the LSD test.

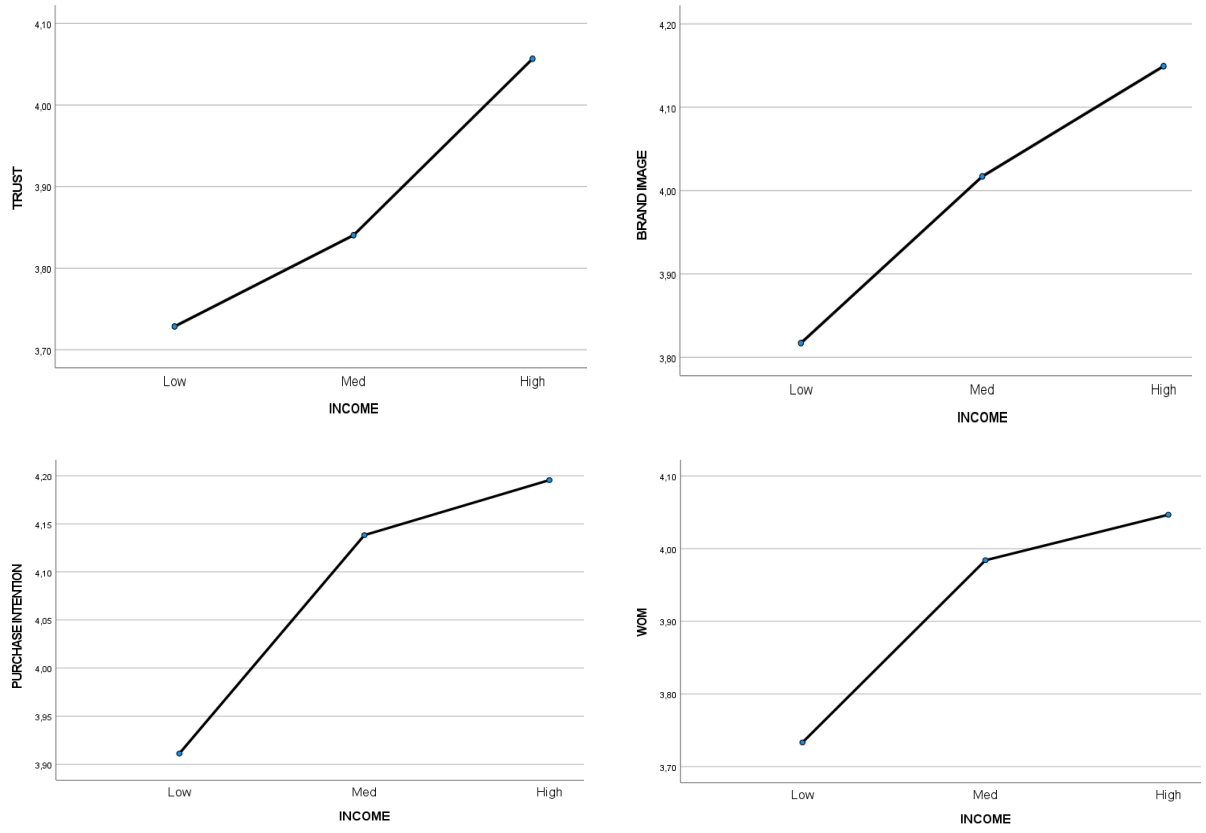
To identify the specific pairwise differences across income categories (1 = Low, 2 = Medium, 3 = High), post-hoc LSD tests were performed. For Trust, a statistically significant mean difference was observed exclusively between low-income and high-income participants (p = .003, Mean Difference = -.32810), with the high-income group exhibiting significantly higher trust levels. Conversely, no significant differences were found between low and medium income groups (p = .284) or between medium and high income groups (p = .058).

Regarding Brand Image, post-hoc comparisons revealed that participants in the low-income group rated brand image significantly lower than both medium-income (p = .045, Mean Difference = -.19988) and high-income participants (p = .002, Mean Difference = -.33219). However, the difference between medium and high income categories did not reach statistical significance (p = .222).

For Purchase Intention, low-income respondents demonstrated significantly lower purchase intentions compared to both medium-income (p = .023, Mean Difference = -.22719) and high-income respondents (p = .008, Mean Difference = -.28444). No statistically significant distinction was observed between the medium and high income groups (p = .597).

Finally, for WOM, low-income participants reported significantly lower WOM intentions relative to medium-income (p = .045, Mean Difference = -.25071) and high-income cohorts (p = .019, Mean Difference = -.31333). Similar to Brand Image and Purchase Intention, the comparison between medium and high income groups yielded no statistically significant difference (p = .645).

Overall, the post-hoc findings indicate that the observed significant main effects are primarily driven by the lower evaluations of the low-income segment compared to higher income tiers. Consequently, H3a, H3b, H3c, and H3d were supported



Graphic 3: Mean Plots of Research Constructs Across Income Levels under the Greenhushing Scenario

A visual examination of the mean plots further illustrates the statistically significant differences observed across income levels under the greenhushing scenario. As depicted in Figure 3, all four constructs—Brand Trust, Brand Image, Purchase Intention, and WOM—exhibit a pronounced, continuous linear upward trajectory as participant income increases from low to high categories.

Participants in the low-income tier recorded the lowest average scores across all dimensions (Trust, Brand Image, Purchase Intention, and WOM), whereas high-income consumers consistently reported the highest mean evaluations. Particularly for Brand Image, Purchase Intention, and WOM, a sharp increase is observed when moving from the low-income to the medium-income category, which then plateaus into a more steady, moderate rise toward the high-income group. For Trust, the sharpest mean increase occurs between the medium and high-income tiers.

These visual patterns align closely with the post-hoc LSD findings, demonstrating that higher-income consumers evaluate corporate greenhushing significantly more favorably. This suggests that affluent individuals—who generally possess higher financial security and purchasing power—may perceive a firm's subtle or understated sustainability communication as a mature, trustworthy, and non-boastful corporate strategy rather than a lack of commitment to environmental responsibility.

Differences in Constructs Across Employment Status

An independent samples t-test was conducted to examine whether consumer evaluations under the greenhushing scenario significantly differed based on employment status (unemployed vs. employed). The Levene's test for equality of variances confirmed that the assumption of homogeneity of variance was met for all variables ($p > .05$)

Table 9: Independent Samples Test for Employment Status

Variables	Levene's Test for Equality of Variances		t-test for Equality of Means		
	F	Sig.	t	df	Sig. (2-tailed)
Trust	1,070	,302	-2,389	272	,018
Brand Image	,557	,456	-2,351	272	,019
Purchase Intention	,026	,873	-1,467	272	,144
WoM	,000	,992	-2,327	272	,021

The empirical findings indicated statistically significant differences between unemployed and employed participants across three of the four constructs: Trust, Brand Image, and WOM. Specifically, employed participants demonstrated significantly higher levels of Trust (M = 3.936) compared to unemployed participants (M = 3.714; t= -2.389, p = .018). Similarly, employed individuals reported more favorable evaluations of Brand Image (M = 4.051) than their unemployed counterparts (M = 3.842; t= -2.351, p = .019). Furthermore, WOM intentions were significantly higher among employed respondents (M = 3.997) relative to unemployed respondents (M = 3.739; t= -2.327, p = .021).

In contrast, no statistically significant difference was observed for Purchase Intention between unemployed (M = 3.983) and employed participants (M = 4.113; t = -1.467, p = .144), although employed respondents exhibited a slightly higher mean score. Overall, these results suggest that employment status significantly shapes consumer attitudes and recommendation behaviors toward corporate greenhushing, with employed individuals holding consistently more positive views.

Based on the independent samples t-test results, employment status led to statistically significant differences in consumer evaluations of corporate greenhushing regarding Brand Trust (p = .018), Brand Image (p = .019), and WOM (p = .021). Consequently, H4a, H4b, and H4c were supported. In contrast, no statistically significant difference was found between employed and unemployed participants concerning Purchase Intention (p = .144). Therefore, H4d was not supported.

Differences in Constructs Across Marital Status

To investigate potential discrepancies in consumer greenhushing responses attributable to marital status, a series of independent samples t-tests was executed across Brand Trust, Brand Image, WOM, and Purchase Intention.

Table 10: Independent Samples Test for Marital Status

Variables	Levene's Test for Equality of Variances		Independent Samples Test		
	F	Sig.	t	df	Sig. (2-tailed)
Trust	,009	,925	2,193	272	,029
Brand Image	,253	,616	1,997	272	,047
Purchase Intention	,009	,925	2,232	272	,026
WoM	2,017	,157	2,462	272	,014

An independent samples t-test was conducted to investigate whether consumer perceptions under the greenhushing scenario significantly differed between married (N = 130) and single (N = 144) respondents. The results of Levene's test for equality of variances established that variance homogeneity was satisfied across all dependent variables (p > .05).

The statistical findings demonstrated significant differences between married and single participants across all four evaluated dimensions. Specifically, married respondents reported significantly higher levels of Brand Trust (M = 3.960) compared to single respondents (M = 3.764; t= 2.193, p = .029). Similarly, evaluations of Brand Image were significantly more favorable among married consumers (M = 4.066) than single consumers (M = 3.896; t= 1.997, p = .047). In terms of behavioral outcomes, married participants exhibited significantly stronger Purchase Intentions (M = 4.167) relative to single participants (M = 3.977; t= 2.232, p = .026). Furthermore, positive WOM recommendations were markedly higher for the married cohort (M = 4.042) compared to the single cohort (M = 3.781, t = 2.462, p = .014).

Based on the independent samples t-test results, statistically significant differences were observed between married and single respondents across all study constructs regarding Brand Trust (p = .029), Brand Image (p = .047), Purchase Intention (p = .026), and WOM (p = .014). Consequently, H5a, H5b, H5c, and H5d were supported.

Differences in Constructs Across Gender

To test whether gender influence individual responses to corporate greenhushing, an independent samples t-test was executed across Brand Trust, Brand Image, WOM, and Purchase Intention.

Table 11: Independent Samples Test for Gender

Variables	Levene's Test for Equality of Variances		Independent Samples Test		
	F	Sig.	t	df	Sig. (2-tailed)
Trust	,223	,637	1,073	272	,284
Brand Image	,442	,507	1,698	272	,091
Purchase Intention	,042	,838	1,397	272	,164
WoM	7,109	,008	2,551	272	,011

An independent samples t-test was executed to evaluate whether gender differences significantly influence consumer evaluations under the greenhushing scenario.

The analytical results revealed no statistically significant differences between female (N = 142) and male (N = 132) respondents regarding Brand Trust (M = 3.903, for females vs. M = 3.807 for males; t= 1.073, p = .284), Brand Image (M = 4.047 for females vs. M = 3.902 for males; t= 1.698, p = .091), and Purchase Intention (M = 4.124 for females vs. M = 4.005 for males; t= 1.397, p = .164). Although female participants exhibited slightly higher average ratings across these three constructs, the discrepancies did not reach statistical significance.

In contrast, a statistically significant difference was identified for WOM (t = 2.551, p = .011). Female participants recorded significantly higher WOM scores (M = 4.035) compared to male participants (M = 3.765). These findings indicate that while gender does not significantly alter internal evaluations such as trust, brand image perception, or purchase likelihood in a greenhushing context, it plays a key role in shaping post-evaluative communication behavior. Specifically, female participants showed a markedly stronger tendency to engage in positive word-of-mouth recommendations.

Based on the independent samples t-test results, gender did not yield statistically significant variations in consumer responses regarding Brand Trust (p = .284), Brand Image (p = .091), and Purchase Intention (p = .164).

Consequently, H6a, H6b, and H6d were not supported. Conversely, a statistically significant difference was observed for Word of Mouth ($p = .011$), meaning H6c was fully supported.

5. CONCLUSION

This study evaluated consumer reactions to corporate greenhushing by analyzing how demographic profiles—specifically age, education, income, employment status, marital status, and gender—influence core brand perceptions and behavioral outcomes. Overall, the empirical findings demonstrate that greenhushing is not perceived uniformly across all consumer segments. Rather than triggering widespread skepticism or backlash, silent or understated sustainability strategies receive significantly more favorable responses from specific demographic groups—namely individuals with higher income, employment (employed), and greater marital stability.

These variations indicate that consumer resilience to understated sustainability disclosures depends heavily on socio-economic security and demographic maturity. Higher socio-economic status appears to foster a psychological buffer, enabling these consumers to view greenhushing as a mature, non-boastful corporate posture rather than a deliberate suppression of environmental responsibility. Conversely, lower-income and unemployed segments exhibit higher skepticism and lower engagement, indicating that financially sensitive consumers require more transparent, explicit, and accessible sustainability messaging to build trust and brand advocacy.

Theoretical and Managerial Implications

Theoretical Contributions

- Demographic Granularity in Greenhushing Literature: This study extends the emerging literature on covert sustainability communication by empirical validation that consumer responses to greenhushing are moderated by socio-economic and demographic traits.
- Revisiting Green Skepticism: By showing that affluent, employed, and married consumers maintain high trust and brand image despite understated disclosures, the research demonstrates that greenhushing does not automatically trigger green skepticism across all market segments.
- Behavioral Disconnection: The findings highlight a divergence between internal perceptual constructs (Trust, Image, Purchase Intention) and external communication behavior (WOM) across gender lines, enriching consumer advocacy frameworks in sustainable marketing.

Managerial Implications

- Targeted Sustainability Communication: Brand managers should avoid a "one-size-fits-all" approach. While greenhushing effectively protects brands from hypocrisy accusations among mature and higher-income targets, explicit and verifiable sustainability claims remain essential when engaging lower-income or price-sensitive segments.
- Leveraging Female Advocacy: Given that female consumers demonstrate a significantly higher propensity for positive Word-of-Mouth under greenhushing scenarios, marketers can design community-driven and word-of-mouth campaigns specifically tailored to female brand advocates.
- Mitigating Perceived Risk: To bridge the trust gap among socio-economically vulnerable groups, companies should provide easily accessible third-party certifications (e.g., QR codes or website disclosures) without cluttering primary campaign messaging.

Future Research

- Cross-Cultural Validation: Future studies should test greenhushing scenarios across diverse cultural and regional contexts to evaluate whether cultural values (e.g., individualism vs. collectivism) alter demographic sensitivity.

- Product Category and Price Points: Expanding the research framework to luxury vs. fast-moving consumer goods (FMCG) would clarify how product involvement and price elasticity interact with greenhushing perceptions.
- Psychographic and Attitudinal Variables: Incorporating psychographic constructs—such as environmental concern, green skepticism, and subjective knowledge—alongside demographics would provide deeper structural insights through mediation or moderation models.
- Longitudinal and Field Experiments: Longitudinal studies or real-world field experiments could measure whether the positive evaluations observed under simulated greenhushing conditions translate into long-term brand equity and actual re-purchase behavior.

Note:

This study is derived from Aylin Başkaya's Master's thesis titled *"Greenwashing, Greenhushing, and Social Responsibility as Sustainability Discourses: A Comparative Analysis in Terms of Consumer Perceptions."*

This study was supported by the Kocaeli University Scientific Research Projects (BAP) Coordination Unit under Project Grant No. **SYL-2026-4817** (ID: 4817), to which the authors extend their gratitude for their support.

REFERENCES

Ajayi O.A., & Mmutle, T. (2021). Corporate reputation through strategic communication of corporate social responsibility. Corporate Communications: An International Journal, 26(5) 1–15, https://doi.org/10.1108/CCIJ-02-2020-0047

Alhouti, S., Johnson, C. M., & Holloway, B. B. (2016). Corporate social responsibility authenticity: Investigating its antecedents and outcomes. Journal of Business Research, 69(3), 1242-1249. https://doi.org/10.1016/j.jbusres.2015.09.007

Arbuckle, J. L. (2019). IBM SPSS Amos 26 User's Guide. Amos Development Corporation.

Carlos, W. C., & Lewis, B. W. (2018). Strategic silence: Withholding certification status as a hypocrisy avoidance tactic. Administrative Science Quarterly, 63(1), 130-169. https://doi.org/10.1177/0001839217695089

Cavusoglu, M., Nanu, L., Mistry, T.G., Kement, U., & Ali, F. (2026). Examining the impact of greenwashing and greenhushing on consumer trust and behavior in the restaurant industry, International Journal of Contemporary Hospitality Management, 38(6), 1927–1952, https://doi.org/10.1108/IJCHM-05-2025-0786

Chen, Y.S. (2010). The drivers of green brand equity: Green brand image, green satisfaction, and green trust. *Journal of Business Ethics,* 93, 307–319. https://doi.org/10.1007/s10551-009-0223-9

Chen, Y. S., & Chang, C. H. (2013). Greenwash and green trust: The mediation effects of green consumer confusion and green perceived risk. Journal of Business Ethics, 114(3), 489-500. https://doi.org/10.1007/s10551-012-1360-0

Chen, Y. S., Lin, C. L., & Chang, C. H. (2014). The influence of greenwash on green word-of-mouth (green WOM): The mediation effects of green perceived quality and green satisfaction. *Quality & Quantity*, 48(5), 2411-2425. https://doi.org/10.1007/s11135-013-9898-1

Connelly, B. L., Certo, S. T., Ireland, R. D., & Reutzel, C. R. (2011). Signaling Theory: A Review and Assessment. Journal of Management, 37(1), 39-67. https://doi.org/10.1177/0149206310388419

De Souza Barbosa, A., Crispim, M. C., Da Silva, L. D., Da Silva, J. M. N., Barbosa, A. M., De Morais Correia, L. M. A., & Morioka, S. (2025). Demographic Variables and the Link Between Environmental, Social, and Governance Criteria and Corporate Sustainability Performance: the Influence on Workers' Perception. Business and Society Review. 131, no. 1: e70032. https://doi.org/10.1111/basr.70032

Ellen, P.S., Webb, D.J. & Mohr, L.A. (2006). Building corporate associations: Consumer attributions for corporate socially responsible programs. Journal of The Academy Marketing Science, 34, 147–157. https://doi.org/10.1177/0092070305284976

Ettinger, A., Grabner-Kräuter, S., Okazaki, S., & Terlutter, R. (2021). The desirability of CSR communication versus greenhushing in the hospitality industry: The customers' perspective. Journal of Travel Research, 60(3), 618-638. https://doi.org/10.1177/0047287520930087

Font, X., Elgammal, I., & Lamond, I. (2017). Greenhushing: the deliberate under communicating of sustainability practices by tourism businesses. Journal of Sustainable Tourism, 25(7), 1007–1023. https://doi.org/10.1080/09669582.2016.1158829

Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. Journal of Marketing Research, 18(1), 39–50.

Franke, G., & Sarstedt, M. (2019). Heuristics versus statistics in discriminant validity testing: a comparison of four procedures". Internet Research, Vol. 29 No. 3 pp. 430–447, doi: https://doi.org/10.1108/IntR-12-2017-0515.

Grunwald, G., Kara, A. & Shrivastava, P. (2026). Who Reacts and How? Consumer Demographics and Psychographics in Corporate Sustainability Crises, 2026 AMA (American Marketing Association) Winter Academic Conference Proceedings - Bridging at the Frontiers: Marketing for a World in Transition, Madrid (Spain), Volume: 37.

Guerreiro, J., & Pacheco, M. (2021). How green trust, consumer brand engagement and green word-of-mouth mediate purchasing intentions. Sustainability, 13(14), 7877. https://doi.org/10.3390/su13147877

Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2019). Multivariate Data Analysis (8th ed.). Cengage Learning

Heider, F. (1958). The psychology of interpersonal relations. New York: Wiley.

Henseler, J., Ringle, C. M., & Sarstedt, M. (2015). A new criterion for assessing discriminant validity in variance-based structural equation modeling. Journal of the Academy of Marketing Science, 43(1), 115–135.

Hojnik, J., Ruzzier, M., & Manolova, T. (2020). Sustainable development: Predictors of green consumerism in Slovenia. Corporate Social Responsibility and Environmental Management, 27, 1695-1708. https://doi.org/10.1002/csr.1917

Hu, L. T., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. Structural Equation Modeling: A Multidisciplinary Journal, 6(1), 1-55.

Isac, N., Javed, A., Radulescu, M., Cismasu, I.D.L, Yousaf, Z., Serbu, R.S., (2025). Is greenwashing impacting on green brand trust and purchase intentions? Mediating role of environmental knowledge. *Environment, Development and Sustainability*, 27, 21329–21346. https://doi.org/10.1007/s10668-023-04352-0

Jones, R. J. III, Reilly, T. M., Cox, M. Z., & Cole, B. M. (2017) Gender Makes a Difference: Investigating Consumer Purchasing Behavior and Attitudes Toward Corporate Social Responsibility Policies. Corporate Social Responsibility and Environmental Management, 24: 133–144. https://doi.org/10.1002/csr.1401.

Khan, N., Nieto-Garcia, M., Acuti, D., & Viglia, G. (2026). An investigation of how and why organizations enact greenhushing. Journal of Advertising Research, 66(1), 150-173. https://doi.org/10.1080/00218499.2025.2514889

Kline, R. B. (2016). Principles and Practice of Structural Equation Modeling (4th ed.). Guilford Press.

Krystallis, A., Zaharia, V., & Zairis, A. (2021). "When" Does It Pay to Be Good? Attributions Mediate the Way CSR Elements Impact on Consumer Responses, and Are Controllable. Sustainability, 13(11), 5869. https://doi.org/10.3390/su13115869

Nguyen, N., & Johnson, L. (2020). Consumer behaviour and environmental sustainability. Journal of Consumer Behaviour, 19, 539-541. https://doi.org/10.1002/cb.1892

Nguyen, K.D., & Vy, L.T. (2026). The silent brand: How perceived greenhushing shapes green purchase intention through brand trust, perceived risk, and consumer green skepticism. Preprints. https://doi.org/10.20944/preprints202605.1375.v1

Nunnally, J. C., & Bernstein, I. H. (1994). Psychometric Theory (3rd ed.). McGraw-Hill.

Park, S.-J., Choi, S., & Kim, E.-J. (2012). The Relationships between Socio-demographic Variables and Concerns about Environmental Sustainability. Corporate Social Responsibility and Environmental Management, 19, 343-354. https://doi.org/10.1002/csr.284

Perdue, B.C., & Summers, J.O. (1986). Checking the success of manipulations in marketing experiments. *Journal of Marketing Research, 23*(4), 317–326. https://doi.org/10.2307/3151807

Rosati, F., Costa, R., Calabrese, A., & Pedersen, E. R. G. (2018). Employee attitudes towards corporate social responsibility: a study on gender, age and educational level differences. Corporate Social Responsibility and Environmental Management, 25, 1306-131. https://doi.org/10.1002/csr.1640

Witek, L., & Kuźniar, W. (2021). Green Purchase Behavior: The Effectiveness of Sociodemographic Variables for Explaining Green Purchases in Emerging Market. Sustainability, 13(1), 209. https://doi.org/10.3390/su13010209

Yakın, V., Çelik, S., & Gülay, G. (2026). Communicating or Not Communicating? A Consumer-Based Indicator for Sustainability Communication: Developing a Greenhushing Attitude Scale. Syst., 14 (5). 463. https://doi.org/10.3390/systems14050463

Zeng, T., Durif, F., & Robinot, E. (2025). Who Are Canada's Green Consumers? A Corporate Social Responsibility-Driven Typology. Journal of Promotion Management, 31, 1054 - 1071. https://doi.org/10.1080/10496491.2025.2560414

Sürdürülebilir Bölgesel Kalkınmada Turizmin Stratejik Rolü

Dr. Öğretim Üyesi Duygu YÜCEL[1] **Emekli Öğr. Gör. Havva ARABACI[2]**

[1] Trakya Üniversitesi, Edirne Sosyal Bilimler Meslek Yüksekokulu, Muhasebe ve Vergi Bölümü, Edirne, Türkiye, duyguyucel@trakya.edu.tr Orcid: 0000-0002-2665-6732

[2] Trakya Üniversitesi, Edirne Sosyal Bilimler Meslek Yüksekokulu, Muhasebe ve Vergi Bölümü, Edirne, Türkiye, arabacih@hotmail.com Orcid: 0000-0003-0212-6590

Özet: Turizm, bölgesel kalkınmanın ekonomik, sosyal, kültürel ve çevresel boyutlarını destekleyebilecek önemli bir sektördür. Özellikle ekonomik faaliyetlerin sınırlı olduğu bölgelerde istihdam yaratılmasına, gelir düzeylerinin artmasına ve yerel ekonomilerin çeşitlenmesine katkı sağlayabilmektedir. Bu çalışma, turizmin sürdürülebilir bölgesel kalkınmadaki stratejik rolünü ve bu rolün gerçekleşme koşullarını değerlendirmeyi amaçlamaktadır. Konu, ulusal ve uluslararası akademik çalışmalar ile kurumsal raporlara dayalı kavramsal bir literatür değerlendirmesi çerçevesinde ele alınmaktadır. Turizmin gelir ve istihdam etkileri; yerel tedarik bağlantıları, altyapı yatırımları, beşerî sermaye, kültürel miras ve çevresel sürdürülebilirlik boyutlarıyla birlikte incelenmektedir. Değerlendirme, turizmdeki büyümenin tek başına bölgesel kalkınma anlamına gelmediğine işaret etmektedir. Ekonomik katkının kalıcılığı, turizm harcamalarının yerel katma değere dönüşmesine, gelir sızıntılarının sınırlandırılmasına ve istihdamın niteliğinin geliştirilmesine bağlıdır. Mevsimsellik, turizme aşırı bağımlılık, ekonomik faydaların belirli kesimlerde yoğunlaşması ve doğal kaynaklar üzerindeki baskılar ise bu katkıyı sınırlandırabilmektedir. Bu nedenle yerel girişimciliğin desteklenmesi, yerel halkın karar alma süreçlerine katılımı, kaynakların korunması ve turizm politikalarının bölgesel kalkınma hedefleriyle bütünleştirilmesi önem taşımaktadır. Çalışma, turist sayısı ve toplam gelir yanında yerel katma değer, gelir dağılımı, istihdam sürekliliği ve çevresel maliyetlerin de politika değerlendirmesine dâhil edilmesini önermektedir.

Anahtar Kelimeler: Turizm, Bölgesel Kalkınma, Bölgesel Ekonomi, Sürdürülebilir Kalkınma, Yerel Kalkınma.

The Strategic Role of Tourism in Sustainable Regional Development

Abstract: Tourism is an important sector with the potential to support the economic, social, cultural, and environmental dimensions of regional development. Particularly in regions with limited economic activity, it can contribute to employment generation, income growth, and the diversification of local economies. This study aims to assess the strategic role of tourism in sustainable regional development and the conditions under which this role can be realised. It adopts a conceptual literature review drawing on national and international academic studies and institutional reports. Tourism's income and employment effects are examined alongside local supply linkages, infrastructure investment, human capital, cultural heritage, and environmental sustainability. The assessment indicates that tourism growth alone does not constitute regional development. Lasting economic benefits depend on the conversion of tourism expenditure into local value added, the reduction of economic leakages, and improvements in employment quality. Seasonality, excessive dependence on tourism, the concentration of economic benefits, and pressures on natural resources can constrain these benefits. Supporting local entrepreneurship, involving residents in decision-making, protecting resources, and integrating tourism policies with regional development objectives are therefore essential. The study recommends that policy evaluation consider local value added, income distribution, employment continuity, and environmental costs alongside visitor numbers and total revenue.

Keywords: Tourism, Regional Development, Regional Economy, Sustainable Development, Local Development.

1. GİRİŞ

Turizm, ekonomik büyüme, istihdam ve gelir yaratma, yerel ekonomilerin çeşitlendirilmesi ve bölgesel kalkınmanın desteklenmesi açısından önemli bir sektör olarak öne çıkmaktadır. Turizm faaliyetleri yalnızca ziyaretçi harcamaları yoluyla doğrudan ekonomik gelir oluşturmakla kalmamakta; ulaştırma, konaklama, yiyecek-içecek, tarım, perakende, kültür ve eğlence gibi farklı sektörlerle kurduğu bağlantılar aracılığıyla bölgesel ekonomik faaliyetlerin gelişmesine de katkı sağlamaktadır. Bu yönüyle turizm, özellikle ekonomik faaliyetlerin sınırlı olduğu kırsal ve dezavantajlı bölgelerde yeni gelir ve istihdam olanaklarının oluşturulmasına katkıda bulunabilmektedir. OECD (2024), turizmin ekonomik büyüme ve istihdamın yanı sıra bölgesel kalkınmayı ve yerel toplulukların ekonomik refahını destekleme potansiyeline dikkat çekmektedir.

Bununla birlikte turizmin bölgesel kalkınmaya sağladığı katkıların sürdürülebilir olabilmesi, ekonomik kazanımların yanı sıra sosyal ve çevresel etkilerin de dikkate alınmasını gerektirmektedir. Sürdürülebilir turizm yaklaşımı; ekonomik gelişme, toplumsal refah, kültürel mirasın korunması ve çevresel sürdürülebilirlik arasında denge kurulmasını esas almaktadır. Bu kapsamda turizm faaliyetlerinin yerel halkın ihtiyaçlarını gözetmesi, doğal ve kültürel kaynakların korunması, turizm gelirlerinin yerel ekonomiye yayılması ve gelecek nesillerin kaynaklardan yararlanma imkânlarının korunması önem taşımaktadır.

Bölgesel kalkınma açısından turizmin önemi, bölgelerin sahip oldukları doğal, kültürel ve beşerî kaynakların ekonomik değere dönüştürülmesiyle daha belirgin hâle gelmektedir. Tarihî yapılar, doğal alanlar, gastronomik değerler, geleneksel el sanatları ve yerel yaşam biçimleri turizm aracılığıyla ekonomik faaliyetlere dâhil edilebilmektedir. Bunun yanı sıra turizm sektörünün tarım, ulaştırma, ticaret ve hizmetler gibi sektörlerle kurduğu ekonomik bağlantılar, bölgesel ekonomide gelir ve istihdam yaratıcı etkilerin ortaya çıkmasını sağlayabilmektedir. Ancak bu katkıların ortaya çıkması, turizm faaliyetlerinin bölgenin özgün koşulları ve taşıma kapasitesi dikkate alınarak planlanmasına bağlıdır.

Plansız ve kontrolsüz turizm gelişimi ise doğal kaynakların aşırı kullanılması, çevresel bozulma, kültürel değerlerin ticarileşmesi, mevsimsel istihdam ve turizm gelirlerinin belirli kesimlerde yoğunlaşması gibi sorunlara yol açabilmektedir. Bu nedenle turizmin bölgesel kalkınma üzerindeki etkisinin yalnızca turist sayısı, turizm geliri veya istihdam gibi ekonomik göstergeler üzerinden değerlendirilmesi yeterli değildir. Yerel halkın turizm süreçlerine katılımı, gelirlerin bölgesel dağılımı, kültürel mirasın korunması, çevresel kaynakların sürdürülebilir kullanımı ve yaşam kalitesinin geliştirilmesi de değerlendirme sürecine dâhil edilmelidir.

Bu çalışmanın amacı, turizmin sürdürülebilir bölgesel kalkınmaya ekonomik, sosyal, kültürel ve çevresel boyutlarda sağladığı katkıları incelemek ve turizmin bölgesel kalkınma sürecindeki rolünü ortaya koymaktır. Bu doğrultuda çalışmada ulusal ve uluslararası literatürden yararlanılarak turizm ve bölgesel kalkınma arasındaki ilişki sürdürülebilirlik perspektifinden değerlendirilmektedir. Çalışmanın temel sorusu, turizmdeki büyümenin hangi koşullarda kalıcı ve kapsayıcı bölgesel refaha dönüşebileceğidir. Çalışma, kavramsal bir literatür değerlendirmesi niteliğindedir; kaynaklar bölgesel kalkınma, yerel ekonomik bağlantılar ve sürdürülebilirlik konularıyla ilişkileri bakımından ele alınmıştır. Ampirik bir etki tahmini veya sistematik literatür taraması yapılmamaktadır. İzleyen bölümlerde kavramsal çerçeve açıklanmakta, turizmin kalkınmayla ilişkili etkileri incelenmekte ve politika önerileri değerlendirilmektedir.

2. SÜRDÜRÜLEBİLİR KALKINMA VE BÖLGESEL KALKINMA

2.1. Bölgesel Kalkınma

Kalkınma kavramı, bir toplumun yalnızca ekonomik kapasitesindeki artışı ifade eden dar bir çerçevede ele alınmamakta; bireylerin yaşam koşullarının iyileştirilmesi, ekonomik ve sosyal imkânlardan yararlanma düzeylerinin artırılması ve toplumsal eşitsizliklerin azaltılması gibi çok boyutlu değişimleri de kapsamaktadır. Bu yönüyle kalkınma, toplumun ekonomik yapısının yanı sıra sosyal, kurumsal ve yapısal unsurlarında meydana gelen dönüşümleri içeren kapsamlı bir süreç olarak değerlendirilmektedir. Dolayısıyla kalkınmanın temelinde, ekonomik büyümenin toplumsal refaha ve yaşam standartlarının iyileştirilmesine yansımasını sağlayacak yapısal dönüşümlerin gerçekleştirilmesi bulunmaktadır (Tekin, 2011).

Bölgesel kalkınma ise ekonomik unsurların yanı sıra sosyal, siyasal, kültürel ve çevresel boyutları da içeren çok yönlü bir süreçtir. Bölgesel kalkınma, bölgelerin sahip oldukları beşerî, ekonomik ve doğal kaynakların etkin biçimde değerlendirilmesi, mevcut potansiyellerin harekete geçirilmesi ve yerel aktörlerin kalkınma sürecine katılımının sağlanması aracılığıyla bölgesel refahın artırılmasını amaçlamaktadır. Bununla birlikte bölgelerin kalkınma süreçlerinin yalnızca kendi iç dinamikleri üzerinden değil, diğer bölgeler ve küresel ekonomik sistemle kurdukları ilişkiler çerçevesinde ele alınması gerekmektedir. Bu doğrultuda katılımcılık, sürdürülebilirlik ve insan kaynaklarının geliştirilmesi, bölgesel kalkınmanın temel unsurları arasında değerlendirilmektedir (Tekin, 2011).

Bölgesel kalkınma, gelişmiş ve gelişmekte olan ülkeler açısından temel politika alanlarından biri olup bölge içindeki ve bölgeler arasındaki gelişmişlik farklılıklarının azaltılmasını amaçlamaktadır. Bu doğrultuda ekonomik ve sosyal imkânların daha dengeli dağıtılması, bölge halkının yaşam koşullarının iyileştirilmesi ve yerel üretim kapasitesinin geliştirilmesi önem taşımaktadır. Dolayısıyla bölgesel kalkınma, yalnızca gelir ve üretim düzeyinin yükselmesini değil, bu artışın toplumsal refaha yansımasını da kapsamaktadır (Çeken, 2008; Kavaklı ve Karakaş, 2022).

Bölgesel kalkınmanın kapsamının genişlemesiyle birlikte kalkınma performansının değerlendirilmesinde yalnızca ekonomik göstergelerin yeterli olmadığı görülmektedir. İstihdam olanaklarının geliştirilmesi, sosyal bütünleşmenin güçlendirilmesi, yaşam kalitesinin yükseltilmesi, doğal ve kültürel kaynakların korunması ve çevresel sürdürülebilirliğin sağlanması da bölgesel kalkınmanın önemli bileşenleri hâline gelmiştir. Bu yaklaşım, bölgelerin sahip olduğu kaynakların ekonomik değere dönüştürülmesi kadar söz konusu kaynakların gelecek nesiller açısından korunmasını ve kalkınma sürecinin toplumun farklı kesimlerine fayda sağlayacak biçimde yürütülmesini de gerekli kılmaktadır.

Bu çerçevede turizm, özellikle kırsal ve ekonomik açıdan dezavantajlı bölgelerin kalkınma süreçlerini destekleyebilecek sektörlerden biri olarak öne çıkmaktadır. Turizm faaliyetleri, bölgelerin doğal ve kültürel varlıklarının ekonomik bir değere dönüştürülmesine, yeni istihdam ve gelir olanaklarının oluşturulmasına ve ekonomik faaliyetlerin çeşitlendirilmesine katkı sağlayabilmektedir. Özellikle alternatif ekonomik faaliyetlerin sınırlı olduğu kırsal ve uzak bölgelerde turizmin ekonomik canlılığı destekleme ve yerel istihdam olanaklarını artırma potansiyeli bulunmaktadır (OECD, 2024).

2.2. Sürdürülebilir Kalkınma ve Sürdürülebilir Turizm

Sürdürülebilir turizm, turizm faaliyetlerinin mevcut ve gelecekte ortaya çıkabilecek ekonomik, sosyal ve çevresel etkilerini bütüncül bir yaklaşımla ele alan; ziyaretçilerin, turizm sektörünün, doğal çevrenin ve ev sahibi toplulukların ihtiyaçlarını dengeli bir biçimde gözeten bir anlayış olarak tanımlanmaktadır (UNEP ve UNWTO, 2005). Bu doğrultuda sürdürülebilir turizm, yalnızca doğal ve çevresel kaynakların korunmasına yönelik uygulamalarla sınırlı olmayıp ekonomik sürdürülebilirliğin sağlanması, toplumsal refahın artırılması, kültürel mirasın korunması ve yerel toplulukların turizm süreçlerine etkin biçimde dâhil edilmesi gibi birbirleriyle ilişkili çok boyutlu unsurları kapsamaktadır.

Birleşmiş Milletler Dünya Çevre ve Kalkınma Komisyonunun 1987 yılında yayımladığı ve Brundtland Raporu olarak bilinen Ortak Geleceğimiz raporunda sürdürülebilir kalkınma, bugünün ihtiyaçlarının gelecek nesillerin kendi ihtiyaçlarını karşılama olanakları tehlikeye atılmadan karşılanması olarak tanımlanmıştır (WCED, 1987). Bu yaklaşım, ekonomik gelişme ile toplumsal refahın ve çevrenin korunmasının birlikte değerlendirilmesini gerektirmektedir (Tıraş, 2012).

Birleşmiş Milletlerin 2030 Sürdürülebilir Kalkınma Gündeminde turizm, özellikle Sürdürülebilir Kalkınma Amaçlarının (SKA) 8.9, 12.b ve 14.7 numaralı alt hedeflerinde açıkça yer almaktadır. Hedef 8.9, istihdam yaratan ve yerel kültür ile ürünleri destekleyen sürdürülebilir turizm politikalarını; hedef 12.b, turizmin sürdürülebilir kalkınma etkilerini izleme araçlarını kapsamaktadır. Hedef 14.7 ise küçük ada gelişmekte olan devletler ve en az gelişmiş ülkelerin deniz kaynaklarının sürdürülebilir kullanımından elde ettiği ekonomik faydaların artırılmasına yöneliktir; turizm bu çerçevedeki faaliyetlerden biridir (United Nations, t.y.).

Turizm sektörü açısından sürdürülebilirlik, doğal, kültürel ve beşerî turizm kaynaklarının uzun vadede korunarak kullanılmasını ve destinasyonların ekonomik, sosyal ve çevresel taşıma kapasitelerinin gözetilmesini ifade etmektedir. Bu bağlamda sürdürülebilir turizm yaklaşımı, turizm faaliyetlerinin kısa vadeli ekonomik getirilerinin artırılmasının ötesinde, destinasyonların uzun dönemli gelişimini ve yaşam kalitesini destekleyen bir anlayışı gerektirmektedir. Yerel halkın turizm faaliyetlerinden ekonomik ve sosyal açıdan fayda sağlaması, kültürel mirasın korunması, doğal kaynakların etkin kullanılması ve destinasyonların uzun vadeli rekabet gücünün sürdürülmesi, sürdürülebilir turizmin temel bileşenleri arasında değerlendirilmektedir.

Sürdürülebilir turizmin önemli unsurlarından biri de yerel halkın turizme ilişkin karar alma ve planlama süreçlerine etkin biçimde katılımının sağlanmasıdır. Yerel toplulukların turizm faaliyetlerinin dışında bırakılması, turizm gelirlerinin belirli gruplar arasında yoğunlaşmasına, ekonomik eşitsizliklerin artmasına ve turizm faaliyetlerine yönelik toplumsal kabulün azalmasına yol açabilmektedir. Buna karşılık yerel girişimciliğin desteklenmesi, yerel ürün ve hizmetlerin turizm değer zincirine dâhil edilmesi ve bölge halkına yönelik istihdam olanaklarının artırılması, turizm gelirlerinin yerel ekonomide daha geniş bir kesime ulaşmasına katkı sağlayabilmektedir. Bu nedenle sürdürülebilir turizm politikalarının geliştirilmesinde yerel paydaşların ihtiyaçlarının ve beklentilerinin dikkate alınması, turizmin bölgesel kalkınmaya sağladığı katkının güçlendirilmesi açısından önem taşımaktadır.

Sürdürülebilir turizm, ayrı bir turizm türü değil, farklı turizm türlerinin planlanması ve yönetilmesinde uygulanması gereken bir yaklaşımdır. Bu nedenle kırsal turizm veya ekoturizm gibi faaliyetler, yalnızca adlandırılmaları nedeniyle sürdürülebilir kabul edilemez; ekonomik, sosyal ve çevresel etkileriyle değerlendirilmelidir (Butler, 1999; UNEP ve UNWTO, 2005).

3. TURİZM VE BÖLGESEL KALKINMA İLİŞKİSİ

3.1. Turizmin Ekonomik Kalkınmaya Katkısı

Turizm sektörü, istihdam ve gelir yaratılması, uluslararası ziyaretçilerden döviz geliri elde edilmesi ve bölgesel ekonomik gelişmenin desteklenmesi açısından önemli bir ekonomik faaliyet alanıdır (OECD, 2024). Turizmin ekonomik etkileri doğrudan faaliyetlerle sınırlı kalmamakta; işletmelerin tedarik talebinden kaynaklanan dolaylı

etkiler ve turizmle bağlantılı gelir elde eden hanehalklarının tüketiminden doğan uyarılmış etkiler aracılığıyla diğer sektörlere yayılabilmektedir. Ancak toplam turist harcaması ile yaratılan katma değer aynı büyüklük değildir. Turizmin GSYH'ye doğrudan katkısının ölçülmesinde, ziyaretçi talebini karşılayan üretimin katma değeri ve ilgili net ürün vergileri esas alınmaktadır. Turizm Uydu Hesabı bu ayrım için temel bir çerçeve sunmakta; dolaylı ve uyarılmış etkiler ise ayrıca modellenmeyi gerektirmektedir (United Nations vd., 2010).

Turistlerin konaklama, yiyecek ve içecek, ulaştırma, alışveriş, kültür ve eğlence hizmetlerine yönelik harcamaları, destinasyonda doğrudan ekonomik faaliyet oluşturur. İşletmelerin mal ve hizmet tedariki ile çalışanların tüketim harcamaları, bu talebin bölge ekonomisine yayılmasını sağlayabilir. Bununla birlikte bölge dışından sağlanan girdiler ve bölge dışında yerleşik sahiplerine aktarılan kârlar gelir sızıntıları oluşturur. Bu nedenle bölgesel çarpan etkisinin büyüklüğü, yerel tedarik kapasitesine ve harcamaların bölge içinde kalma düzeyine bağlıdır; ulusal düzeydeki katkı ile yerel ekonomide kalan fayda aynı değildir (UNEP ve UNWTO, 2005).

Turizm sektörü aynı zamanda doğrudan ve dolaylı istihdam olanaklarının oluşmasına katkıda bulunmaktadır. Konaklama işletmeleri, restoranlar, seyahat acenteleri, ulaştırma işletmeleri, tur operatörleri ve rekreasyon hizmetleri turizm talebine bağlı olarak doğrudan istihdam yaratırken; tarım, gıda, imalat, perakende ve çeşitli hizmet sektörleri turizm sektörünün oluşturduğu talep artışından dolaylı olarak yararlanabilmektedir. Bu yönüyle turizm, özellikle hizmet sektörünün gelişmesine ve ekonomik faaliyetlerin çeşitlenmesine katkı sağlayan sektörlerden biri olarak öne çıkmaktadır. Doğrudan ve dolaylı istihdam hesapları değerlendirilirken turizme atfedilen faaliyetlerin kapsamı açıklanmalı ve aynı istihdamın birden fazla kez sayılmasından kaçınılmalıdır (United Nations vd., 2010).

Turizm faaliyetlerinin gelişmesi, aynı zamanda destinasyonlara yönelik yatırım kararlarını ve altyapı yatırımlarını da etkileyebilmektedir. Konaklama tesisleri, ulaştırma altyapısı, rekreasyon alanları, kültürel tesisler ve turizmle ilişkili diğer yatırımlar, bölgedeki ekonomik faaliyetlerin çeşitlenmesine ve hizmet altyapısının gelişmesine katkı sağlayabilmektedir. Bununla birlikte, turizm yatırımlarının bölgesel kalkınmaya kalıcı katkı sağlayabilmesi, yalnızca yatırım hacminin artırılmasına bağlı değildir. Yatırımların yerel ekonomik aktörlerle bağlantısının kurulması, yerel tedarik zincirlerinin geliştirilmesi ve turizm faaliyetlerinden elde edilen ekonomik değerin mümkün olduğunca destinasyon içerisinde tutulması önem taşımaktadır.

Bu çerçevede turizmin ekonomik katkısının sürdürülebilirliği, yerel işletmelerin ve üreticilerin turizm değer zincirine katılımıyla ilişkilidir. Yerel tedarik ağlarının geliştirilmesi ve küçük işletmelerin pazara erişiminin desteklenmesi, ekonomik faydaların bölge içinde daha geniş bir kesime ulaşmasına yardımcı olabilir (OECD, 2020). Buna karşılık turizme aşırı bağımlılık, talepteki daralmaların istihdam ve gelir üzerinde yoğunlaşmasına yol açabilir. Sektörün ekonomik ve jeopolitik belirsizliklere, krizlere ve aşırı hava olaylarına duyarlılığı, bölgesel kalkınma politikalarında ekonomik çeşitlendirme ve kriz hazırlığını gerekli kılmaktadır (OECD, 2026).

3.2. Turizmin Sosyal Kalkınmaya Katkısı

Turizm sektörü, ekonomik katkılarının yanı sıra istihdam yaratma, insan kaynaklarının geliştirilmesi, sosyal katılımın artırılması ve kültürlerarası etkileşimin güçlendirilmesi yoluyla sosyal kalkınma süreçlerine de katkı sağlayabilmektedir. Özellikle yerel iş gücünün turizm faaliyetlerine dâhil edilmesi, bölge halkının ekonomik yaşama katılımını artırırken bireylerin gelir elde etme ve mesleki deneyim kazanma olanaklarını da genişletebilmektedir. Bununla birlikte, turizm sektöründe istihdamın niteliği, gerekli beceriler, çalışma koşulları ve iş gücü piyasasında karşılaşılan yapısal sorunlar, turizmin sosyal sürdürülebilirliği açısından dikkate alınması gereken temel konular arasında yer almaktadır (OECD, 2024).

Turizmin bölgesel kalkınma üzerindeki etkileri yalnızca ekonomik göstergelerle sınırlı olmayıp, beşerî sermayenin ve sosyal kapasitenin geliştirilmesini de kapsamaktadır. Turizm faaliyetlerinin gelişmesiyle birlikte bölgedeki eğitim, mesleki eğitim ve beceri geliştirme olanaklarına yönelik talep artabilmekte ve bu durum yerel iş gücünün niteliğinin geliştirilmesine katkıda bulunabilmektedir. Özellikle konaklama, yiyecek-içecek, ulaştırma, rehberlik ve rekreasyon gibi alanlarda ortaya çıkan iş gücü ihtiyacı, bireylerin mesleki beceriler kazanmasına ve iş gücü piyasasına daha etkin biçimde katılmasına olanak sağlayabilmektedir.

Turizm sektörünün farklı eğitim düzeylerine ve mesleki becerilere sahip bireylere istihdam olanakları sunabilmesi, iş gücüne katılımın artırılması bakımından önem taşımaktadır. Bu durum özellikle kadınlar ve gençler açısından dikkat çekici bir potansiyel ortaya koymaktadır. Turizm işletmelerinde farklı nitelik ve uzmanlık düzeylerinde iş olanaklarının bulunması, bu grupların yerel iş gücü piyasasına dâhil olmalarını ve ekonomik yaşama daha aktif biçimde katılmalarını destekleyebilmektedir. Ancak bu katkının sürdürülebilir olabilmesi için istihdamın yalnızca niceliksel olarak artırılması değil, aynı zamanda çalışma koşullarının iyileştirilmesi, mesleki gelişim olanaklarının

artırılması ve çalışanların sosyal haklarının güvence altına alınması gerekmektedir. Bu nedenle kadınlar ve gençler için sağlanan fırsatlar, eşit ücret, kayıtlı çalışma ve mesleki ilerleme olanaklarıyla birlikte değerlendirilmelidir (OECD, 2024).

Turizm faaliyetleri, ekonomik ve istihdam boyutunun yanı sıra farklı toplumlar ve kültürler arasında sosyal ve kültürel etkileşim kurulmasına da olanak sağlamaktadır. Ziyaretçiler ile yerel halk arasındaki doğrudan etkileşim, farklı kültürlerin, yaşam biçimlerinin ve geleneklerin karşılıklı olarak tanınmasına katkıda bulunabilmektedir. Bu etkileşim, kültürel farkındalığın gelişmesini ve toplumlar arasındaki karşılıklı anlayışın güçlenmesini destekleyebilmektedir. Bununla birlikte, kültürel etkileşimin olumlu sonuçlar doğurabilmesi için yerel kültürel değerlerin korunması ve turizm faaliyetlerinin yerel toplumun sosyal ve kültürel yapısıyla uyumlu biçimde yürütülmesi önem taşımaktadır.

Öte yandan, turizm sektöründe istihdamın mevsimsel özellik göstermesi, düşük ücret düzeyleri, iş güvencesinin sınırlı olması ve çalışma koşullarına ilişkin sorunlar, turizmin sosyal sürdürülebilirliği açısından önemli riskler oluşturabilmektedir. Özellikle turizm faaliyetlerinin belirli dönemlerde yoğunlaşması, çalışanların yıl boyunca düzenli gelir elde etmesini güçleştirebilmektedir. Bu nedenle turizmin sosyal kalkınmaya sağladığı katkının değerlendirilmesinde yalnızca oluşturulan istihdamın sayısına değil, istihdamın niteliğine ve çalışanların sahip olduğu çalışma koşullarına da dikkat edilmesi gerekmektedir. Mesleki eğitimin iş gücü talebiyle eşleştirilmesi ve sezon dışı faaliyetlerin geliştirilmesi, bu risklerin azaltılmasına yönelik politika seçenekleridir (OECD, 2024).

3.3. Turizm, Kültürel Miras ve Bölgesel Kimlik

Turizm, yerel kültürel değerlerin, geleneklerin ve yerel ürünlerin tanıtılması ve ekonomik değer kazanması açısından önemli fırsatlar sunabilmektedir. Birleşmiş Milletler Sürdürülebilir Kalkınma Amaçları kapsamında sürdürülebilir turizmin yerel kültür ve ürünlerin desteklenmesine katkı sağlaması gerektiği vurgulanmaktadır (United Nations, t.y.). Bu bağlamda turizm, yalnızca ekonomik bir faaliyet alanı değil, aynı zamanda destinasyonların kültürel değerlerinin görünürlüğünü artıran ve bölgesel kimliğin güçlenmesine katkı sağlayan bir araç olarak değerlendirilmektedir.

Kültürel miras, birçok destinasyonun turizm çekiciliğini oluşturan temel unsurlardan biridir. Tarihî yapılar, arkeolojik alanlar, geleneksel mimari, gastronomi, el sanatları, festivaller ve yerel yaşam biçimleri gibi somut ve somut olmayan kültürel değerler, destinasyonların özgün karakterinin oluşmasında önemli rol oynamaktadır. Bu unsurlar, ziyaretçilerin destinasyona yönelik deneyimlerini zenginleştirirken yerel kültürün ulusal ve uluslararası düzeyde tanıtılmasına da olanak sağlamaktadır.

Turizm faaliyetlerinden elde edilen gelirler, kültürel mirasın korunması, bakımı ve restorasyonu için finansal kaynak oluşturabilmektedir. Tarihî yapıların ve kültürel alanların turizm faaliyetleri kapsamında değerlendirilmesi, bu varlıkların ekonomik ve sosyal işlevlerinin yeniden canlandırılmasına katkı sağlayabilmektedir. Ayrıca gastronomi turizmi, kültür turizmi ve yaratıcı turizm gibi alternatif turizm türleri, yerel kültürel değerlerin ekonomik bir unsura dönüşmesini ve yerel üreticilerin turizm değer zincirine katılmasını destekleyebilmektedir.

Bununla birlikte kültürel mirasın aşırı ticarileştirilmesi, kültürel özgünlüğün zayıflaması ve yoğun ziyaretçi baskısı gibi çeşitli riskler ortaya çıkabilmektedir. Bu nedenle sürdürülebilir kültürel turizm anlayışında kültürel mirasın korunması, yerel halkın karar alma süreçlerine katılımı ve turizm faaliyetleri ile kültürel değerlerin korunması arasında dengeli bir yaklaşım benimsenmesi önem taşımaktadır. Böylece turizm, bölgesel kimliğin korunmasına ve kültürel mirasın gelecek nesillere aktarılmasına katkı sağlayan sürdürülebilir bir kalkınma aracı olarak değerlendirilebilmektedir. Yerel toplulukların kültürel mirasın yönetimine ve ekonomik faydaların paylaşımına katılımı bu dengenin temel koşullarındandır (UNESCO, t.y.).

3.4. Turizm ve Altyapı Gelişimi

Turizm faaliyetlerinin gelişmesi, destinasyonlarda ulaşım, iletişim, konaklama, sağlık, güvenlik ve kamu hizmetleri gibi çeşitli alanlarda altyapı yatırımlarının artırılmasını teşvik edebilmektedir. Turizm talebindeki artış, ziyaretçilerin ihtiyaçlarının karşılanmasına yönelik altyapı kapasitesinin geliştirilmesini gerektirirken, gerçekleştirilen yatırımlar aynı zamanda yerel halkın yaşam koşullarının iyileştirilmesine de katkı sağlayabilmektedir.

Özellikle ulaşım altyapısının geliştirilmesi, destinasyonların erişilebilirliğini artırmakta ve turizm hareketliliğinin kolaylaşmasını sağlamaktadır. Bunun yanında gelişmiş ulaşım olanakları, yerel halkın eğitim, sağlık, istihdam ve

diğer sosyal hizmetlere erişimini de kolaylaştırabilmektedir. Benzer şekilde iletişim ve dijital altyapının geliştirilmesi, turizm işletmelerinin bilgiye erişimini ve rekabet gücünü artırırken, yerel toplumun iletişim ve dijital hizmetlerden yararlanma olanaklarını da genişletebilmektedir.

Bununla birlikte, turizm amacıyla gerçekleştirilen altyapı yatırımlarının planlanmasında yalnızca turist sayısındaki artışın dikkate alınması yeterli değildir. Yatırım kararlarında destinasyonun ekonomik, sosyal ve çevresel taşıma kapasitesi ile doğal kaynakların korunması ve yerel halkın ihtiyaçları birlikte değerlendirilmelidir. Plansız ve kontrolsüz altyapı gelişimi, doğal kaynaklar üzerinde baskı oluşturabileceği gibi mevcut kamu hizmetlerinin kapasitesini de zorlayabilmektedir. Bu nedenle altyapı yatırımlarının uzun vadeli, bütüncül ve sürdürülebilir bir planlama yaklaşımı çerçevesinde gerçekleştirilmesi, turizmin bölgesel kalkınmaya sağladığı katkının sürdürülebilir hâle getirilmesi açısından önem taşımaktadır. Kamu yatırımlarında sezonluk kullanım yoğunluğu, bakım ve işletme giderleri ile diğer kamu hizmetlerinden vazgeçmenin fırsat maliyeti de değerlendirilmelidir. Böylece yatırımın özel işletmelere sağladığı yarar ile bölge halkına sağladığı toplumsal fayda birlikte gözetilebilir.

3.5. Turizmin Çevresel Boyutu

Turizm faaliyetlerinin ekonomik ve sosyal katkılarının yanı sıra doğal çevre ve yerel topluluklar üzerinde oluşturabileceği olumsuz etkilerin de dikkate alınması gerekmektedir. Turizm talebinin yoğunlaşması, destinasyonların doğal kaynakları ve çevresel kapasitesi üzerinde çeşitli baskılar oluşturabilmektedir. OECD (2024), destinasyonların turizm talebini etkin biçimde yönetmesi, turizmin çevresel ve sosyal etkilerini dengelemesi ve sürdürülebilir turizm politikalarını geliştirmesi gerektiğine dikkat çekmektedir.

Turizm ve doğal çevre arasındaki ilişki karşılıklı bir nitelik taşımaktadır. Doğal alanlar, peyzaj özellikleri ve biyolojik çeşitlilik, birçok destinasyon açısından önemli turizm çekicilikleri oluştururken, yoğun ve plansız turizm faaliyetleri aynı kaynaklar üzerinde baskı yaratabilmektedir. Özellikle su tüketiminin artması, atık miktarının yükselmesi, enerji kullanımının yoğunlaşması, doğal alanların yapılaşmaya açılması ve biyolojik çeşitlilik üzerindeki baskılar, turizmin çevresel etkileri arasında değerlendirilmektedir. Bu nedenle turizm faaliyetlerinin planlanmasında destinasyonların doğal kaynakları ve ekolojik taşıma kapasitelerinin dikkate alınması önem taşımaktadır.

Bununla birlikte turizm, doğal çevrenin korunmasına yönelik ekonomik ve toplumsal teşviklerin oluşmasına da katkı sağlayabilmektedir. Milli parklar, korunan alanlar ve doğal güzelliklerin turizm açısından değer kazanması, bu alanların korunmasına yönelik farkındalığın artmasına ve koruma faaliyetleri için finansal kaynak oluşturulmasına katkıda bulunabilmektedir. Bu açıdan turizm faaliyetlerinin çevre üzerinde yalnızca baskı oluşturan bir unsur olarak değil, uygun planlama ve yönetim koşullarında doğal kaynakların korunmasını destekleyebilecek bir araç olarak da değerlendirilmesi mümkündür.

Sürdürülebilir turizm yaklaşımı kapsamında enerji ve su verimliliğinin artırılması, atıkların azaltılması ve etkin biçimde yönetilmesi, yenilenebilir enerji kaynaklarının kullanımının yaygınlaştırılması, çevre dostu ulaşım sistemlerinin geliştirilmesi ve ekolojik konaklama uygulamalarının desteklenmesi önem kazanmaktadır. Bu tür uygulamalar, turizm sektörünün doğal kaynaklar üzerindeki baskısının azaltılmasına ve çevresel etkilerinin kontrol altında tutulmasına katkı sağlayabilmektedir. Çevresel maliyetlerin dikkate alınmadığı bir gelir artışı, bölgesel refahın aynı ölçüde yükseldiğini göstermeyebilir. Su, enerji ve atık yönetimine ilişkin göstergelerin ekonomik göstergelerle birlikte izlenmesi, bu nedenle gereklidir (OECD, 2024).

3.6. Turizmin Bölgesel Rekabet Gücüne Katkısı

Bölgelerin rekabet gücü, sahip oldukları doğal, beşerî, ekonomik ve kültürel kaynakları sürdürülebilir biçimde ekonomik ve sosyal değere dönüştürebilme kapasiteleriyle yakından ilişkilidir. Turizm açısından destinasyonların rekabet gücünü belirleyen unsurlar yalnızca sahip olunan doğal ve kültürel kaynaklarla sınırlı değildir. Ulaşılabilirlik, turizm altyapısı, hizmet kalitesi, nitelikli insan kaynakları, teknolojik kapasite, destinasyon imajı ve kurumsal yapı da bölgesel rekabet gücünün önemli bileşenleri arasında yer almaktadır. Bu unsurların birbirleriyle uyumlu biçimde geliştirilmesi, destinasyonların değişen turist beklentilerine cevap verebilme kapasitesini artırabilmektedir.

Turizm destinasyonlarının markalaşması, bölgelerin ulusal ve uluslararası düzeyde tanınırlığının artırılmasına ve farklı destinasyonlar arasında özgün bir konum oluşturmasına katkı sağlayabilmektedir. Bölgesel marka oluşturma sürecinde yerel kültür, gastronomi, doğal kaynaklar, tarihî değerler ve özgün turizm deneyimleri önemli unsurlar olarak değerlendirilmektedir. Destinasyonun kendine özgü özelliklerinin etkili biçimde tanıtılması, ziyaretçilerin destinasyona yönelik farkındalığının ve ilgisinin artırılmasına katkıda bulunabilmektedir.

Bu nedenle destinasyon markalaşmasının yerel değerlerle uyumlu ve uzun vadeli bir strateji çerçevesinde ele alınması önem taşımaktadır.

Bölgesel rekabet gücü yalnızca turist sayısı veya ziyaretçi yoğunluğu üzerinden değerlendirilmemelidir. Hizmet kalitesi, iş gücü verimliliği, yerel işletmelerin katma değer yaratma kapasitesi ve kaynakların korunması da dikkate alınmalıdır. Düşük fiyatlara dayalı rekabet, gelir ve ücretleri baskılayabileceğinden, destinasyonların rekabet stratejisinin nitelikli hizmet ve yerel değer üretimiyle desteklenmesi önem taşımaktadır (OECD, 2024).

3.7. Kırsal Kalkınma ve Turizm

Kırsal kalkınma politikalarının temel hedefi, kırsal kesimde yaşayan nüfusun ekonomik ve sosyal refah düzeyinin yükseltilmesi ve buna bağlı olarak yaşam koşullarının iyileştirilmesidir. Bu doğrultuda, kırsal alanlarda istihdam olanaklarının çeşitlendirilmesi ve artırılması, beşerî sermayenin geliştirilmesi, yerel gelir kaynaklarının güçlendirilmesi ve kırsal ekonomiyi destekleyen faaliyetlerin teşvik edilmesi önemli unsurlar arasında yer almaktadır. Bunun yanı sıra, kırsal nüfusun yaşam kalitesinin yükseltilmesi, yerel düzeyde etkin örgütlenme yapılarının oluşturulması ve kalkınma süreçlerine farklı paydaşların katılımının sağlanması, sürdürülebilir bir kırsal kalkınma yaklaşımının temel bileşenlerini oluşturmaktadır.

Kırsal alanlarda ekonomik faaliyetlerin çeşitlendirilmesi, bölgesel kalkınmanın sürdürülebilirliği açısından önemli bir unsur olarak değerlendirilmektedir. Ekonomik faaliyetlerin büyük ölçüde tarım ve hayvancılığa dayandığı kırsal bölgelerde turizm, mevcut ekonomik faaliyetleri destekleyen ve alternatif gelir kaynaklarının oluşturulmasına katkı sağlayan bir sektör niteliği taşıyabilmektedir. Bu kapsamda kırsal turizm, tarım turizmi, ekoturizm, gastronomi turizmi ve doğa turizmi gibi turizm türleri, kırsal bölgelerin doğal, kültürel ve ekonomik potansiyelinin değerlendirilmesine olanak sağlayabilmektedir.

Kırsal turizm faaliyetlerinin gelişmesi, yerel üreticiler ile ziyaretçiler arasında doğrudan ekonomik ilişkilerin kurulmasını destekleyebilmektedir. Yerel gıda ürünleri, el sanatları, geleneksel üretim teknikleri ve yöresel ürünlerin turizm faaliyetlerine dâhil edilmesi, tarım sektörü ile turizm sektörü arasındaki bağlantıların güçlenmesine katkı sağlayabilmektedir. Böylece yerel üreticiler için yeni pazar olanakları ortaya çıkarken, turizm faaliyetlerinden elde edilen gelirlerin yerel ekonomide tutulması ve bölge içerisinde dolaşımının artırılması mümkün olabilmektedir.

Kırsal turizm ile göç arasındaki ilişki ise bölgenin ekonomik yapısı, istihdam olanakları ve turizm faaliyetlerinin sürekliliği gibi çeşitli faktörlere bağlı olarak değişebilmektedir. Turizmin yerel nüfusa düzenli gelir ve istihdam olanakları sunması, özellikle genç nüfusun bölge içerisinde ekonomik faaliyetlere katılımını destekleyerek göç baskısının azaltılmasına katkı sağlayabilmektedir. Ancak mevsimsel ve düşük nitelikli istihdamın hâkim olduğu turizm faaliyetlerinin göçü kalıcı olarak azaltacağı sonucuna ulaşmak mümkün değildir. Bu nedenle kırsal alanlarda turizmin göç üzerindeki olumlu etkilerinin güçlendirilmesi için süreklilik gösteren ekonomik faaliyetlerin, nitelikli istihdam olanaklarının ve yerel girişimciliğin desteklenmesi önem taşımaktadır.

Turizmin bölgesel eşitsizlikleri azaltma potansiyeli, yatırımların mekânsal dağılımına bağlıdır. Tosun, Timothy ve Öztürk (2003), Türkiye'de turizm teşvikleriyle görece gelişmiş kıyı bölgelerinde yoğunlaşan kitle turizmi yatırımlarının bölgeler ve toplumsal kesimler arasındaki eşitsizlikleri artırdığını belirtmektedir. Bu sonuç, turizmde büyüme ile dengeli bölgesel kalkınmanın aynı süreç olmadığını göstermektedir. Kırsal turizm politikalarının bu nedenle yerel üretim bağlantıları, erişilebilirlik ve küçük işletmelerin pazara katılımıyla desteklenmesi gerekmektedir.

4. TURİZMİN BÖLGESEL KALKINMADAKİ STRATEJİK ROLÜ

Turizmin bölgesel kalkınmadaki stratejik rolü, sektörün farklı politika alanlarıyla kurduğu güçlü ve çok boyutlu ilişkiden kaynaklanmaktadır. Ulaştırma, altyapı, çevre, kültür, istihdam ve bölgesel kalkınma politikalarının turizm politikalarıyla koordineli biçimde yürütülmesi, turizmin bölgesel düzeyde yaratabileceği ekonomik ve sosyal faydaların artırılmasına katkı sağlayabilir (OECD, 2024). Bu açıdan turizm, yalnızca ekonomik büyümeyi destekleyen bir sektör değil, aynı zamanda farklı politika alanlarını ortak bir kalkınma hedefi etrafında bir araya getirebilen stratejik bir araç olarak değerlendirilebilir.

Bu doğrultuda turizm politikalarının, bölgenin genel kalkınma hedefleriyle bütünleştirilmesi önem taşımaktadır. Bölgenin sahip olduğu doğal, kültürel ve beşerî kaynakların belirlenmesi, mevcut turizm potansiyelinin değerlendirilmesi, bölgesel ihtiyaç ve önceliklerin dikkate alınması, yerel aktörlerin karar alma süreçlerine katılımının sağlanması ve sürdürülebilirlik ilkelerinin politika tasarımına dâhil edilmesi bu bütünleşik yaklaşımın

temel unsurlarını oluşturmaktadır. Böyle bir yaklaşım, turizmin yalnızca ziyaretçi ve gelir artışı üzerinden değil, bölgesel refah, istihdam, yaşam kalitesi ve kaynakların korunması gibi daha geniş kalkınma hedefleri çerçevesinde değerlendirilmesine olanak sağlayabilir. Uygulamada yerel tedarik ağları ve üretici kooperatifleri desteklenebilir; mesleki eğitim, sezon dışı turizm faaliyetleri ve çevresel altyapı yatırımları birlikte planlanabilir. Teşviklerin yalnızca yatak kapasitesi artışına değil, yerel katma değer, kayıtlı istihdam ve kaynak verimliliği hedeflerine bağlanması, kalkınma amaçlarıyla uyumu güçlendirebilir.

Turizmin bölgesel kalkınma açısından stratejik bir araç olarak değerlendirilebilmesi, yalnızca turizm sektöründe faaliyet gösteren aktörlerin çabalarıyla sınırlı olmayıp, farklı paydaşlar arasındaki iş birliği ve koordinasyonun geliştirilmesini de gerektirmektedir. Bu bağlamda kamu kurumları, yerel yönetimler, özel sektör temsilcileri, sivil toplum kuruluşları, üniversiteler ve yerel halkın turizm planlama ve uygulama süreçlerine dâhil edilmesi, bölgesel turizm politikalarının yerel ihtiyaçlar ve mevcut kapasitelere uygun biçimde şekillendirilmesine katkı sağlayabilmektedir. Aynı zamanda farklı paydaşların sahip olduğu bilgi, deneyim ve kaynakların ortak bir süreç içerisinde bir araya getirilmesi, sürdürülebilirlik hedeflerinin bölgesel düzeyde uygulanabilirliğini güçlendirebilmektedir. Bu nedenle bölgesel turizm politikalarının etkinliği, yalnızca sektörel faaliyetlerin başarısına değil, aynı zamanda kamu, özel sektör ve toplum arasında oluşturulan yönetişim, koordinasyon ve iş birliği mekanizmalarının niteliğine de bağlıdır (OECD, 2024; UNEP ve UNWTO, 2005).

5. TURİZMİN SÜRDÜRÜLEBİLİR BÖLGESEL KALKINMA AÇISINDAN DEĞERLENDİRİLMESİ

Turizm ile sürdürülebilir bölgesel kalkınma arasındaki ilişki, ekonomik, sosyal, kültürel ve çevresel boyutların birlikte değerlendirilmesini gerektirmektedir. Önceki bölümlerde ele alınan gelir, istihdam, altyapı ve miras koruma olanakları, yerel ekonomik bağlantılar ve katılımcı yönetim yoluyla bölgesel refaha dönüşebilir. Ancak bu dönüşümün değerlendirilmesinde faydaların kimlere ulaştığı, kamu kaynaklarının nasıl kullanıldığı ve çevresel maliyetlerin kimler tarafından üstlenildiği de önem taşımaktadır (OECD, 2021; UNESCO, t.y.).

Bununla birlikte, turizmin sürdürülebilir bölgesel kalkınmaya sağlayabileceği katkılar kendiliğinden ortaya çıkmamaktadır. Bu katkıların düzeyi; turizm faaliyetlerinin nasıl planlandığı ve yönetildiği, yerel halkın karar alma süreçlerine ne ölçüde katıldığı, turizmden elde edilen ekonomik faydaların bölge içerisinde nasıl dağıldığı, çevresel yönetim kapasitesi ve destinasyonun taşıma kapasitesi gibi çeşitli faktörlere bağlıdır. Kontrolsüz ve yoğun turizm faaliyetleri, doğal kaynaklar üzerindeki baskının artmasına, çevresel bozulmaya, kültürel değerlerin ticarileşmesine ve ekonomik faydaların belirli aktörlerde yoğunlaşmasına neden olabileceğinden, turizmin kalkınma aracı olarak değerlendirilmesinde bu risklerin de dikkate alınması gerekmektedir. Ayrıca kapasitenin kısa dönemde sınırlı olduğu destinasyonlarda yoğun talep, konut ve yerel hizmetler üzerinde fiyat baskısı yaratabilir. Bu nedenle nominal turizm gelirindeki artışın yerel halkın satın alma gücü ve hizmetlere erişimi üzerindeki etkileri ayrıca izlenmelidir (OECD, 2024).

Bu çerçevede sürdürülebilir bölgesel turizm politikalarında yalnızca turist sayısındaki artışa dayalı niceliksel büyüme anlayışı yerine, ekonomik, sosyal, kültürel ve çevresel boyutları birlikte gözeten nitelikli ve dengeli bir gelişme yaklaşımının benimsenmesi önem taşımaktadır. Turist sayısı ve turizm gelirlerinin yanı sıra ziyaretçi başına yaratılan ekonomik değer, yerel işletmelerin turizm gelirlerinden aldığı pay, istihdamın niteliği ve sürekliliği, doğal ve kültürel kaynakların korunma düzeyi, kaynak kullanımının sürdürülebilirliği ve yerel halkın turizm faaliyetlerine yönelik tutumu gibi göstergelerin de değerlendirme süreçlerine dâhil edilmesi gerekmektedir. Bu göstergeler, yerel yönetimler ve ilgili kurumlar arasında düzenli veri paylaşımıyla izlenmeli; nominal gelir artışları fiyat değişimlerinden arındırılarak yorumlanmalıdır. Önerilen göstergeler bu çalışmada hesaplanmış bir endeks veya ampirik bulgu değil, politika izleme çerçevesinin bileşenleridir (OECD, 2024).

6. SONUÇ VE DEĞERLENDİRME

Bu kavramsal değerlendirme, turizmin sahip olduğu çok boyutlu ekonomik, sosyal, kültürel ve çevresel bağlantılar nedeniyle sürdürülebilir bölgesel kalkınma sürecinde önemli bir araç olabileceğine işaret etmektedir. Sektörün doğrudan ve dolaylı istihdam yaratma kapasitesi, yerel gelirleri artırması, girişimcilik faaliyetlerini desteklemesi ve farklı sektörler arasında ekonomik bağlantılar oluşturması, turizmin bölgesel ekonomik kalkınma açısından taşıdığı potansiyeli ortaya koymaktadır. Bununla birlikte turizmin bölgesel kalkınmaya sağladığı katkının yalnızca turizm sektöründeki büyüme göstergeleri üzerinden değerlendirilmemesi, bu katkının bölgesel refah ve yaşam kalitesi üzerindeki etkilerinin de dikkate alınması gerekmektedir.

Özellikle kırsal bölgelerde turizm faaliyetlerinin geliştirilmesi, yerel ürün, hizmet ve üreticilerin turizm değer zincirine dâhil edilmesine olanak sağlayabilir. Bunun kalıcı kalkınma katkısına dönüşmesi, turizm harcamalarının

yerel katma değer yaratmasına, gelir sızıntılarının azaltılmasına ve mevsimsel istihdamın daha düzenli gelir olanaklarıyla desteklenmesine bağlıdır. Turizme aşırı bağımlılık ise dış talep daralmalarının bölgesel ekonomi üzerindeki etkisini güçlendirebilir.

Bununla birlikte turizmin bölgesel kalkınma üzerindeki etkileri her koşulda olumlu sonuçlar doğurmamaktadır. Kontrolsüz ve plansız turizm gelişimi; doğal kaynakların aşırı kullanımı, çevresel bozulma, kültürel değerlerin aşırı ticarileştirilmesi, altyapı üzerindeki baskının artması ve turizmden elde edilen ekonomik faydaların belirli aktörlerde yoğunlaşması gibi sorunlara yol açabilmektedir. Bu nedenle turizmin bölgesel kalkınma açısından stratejik bir araç olarak kullanılabilmesi, sektörün ekonomik getirileri ile sosyal, kültürel ve çevresel etkilerinin birlikte değerlendirilmesini ve sürdürülebilirlik ilkelerinin planlama ve uygulama süreçlerine sistematik biçimde dâhil edilmesini gerektirmektedir.

Bu çerçevede turizmin sürdürülebilir bölgesel kalkınmaya katkısının artırılması için yerel aktörlerin karar alma süreçlerine etkin biçimde katılımının sağlanması, yerel girişimciliğin ve küçük işletmelerin desteklenmesi, doğal ve kültürel kaynakların korunması, turizm gelirlerinin bölge içerisinde daha dengeli dağılmasını sağlayacak mekanizmaların geliştirilmesi ve uzun vadeli bölgesel planlama anlayışının benimsenmesi önem taşımaktadır. Aynı zamanda turizm politikalarının uygulanmasında kamu kurumları, yerel yönetimler, özel sektör, sivil toplum kuruluşları, üniversiteler ve yerel toplum arasındaki iş birliğinin güçlendirilmesi, bölgesel turizm politikalarının etkinliğini artırabilecek unsurlardan biridir.

Çalışmanın temel değerlendirmesi, turizmin sürdürülebilir bölgesel kalkınmadaki stratejik rolünün ziyaretçi artışından çok yerel üretim kapasitesi, kapsayıcı gelir paylaşımı ve kaynakların korunmasıyla belirlendiğidir. Bununla birlikte çalışma, literatüre dayalı kavramsal bir değerlendirme olduğundan etkilerin büyüklüğünü ölçmemekte ve nedensellik ortaya koymamaktadır. Gelecek araştırmalarda bölgeler arası karşılaştırmalar, bölgesel girdi-çıktı analizleri ve istihdam ile çevresel göstergelerin birlikte incelenmesi, burada tartışılan mekanizmaların ampirik olarak değerlendirilmesine katkı sağlayabilir.

KAYNAKÇA

Butler, R. W. (1999). Sustainable tourism: A state-of-the-art review. Tourism Geographies, 1(1), 7–25. https://doi.org/10.1080/14616689908721291

Çeken, H. (2008). Turizmin bölgesel kalkınmaya etkisi üzerine teorik bir inceleme. Afyon Kocatepe Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi, 10(2), 293–306. https://dergipark.org.tr/tr/pub/akuiibfd/article/20411

Kavaklı, E. ve Karakaş, A. (2022). Turizmin bölgesel kalkınmaya etkisi üzerine bir inceleme. Bartın Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi, 13(25), 37–50. https://doi.org/10.47129/bartiniibf.1062723

OECD. (2020). OECD Tourism Trends and Policies 2020. OECD Publishing. https://doi.org/10.1787/6b47b985-en

OECD. (2021). Managing tourism development for sustainable and inclusive recovery. OECD Tourism Papers, 2021/01. OECD Publishing. https://doi.org/10.1787/b062f603-en

OECD. (2024). OECD Tourism Trends and Policies 2024. OECD Publishing. https://doi.org/10.1787/80885d8b-en

OECD. (2026). OECD Tourism Trends and Policies 2026. OECD Publishing. https://doi.org/10.1787/3fd3cd75-en

Tekin, A. (2011). Küreselleşen dünyada bölgesel kalkınma dinamikleri, kamu politikaları ve bölgesel kalkınma ajansları. Dumlupınar Üniversitesi Sosyal Bilimler Dergisi, 29, 37–48. https://dergipark.org.tr/tr/download/article-file/55671

Tıraş, H. H. (2012). Sürdürülebilir kalkınma ve çevre: Teorik bir inceleme. Kahramanmaraş Sütçü İmam Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi, 2(2), 57–73. https://dergipark.org.tr/tr/pub/ksuiibf/article/125901

Tosun, C., Timothy, D. J. ve Öztürk, Y. (2003). Tourism growth, national development and regional inequality in Turkey. Journal of Sustainable Tourism, 11(2–3), 133–161. https://doi.org/10.1080/09669580308667200

UNESCO. (t.y.). Guide 4: Engaging local communities and businesses. World Heritage Sustainable Tourism Toolkit. https://whc.unesco.org/en/sustainabletourismtoolkit/guide4/ (Erişim tarihi: 7 Ekim 2026).

United Nations. (t.y.). Sustainable tourism. Department of Economic and Social Affairs. https://sdgs.un.org/topics/sustainable-tourism (Erişim tarihi: 7 Ekim 2026).

United Nations, Commission of the European Communities, OECD ve UNWTO. (2010). Tourism Satellite Account: Recommended Methodological Framework 2008. United Nations. https://unstats.un.org/unsd/publication/seriesf/seriesf_80rev1e.pdf

United Nations Environment Programme (UNEP) ve World Tourism Organization (UNWTO). (2005). Making tourism more sustainable: A guide for policy makers. UNEP ve UNWTO. https://www.unep.org/resources/report/making-tourism-more-sustainable-guide-policy-makers

World Commission on Environment and Development (WCED). (1987). Our common future. United Nations, A/42/427. https://sdgs.un.org/sites/default/files/documents/5987our-common-future.pdf

Almanya'da Gençlik ve İsyan: Alman Çocuk ve Gençlik Yazınında Başkaldırı Örnekleri

Prof. Dr. Hikmet ASUTAY[1]

[1] Trakya Üniversitesi Eğitim Fakültesi Yabancı Diller Eğt. Bl. Alman Dili Eğitimi, Edirne, E-Posta: asutay@trakya.edu.tr, ORCİD ID: 0000-0002-0175-2429

Özet: Gençlik, modern toplumlarda yalnızca biyolojik ve psikolojik bir geçiş evresi değil, aynı zamanda toplumsal normların, otorite biçimlerinin ve yerleşik değer sistemlerinin sorgulanabildiği kültürel bir alan olarak değerlendirilmektedir. Bu nedenle isyan, başkaldırı, direnç ve devrim kavramları çocuk ve gençlik edebiyatının tarihsel gelişimi içerisinde önemli bir yer edinmiştir. Özellikle Alman çocuk ve gençlik edebiyatında bireyin aile, okul, siyasal iktidar ve toplumsal normlarla çatışması farklı dönemlerde farklı anlatı biçimleriyle işlenmiştir. Bu çalışmada *kjl&m – Kinder-/Jugendliteratur und Medien in Forschung, Schule und Bibliothek* dergisinin 2019 yılında yayımlanan "Die gelesene Revolution. Kinder- und Jugendliteratur in revolutionären Kontexten" başlıklı 19.1 sayısında yer alan çalışmalar bütüncül biçimde incelenmektedir. Jana Mikota'nın 1918 Alman Devrimi'nin çocuk ve gençlik edebiyatındaki temsillerine ilişkin araştırmasından başlayarak Wiebke Helm'in Fransız Devrimi'nin DDR çocuk kitaplarındaki sunumuna, Sabine Planka'nın Christine Nöstlinger'in *Wir pfeifen auf den Gurkenkönig* romanındaki aile içi başkaldırı çözümlemesine, Johannes Mayer'in GRIPS çocuk tiyatrosundaki antiotoriter ve özgürleştirici yapılara, Beate Zekorn-von Bebenburg'un *Struwwelpeter* figüründeki isyan motifine ve Manuela Kalbermatten'in feminist gelecek kurgularındaki devrimci özne tartışmasına kadar uzanan farklı yaklaşımlar karşılaştırmalı olarak ele alınmaktadır. İnceleme sonucunda Alman çocuk ve gençlik yazınında isyanın yalnızca siyasal devrim biçiminde değil; aile otoritesine direnme, kuşak çatışması, bireysel özerklik talebi, toplumsal normlardan sapma, kolektif eylem, feminist başkaldırı ve ütopyacı toplumsal dönüşüm biçimlerinde de temsil edildiği görülmektedir.

Anahtar Kelimeler: Alman gençlik edebiyatı, gençlik, isyan, başkaldırı, devrim, direnç, otorite, çocuk ve gençlik edebiyatı

Youth and Rebellion in Germany: Examples of Rebellion in German Children's and Young Adult Literature

Abstract: In modern societies, youth is evaluated not merely as a biological and psychological transition phase, but also as a cultural domain where social norms, forms of authority, and established value systems can be questioned. Consequently, concepts such as rebellion, defiance, resistance, and revolution have occupied a significant place in the historical development of children's and young adult literature. Particularly in German children's and young adult literature, the individual's conflict with the family, school, political power, and societal norms has been addressed through various narrative forms across different periods. This study comprehensively examines the articles published in the 2019 issue (No. 19.1) of the journal kjl&m – Kinder-/Jugendliteratur und Medien in Forschung, Schule und Bibliothek, titled "Die gelesene Revolution. Kinder- und Jugendliteratur in revolutionären Kontexten". A comparative analysis is conducted on diverse approaches, ranging from Jana Mikota's research on representations of the 1918 German Revolution in children's and young adult literature, to Wiebke Helm's presentation of the French Revolution in East German (GDR) children's books, Sabine Planka's analysis of domestic rebellion in Christine Nöstlinger's novel Wir pfeifen auf den Gurkenkönig, Johannes Mayer's exploration of anti-authoritarian and emancipatory structures in GRIPS children's theater, Beate Zekorn-von Bebenburg's examination of the rebellion motif in the figure of Struwwelpeter, and Manuela Kalbermatten's discussion on the revolutionary subject in feminist future fictions. As a result of this study, it is observed that rebellion in German children's and young adult literature is represented not only as political revolution, but also in the forms of resistance to familial authority, generational conflict, demand for individual autonomy, deviation from societal norms, collective action, feminist defiance, and utopian social transformation.

Keywords: German Literature, Young adult literature, rebellion, revolution, authority.

GİRİŞ

Gençlik ve isyan arasındaki ilişki yazın, sosyoloji ve kültür tarihi açısından birbirinden bağımsız düşünülemeyecek iki olgu olarak ortaya çıkmaktadır. Gençlik dönemi bireyin yalnızca çocukluktan yetişkinliğe geçtiği bir gelişim aşaması değildir. Aynı zamanda aile, okul, toplum ve siyasal sistem tarafından belirlenen değerlerin sorgulanmaya başlandığı, kişinin kendi öznel konumunu oluşturmaya yöneldiği bir dönemdir. Bu bağlamda "isyan" kavramı yalnızca doğrudan siyasal devrim ya da şiddet içeren kolektif ayaklanma anlamında değil, mevcut otorite yapılarını sorgulama, onlara karşı direnme ve alternatif yaşam biçimleri geliştirme anlamlarında da kullanılabilir. Alman çocuk ve gençlik yazını tarihine bakıldığında bu ilişkinin farklı tarihsel koşullar altında yeniden üretildiği görülmektedir. 1848 Devrimi, 1918–1919 Alman Devrimi, iki dünya savaşı arasındaki siyasal çatışmalar, Nazi dönemi ve savaş sonrası Almanya, 1968 öğrenci hareketi, DDR deneyimi,

feminist hareketler ve çağdaş toplumsal protestolar çocuk ve gençlik edebiyatının hem içerik hem de estetik yapılanmasını etkilemiştir.

kjl&m (Kinder- Jugendliteratur und Medien) başlıklı çocuk- gençlik yazını ve medyaları dergisinin 2019 tarihli 19.1 sayısı ağırlıklı tema olarak bu konuya ayrılmıştır. Sayının "Die gelesene Revolution" başlığı taşıması, devrimi yalnızca tarihsel bir olay olarak değil, çocuk ve gençlik yazını aracılığıyla okunan, yeniden anlatılan ve kuşaklar arasında aktarılan kültürel bir olgu olarak ele aldığını göstermektedir. Derginin editoryal yaklaşımında da 1789 Fransız Devrimi'nden 1848'e, 1918'e, 1968'e, Nikaragua ve Çin devrimlerine kadar farklı tarihsel örneklerin çocuk ve gençlik yazınındaki karşılıklarının incelendiği görülmektedir.

Bu bildirinin amacı söz konusu çalışmalardan hareketle Alman çocuk ve gençlik edebiyatında Jugend–Rebellion–Revolution–Widerstand–Autonomie ekseninde şekillenen temel eğilimleri ortaya koymaktır.

GENÇLİK, DEVRİM VE KÜLTÜREL BELLEK

Çocuk ve gençlik yazınında devrim olgusunun önemli işlevlerinden biri tarihsel belleğin genç kuşaklara aktarılmasıdır. Bununla birlikte bu aktarımın hiçbir zaman tamamen tarafsız olmadığı görülmektedir. Devrimlerin yazınsal temsili, yazıldığı dönemin siyasal ve eğitsel anlayışlarından etkilenmektedir.

Jana Mikota, "Das Jahr 1918 in der Kinder- und Jugendliteratur oder: Wie Nesthäkchen einen Schülerrat gründen wollte" başlıklı çalışmasında 1918–1919 Alman Devrimi'nin farklı dönemlerde yayımlanmış çocuk ve gençlik kitaplarında nasıl anlatıldığını incelemektedir. Mikota'ya göre çocuk ve gençlik yazınında 1918 devriminin temsilleri homojen değildir; Weimar Cumhuriyeti, DDR[7] ve savaş sonrası Federal Almanya'daki metinler aynı tarihsel olayı farklı ideolojik perspektiflerden sunmaktadır (Mikota, 2019). Mikota'nın dikkat çektiği önemli noktalardan biri, devrim kavramının genç okura doğrudan siyasal teori aracılığıyla değil, çoğu zaman çocuk karakterlerin gündelik yaşamı üzerinden aktarılmasıdır. Else Ury'nin *Nesthäkchen* dizisinde örneğin okul ortamındaki değişiklikler, öğrenci temsilciliği ve "Schülerrat" düşüncesi siyasal devrimin çocuk dünyasındaki küçük ölçekli karşılıkları hâline gelmektedir. Böylelikle devlet ölçeğindeki siyasal dönüşüm, okul ve aile gibi genç bireyin doğrudan deneyimlediği toplumsal yapılara aktarılmaktadır (Mikota, 2019).

Mikota ayrıca sosyalist çocuk ve gençlik yazınında devrimci anlatının daha belirgin bir sınıfsal perspektife sahip olduğunu göstermektedir. İşçiler, Spartakistler, Karl Liebknecht ve Rosa Luxemburg gibi tarihsel figürler bu metinlerde devrimci mücadele çerçevesine yerleştirilmektedir. Buna karşılık burjuva çocuk yazınında devrim daha çok gündelik yaşamdaki düzensizlik, kuşaklar arası gerilim ya da toplumsal belirsizlik üzerinden görünür hâle gelmektedir (Mikota, 2019). Dolayısıyla Alman gençlik yazınında isyanın önemli biçimlerinden biri tarihsel olayın çocuk perspektifinden yeniden kodlanmasıdır.

SİYASAL DEVRİMİN GENÇ OKURA AKTARILMASI: FRANSIZ DEVRİMİ ÖRNEĞİ

Wiebke Helm'in "'Zur Bastille!' – Die Französische Revolution von 1789 im Kinder- und Jugendbuch der DDR" başlıklı çalışması devrim anlatısının ideolojik ve pedagojik işlevini daha açık biçimde ortaya koymaktadır. Helm, Fransız Devrimi'nin özellikle DDR çocuk ve gençlik yazınındaki temsillerini inceleyerek, tarihsel anlatının sosyalist devletin siyasal eğitim anlayışıyla nasıl ilişkilendiğini göstermektedir (Helm, 2019). Fransız Devrimi burada yalnızca geçmişte gerçekleşmiş bir siyasal dönüşüm değildir. Feodal düzenin çözülmesi, sınıfsal eşitsizliklerin sorgulanması ve ezilen kesimlerin siyasal özne hâline gelmesi üzerinden genç okura tarihsel ilerleme düşüncesi aktarılmaktadır. Böyle bir anlatıda genç kahraman çoğu zaman tarihsel olayları yalnızca izleyen bir figür olmaktan çıkar. Tarihin içindeki değişimi gözlemleyen, mevcut hiyerarşileri sorgulayan ve yeni toplumsal değerlerle karşılaşan bir özne hâline gelir. Helm'in çalışması, devrim kavramının çocuk ve gençlik yazınında iki ayrı düzlemde işlediğini ortaya koymaktadır: Birincisi gerçek tarihsel devrimin anlatılması, ikincisi ise genç okurun düşünsel olarak mevcut toplumsal düzeni sorgulamaya yöneltilmesidir (Helm, 2019).

AİLE İÇİNDE DEVRİM: CHRİSTİNE NÖSTLİNGER VE OTORİTEYE BAŞKALDIRI

Dergideki çalışmalar arasında "gençlik ve isyan" ilişkisini doğrudan gündelik yaşam ve aile bağlamında ele alan en önemli metin Sabine Planka'nın *Christine Nöstlinger* üzerine yaptığı incelemedir, denebilir. Planka,

[7] DDR: Deutsche Demokratische Republik: (eski) Doğu Alman Cumhuriyeti. Bu çalışmada kısaltma olarak kullanılacaktır.

"'Wir ist nicht ihres Kammerdiener!' Revolutionen im Hause Hogelmann in Christine Nöstlingers *Wir pfeifen auf den Gurkenkönig*" başlıklı makalesinde devrim kavramının siyasal düzeyden aile mikrokozmosuna aktarılabileceğini göstermektedir (Planka, 2019). Nöstlinger'in romanında otorite yalnızca devlet ya da siyasal sistem tarafından temsil edilmez. Baba figürü, geleneksel aile yapısındaki hiyerarşik iktidarın temsilcisidir. Çocukların bu otoriteye itiraz etmeleri ise bir tür gündelik yaşam devrimine dönüşmektedir. Planka özellikle *"Widerstand, Rebellion und Autonomie des Kindes"* kavramlarını ön plana çıkarmaktadır. Çocuğun kendi kararlarını verebilmesi, yetişkin otoritesini sorgulaması ve aile içindeki iktidar ilişkilerine karşı çıkabilmesi modern çocuk ve gençlik yazınının önemli özellikleri arasındadır (Planka, 2019). Bu çerçevede devrim artık büyük siyasal sistemlerin değişmesi anlamına gelmemektedir. Çocuğun aile içerisindeki söz hakkının genişlemesi de devrimci bir süreç olarak okunabilmektedir. Nöstlinger'in metninde çocuklar, kendilerinden koşulsuz itaat bekleyen otoriter baba modelini kabullenmezler. Böylece başkaldırı:

itaat → sorgulama → direnç → özerklik

şeklinde gelişen bir süreç olarak ortaya çıkmaktadır. Planka'nın çözümlemesi, 1960'ların sonu ve 1970'lerde Almanca çocuk ve gençlik yazınında güçlenen antiotoriter yaklaşım açısından önemlidir. Çocuk artık eğitilmesi ve disipline edilmesi gereken edilgen bir nesne değil; kendi hakları, düşünceleri ve çıkarları bulunan toplumsal bir aktördür (Planka, 2019).

1968. SONRASI ÇOCUK TİYATROSUNDA BAŞKALDIRI: GRIPS

Johannes Mayer'in "Die Bühne als Ort konkreter Utopie am Beispiel von GRIPS" başlıklı çalışması, çocuk yazınındaki başkaldırı temasını tiyatro bağlamına taşımaktadır. Berlin'de gelişen GRIPS tiyatrosu, 1960'ların sonundaki toplumsal dönüşüm ve 1968 öğrenci hareketinin kültürel ortamıyla doğrudan ilişkilidir. Mayer'e göre bu tiyatro anlayışı çocuklara mevcut gerçekliği olduğu gibi kabul etmelerini öğretmek yerine, toplumsal koşulların değiştirilebilir olduğunu göstermeyi hedeflemektedir (Mayer, 2019). GRIPS tiyatrosundaki çocuk figürleri çoğu zaman yetişkinlerin kurduğu düzenle çatışmaktadır. Okul, aile, tüketim toplumu ve gündelik yaşamın hiyerarşik ilişkileri eleştiriye açılmaktadır. Bu anlamda sahne bir "*konkrete Utopie*", yani somut ütopya alanı hâline gelmektedir (Mayer, 2019). Çocuk ve genç seyirciye verilen temel mesaj mevcut koşulların zorunlu olmadığıdır. İnsanlar içinde bulundukları toplumsal yapıları değiştirebilirler. Bu yaklaşım 1970'lerin Alman çocuk ve gençlik yazınındaki genel dönüşümle de örtüşmektedir. Geleneksel çocuk yazınının uyum sağlayan ve kurallara itaat eden çocuk figürünün yerini giderek eleştiren, soru soran ve kolektif biçimde hareket edebilen çocuk karakter almaktadır. Dolayısıyla Mayer'in çalışması açısından isyan, yalnızca "karşı çıkmak" değildir. İsyan aynı zamanda alternatif toplumsal ilişkileri tahayyül edebilme kapasitesidir.

İSYANKÂR ÇOCUK FİGÜRÜNÜN TARİHSEL KÖKLERİ: STRUWWELPETER

Beate Zekorn-von Bebenburg'un "Struwwelpeter als Rebell. Heinrich Hoffmanns Bilderbuch im Kontext der Revolution von 1848" başlıklı çalışması Alman çocuk yazınındaki isyan figürünün tarihsel kökenlerini 19. yüzyıla kadar götürmektedir. "*Struwwelpeter"* uzun süre çocuklara kurallara uymamanın sonuçlarını gösteren didaktik bir metin olarak değerlendirilmiştir. Ancak Zekorn-von Bebenburg, eseri 1848 devrimci hareketinin siyasal ve kültürel bağlamına yerleştirerek farklı bir okuma önermektedir (Zekorn-von Bebenburg, 2019).

Struwwelpeter'in taranmamış saçları, kesilmemiş tırnakları ve toplumsal görünüş normlarına uymayan bedeni onu daha ilk bakışta normatif toplum düzeninin dışında konumlandırmaktadır. Bu açıdan bedenin kendisi bir direnç alanına dönüşmektedir. Yazarın çözümlemesinde Hoffmann'ın siyasal karikatürleri ve 1848 Devrimi'yle ilişkisi de önem kazanmaktadır. Struwwelpeter böylelikle sadece "yaramaz çocuk" değil, mevcut toplumsal düzenin taleplerine uyum göstermeyen bir figür olarak okunabilmektedir (Zekorn-von Bebenburg, 2019). Buradaki isyan türü büyük ölçüde semboliktir:

beden → norm ihlali → bireysellik → toplumsal direnç.

Bu yaklaşım Alman gençlik yazınında asi genç tipinin köklerinin 20. yüzyılla sınırlı olmadığını göstermektedir.

DİRENÇ İMGELERİ VE POPÜLER KÜLTÜR

Peter Rinnerthaler'in "*Widerspenstige Bilder. Bildästhetische Repräsentationen von Revolution in Bilderbuch, Comic und Graphic Novel*" başlıklı çalışması isyan ve devrim temasını görsel kültür üzerinden değerlendirmektedir. Rinnerthaler'in temel sorularından biri devrimin çağdaş çocuk ve gençlik kültüründe hangi

imgeler aracılığıyla görünür kılındığıdır (Rinnerthaler, 2019). Çalışmada *Bella Ciao*, *V for Vendetta*, Guy Fawkes maskesi ve Pippi Langstrumpf gibi çok farklı kültürel göstergeler direnç ve devrim bağlamında birlikte düşünülmektedir.

Bu noktada önemli olan, devrim sembollerinin tarihsel bağlamlarından koparak popüler kültür içerisinde yeni anlamlar kazanmasıdır. Örneğin *Guy Fawkes* maskesi tarihsel kökeninden farklılaşarak çağdaş protesto hareketlerinde genel bir iktidar karşıtlığı sembolüne dönüşmektedir. Benzer biçimde *Pippi Langstrumpf* doğrudan siyasal devrimci bir karakter olmamasına rağmen yetişkin otoritesini, toplumsal cinsiyet normlarını ve geleneksel çocukluk anlayışını bozan yapısı nedeniyle kültürel bir direnç figürü olarak okunabilmektedir (Rinnerthaler, 2019). Rinnerthaler'in değerlendirmesi, günümüz gençlik kültüründeki isyanın giderek *görsel ve medyatik* bir özellik kazandığını düşündürmektedir.

DEVRİMİN KÜRESEL VE İDEOLOJİK BOYUTU: ÇİN ÖRNEĞİ

Lucia Obi'nin "*Bildgeschichten im Dienst der chinesischen Revolution*" başlıklı çalışması doğrudan Alman gençlik yazınına odaklanmamakla birlikte, devrim ile çocuk-gençlik yazını arasındaki ilişkinin ideolojik boyutunu anlamak açısından sayı içerisinde karşılaştırmalı bir işlev üstlenmektedir. Obi, Çin'deki *Lianhuanhua* resimli öykülerinin devrimci ideolojinin genç kuşaklara aktarılmasındaki rolünü incelemektedir (Obi, 2019). Çocuk kahramanlar kimi anlatılarda asker, direnişçi, haberci, devrimci öğrenci ya da kolektif mücadeleye katılan örnek bireyler olarak sunulmaktadır. Böylelikle çocukluk, siyasal ideolojinin dışında kalan masum ve apolitik bir alan olmaktan çıkarılmaktadır. Ancak burada Alman çocuk yazınındaki antiotoriter çizgiden farklı bir durum bulunmaktadır. Nöstlinger ya da GRIPS örneklerinde genç bireyin otorite karşısındaki özerkliği öne çıkarılırken Obi'nin incelediği devrimci Çin anlatılarında bireyin kolektif siyasal programa katılımı önem kazanmaktadır. Bu karşıtlık, gençlik yazınındaki "devrim" kavramının tek bir anlama sahip olmadığını göstermektedir.

FEMİNİST GENÇLİK YAZININDA DEVRİM

Manuela Kalbermatten'in "*Die feministischen Revolutionen der Future Fiction*" başlıklı çalışması, sayıdaki devrim tartışmasını çağdaş gençlik yazınına taşımaktadır. Kalbermatten özellikle Suzanne Collins'in *The Hunger Games* üçlemesi üzerinden genç kadın kahramanın siyasal isyan içerisindeki konumunu ele almaktadır. Katniss Everdeen'in "Mockingjay" figürüne dönüşmesi, bireysel direncin kolektif başkaldırının sembolü hâline gelmesi olarak okunmaktadır (Kalbermatten, 2019). Ancak Kalbermatten bu dönüşümü doğrudan ve sorunsuz bir feminist devrim olarak değerlendirmez. Genç kadın kahramanların devrimci potansiyellerinin popüler kültür, romantik anlatılar, toplumsal cinsiyet beklentileri ve neoliberal bireycilik tarafından sınırlandırılabildiğine dikkat çeker (Kalbermatten, 2019). Bu nedenle feminist gençlik yazınındaki başkaldırı en az iki düzey taşımaktadır:

1. ***siyasal iktidara karşı direnç,***
2. ***ataerkil toplumsal cinsiyet düzenine karşı direnç.***

Kalbermatten'in incelemesi, çağdaş gençlik yazınında "asi genç" figürünün giderek genç kadın karakter üzerinden yeniden tanımlandığını göstermektedir.

İTAATTEN ÖZERKLİĞE: GENÇLİK YAZININ DÖNÜŞÜMÜ

Dergide incelenen bilimsel çalışmaların ortak noktalarından biri çocuk ve genç figürünün zaman içerisinde edilgen konumdan çıkmasıdır. Geleneksel didaktik çocuk yazınında temel amaç çoğunlukla çocuğu var olan toplumsal düzene hazırlamaktır. Modern ve çağdaş çocuk-gençlik yazınında ise bu ilişkinin tersine çevrildiği örnekler giderek çoğalmaktadır. Çocuk artık yalnızca topluma uyum sağlaması gereken kişi değildir; toplumu değerlendirebilen ve gerektiğinde değiştirmeye çalışan bireydir. Bu dönüşüm özellikle Nöstlinger ve GRIPS örneklerinde görünürdür. Planka'nın Nöstlinger çözümlemesinde çocuk aile içindeki ataerkil otoriteyi sorgularken (Planka, 2019), Mayer'in GRIPS incelemesinde çocuk toplumsal yaşamın dönüştürülebilir olduğunu deneyimlemektedir (Mayer, 2019). Bu yönüyle Alman çocuk ve gençlik yazınında başkaldırı giderek özneleşmenin bir aşaması hâline gelmektedir.

Bu bağlamda çocuk ve gençlik edebiyatına özgü önemli bir paradoks ortaya çıkmaktadır. Yetişkin yazar, çocuk okura "isyan eden çocuk" figürünü sunmaktadır. Dolayısıyla otoriteye karşı çıkma düşüncesi dahi çoğunlukla yetişkinler tarafından oluşturulan yazınsal bir yapı içerisinde aktarılır. Bu nedenle gençlik yazınındaki isyan

tamamen özgür ve kendiliğinden bir olgu değildir. Yazar, yayınevi, eğitim sistemi, okul ve kültürel kurumlar isyanın hangi biçimlerinin kabul edilebilir olduğunu dolaylı biçimde belirleyebilir.

Mikota'nın farklı dönemlerin 1918 Devrimi'ni farklı biçimlerde anlatması konusunda ortaya koyduğu bulgular (Mikota, 2019), Helm'in DDR çocuk yazınına ilişkin incelemesi (Helm, 2019) ve Obi'nin Çin devrimci resimli anlatıları üzerine değerlendirmesi (Obi, 2019) bu durumu açık biçimde göstermektedir. Dolayısıyla çocuk ve gençlik yazınında "devrim" hem özgürleştirici hem de ideolojik olarak yönlendirilebilir bir kavramdır.

SONUÇ

kjl&m dergisinin "Die gelesene Revolution" temalı sayısındaki çalışmalar birlikte değerlendirildiğinde, Alman çocuk ve gençlik yazınında isyan ve devrim kavramlarının yalnızca doğrudan siyasal ayaklanmalar bağlamında ele alınmadığı görülmektedir. Devrim, bir yandan 1789, 1848 ve 1918 gibi tarihsel kırılmaların genç kuşaklara aktarılmasını sağlarken, diğer yandan çocuk ve genç bireyin aile, okul, toplumsal cinsiyet rolleri ve kültürel normlarla ilişkisini yeniden düşünmenin bir aracına dönüşmektedir.

Mikota'nın çalışmasında 1918 Devrimi tarihsel belleğin farklı ideolojik biçimlerde yeniden üretilmesine işaret ederken, Helm Fransız Devrimi'nin DDR çocuk yazınındaki siyasal-pedagojik işlevini ortaya koymaktadır. Planka ise devrim kavramını aile mikrokozmosuna taşıyarak çocuğun otoriteye karşı direncini bireysel özerklik bağlamında ele almaktadır. Mayer'in GRIPS incelemesi, 1968 sonrası çocuk tiyatrosunun eleştirel ve dönüştürücü yaklaşımını ortaya koyarken, Zekorn-von Bebenburg *Struwwelpeter* figürünün tarihsel bağlamında isyankâr çocuğun daha erken biçimlerini görünür kılmaktadır. Rinnerthaler günümüz görsel kültüründe devrim ve direnç sembollerinin dolaşımını incelerken, Kalbermatten bu tartışmayı feminist gelecek kurgularına ve genç kadın öznenin devrimci potansiyeline taşımaktadır. Obi'nin Çin örneği ise gençlik yazınının devrimci ideolojinin taşıyıcısı olabileceğini gösteren karşılaştırmalı bir model oluşturmaktadır. Bu çalışmalar ışığında Alman çocuk ve gençlik yazınındaki isyan anlayışının genel gelişimi şu doğrultuda ifade edilebilir:

itaatsizlik → otoritenin sorgulanması → bireysel özerklik →

kolektif direnç → toplumsal dönüşüm.

Dolayısıyla Alman gençlik yazınında isyan yalnızca yıkıcı ya da düzen bozucu bir davranış değildir. Özellikle 20. yüzyılın ikinci yarısından itibaren eleştirel düşünme, bireysel özerklik, demokratik katılım ve toplumsal değişim düşüncelerinin yazınsal anlatım biçimlerinden biri hâline gelmiştir. Bu açıdan çocuk ve gençlik yazınındaki asi çocuk ya da genç figürü, modern Alman yazınında yalnızca yetişkin dünyasına karşı çıkan bir karakter olarak değil, toplumun mevcut değerlerini sınayan ve alternatif geleceklerin düşünülmesini mümkün kılan kültürel bir özne olarak değerlendirilebilir.

KAYNAKÇA

Helm, W. (2019). „Zur Bastille!" – Die Französische Revolution von 1789 im Kinder- und Jugendbuch der DDR. *kjl&m: Kinder-/Jugendliteratur und Medien in Forschung, Schule und Bibliothek, 71*(1), 16–24.

Kalbermatten, M. (2019). Die feministischen Revolutionen der Future Fiction. *kjl&m: Kinder-/Jugendliteratur und Medien in Forschung, Schule und Bibliothek, 71*(1), 73–81.

Mayer, J. (2019). Die Bühne als Ort konkreter Utopie am Beispiel von GRIPS. *kjl&m: Kinder-/Jugendliteratur und Medien in Forschung, Schule und Bibliothek, 71*(1), 35–43.

Mikota, J. (2019). Das Jahr 1918 in der Kinder- und Jugendliteratur oder: Wie Nesthäkchen einen Schülerrat gründen wollte. *kjl&m: Kinder-/Jugendliteratur und Medien in Forschung, Schule und Bibliothek, 71*(1), 3–15.

Obi, L. (2019). Bildgeschichten im Dienst der chinesischen Revolution. *kjl&m: Kinder-/Jugendliteratur und Medien in Forschung, Schule und Bibliothek, 71*(1), 44–53.

Planka, S. (2019). „Wir ist nicht ihres Kammerdiener!" Revolutionen im Hause Hogelmann in Christine Nöstlingers *Wir pfeifen auf den Gurkenkönig*. *kjl&m: Kinder-/Jugendliteratur und Medien in Forschung, Schule und Bibliothek, 71*(1), 25–34.

Rinnerthaler, P. (2019). Widerspenstige Bilder: Bildästhetische Repräsentationen von Revolution in Bilderbuch, Comic und Graphic Novel. *kjl&m: Kinder-/Jugendliteratur und Medien in Forschung, Schule und Bibliothek, 71*(1), 64–72.

Zekorn-von Bebenburg, B. (2019). Struwwelpeter als Rebell: Heinrich Hoffmanns Bilderbuch im Kontext der Revolution von 1848. *kjl&m: Kinder-/Jugendliteratur und Medien in Forschung, Schule und Bibliothek, 71*(1), 54–63.

Donald Trump Dönemi Amerika Birleşik Devletleri Savunma Politikalarında Yapay Zekâ: Maven Projesi *[81]

Doktora Öğrencisi Kevser Ergin Ürüt[1]

[1] Trakya Üniversitesi/ İktisadi ve İdari Bilimler Fakültesi, Uluslararası İlişkiler Bölümü, kevserergin@trakya.edu.tr, ORCID: 0000-0002-1697-6134.

Özet: Donald Trump'ın Başkanlığı (2017-2021 ve 2021- günümüz) döneminde Amerika Birleşik Devletleri (ABD) savunma politikalarında; büyük güç mücadelesi, ABD'nin ulusal çıkarları ve her alanda lider olma hedefi ön plana çıkmaktadır. 21. Yüzyıl uluslararası ilişkilerinin hızla değişen konjonktüründe, tüm bu hedeflere giden yolda teknolojik üstünlüğün öneminin giderek arttığı söylenebilir. Teknolojik üstünlüğün anahtar rolünde ise yapay zekâ entegrasyonu karşımıza çıkmaktadır. Buradan hareketle çalışmada, Donald Trump dönemi ABD savunma politikalarında yapay zekanın yerinin örnek vaka olarak seçilen Maven Projesi üzerinden analiz edilmesi amaçlanmıştır. Çalışmada Trump dönemi savunma politikalarında yapay zekanın dönüşümünün, Maven Projesi'nin gelişimiyle paralel seyrettiği söylenebilir. Bu minvalde yapay zekanın savunma politikaları içinde yer alan soyut bir projeden, savaş alanlarına ve operasyonlara uygulanan somut bir savaş sistemine dönüştüğü çıkarımına varılabilir. Bu bağlamda öncelikle Donald Trump'ın başkanlık döneminde ABD savunma politikalarında yapay zekanın yeri değerlendirilmiştir. Söz konusu inceleme yapılırken; 2017 Ulusal Güvenlik Stratejisi, 2018 Ulusal Savunma Stratejisi, Ulusal Yapay Zekâ Araştırma ve Geliştirme Stratejik Planı 2019 Güncellemesi, 2025 Ulusal Güvenlik Stratejisi, 2026 Ulusal Savunma Stratejisi ve Savaş Bakanlığı tarafından yapay zekaya yönelik geliştirilen politikalar ve uygulamalar araştırılmıştır. Ardından bu uygulamalardan biri olan ve ABD'nin resmi askeri programı haline gelen Maven Projesi incelenmiştir. Çalışmada son olarak projenin sistemleşmiş hali olan Maven Akıllı Sistemi'nin *(Maven Smart Sysem-MSS)* kullanıldığı iki örnek olarak seçilen: Mutlak Kararlılık Operasyonu *(Operation Absolute Resolve)* ve Destansı Öfke Operasyonu *(Operation Epic Fury)* incelenmiştir.

Anahtar Kelimeler: Donald Trump Dönemi, Yapay Zekâ, Maven Projesi, Amerika Birleşik Devletleri(ABD)

1. GİRİŞ

11 Eylül Saldırıları sonrası dönemde ABD, savunma politikalarını terörle mücadele alanlarında yoğunlaştırırken, Çin'in Pasifik'teki yükselişi ve Rusya'nın 2014 Kırım ilhakıyla başlayan ve saldırganlaşan dış politikası uluslararası alanda tehdit unsurlarını değiştirmeye başlamıştır (U.S. Department of State, 2017; U.S. Department of Defense, 2018). Bu süreçte ABD terörle mücadele operasyonları için Irak, Afganistan ve Ortadoğu'da yüksek bütçeler harcarken ve odağını burada tutarken diğer ülkelerle arasındaki teknolojik farkın gün geçtikçe kapandığını fark edememiştir (The White House, 2002: 15; The White House, 2011:1-4). Diğer yandan söz konusu Çin ve Rusya gibi aktörlerin 1990'lardan itibaren serbest piyasa ve kurumlara liberal entegrasyonunu öngören anlayış yaşanan gelişmelerle silikleşmiştir (Mearsheimer, 2019:23). Tüm bu süreçte gelişen teknolojiyle birlikte askeri gücün ve savaş alanlarının doğası da dönüşmüştür. Derin öğrenme ve ardında üretken yapay zekâ alanlarında yaşanan sıçramalar ise yapay zekâ sistemlerinin devletlerarası rekabette teknolojik üstünlüğün kilit ögeleri haline gelmesine yol açmıştır. Tüm bu gelişmelerin Obama dönemi sonrasında yönetime gelen Donald Trump'ın savunma politikalarını şekillendirdiği söylenebilir. Bu minvalde çalışmada, Donald Trump'ın başkanlık dönemi olan 2017-2021 ve 2021'den günümüze kadar olan kısımdaki savunma politikalarında yapay zekanın yerinin örnek vaka olarak seçilen Maven Projesi üzerinden araştırılması amaçlanmıştır. İnceleme sonucunda Trump dönemi savunma politikalarında yapay zekanın yerinin Maven Projesi'nin gelişimiyle paralel olarak ilerleyerek; soyut bir kavram olarak bir teoriden, savaş alanlarına ve operasyonlara uygulanan somut bir sisteme dönüştüğü söylenebilir. Öyle ki, yapay zekâ hem ulusal güvenliğin tesisinde hem de büyük güç rekabetinde ezici teknolojik ve askeri güç liderliği için elzem görülür hale gelmiştir. Bu bağlamda çalışmada ilk olarak Donald Trump dönemi savunma politikalarında yapay zekanın yeri araştırılmıştır. Söz konusu araştırma yapılırken; 2017 Ulusal Güvenlik Stratejisi, 2018 Ulusal Savunma Stratejisi, Ulusal Yapay Zekâ Araştırma ve Geliştirme Stratejik Planı 2019 Güncellemesi, 2025 Ulusal Güvenlik Stratejisi, 2026 Ulusal Savunma Stratejisi ve Savaş Bakanlığı tarafından yapay zekaya yönelik geliştirilen politikalar ve uygulamalar araştırılmıştır. Ardından 2017 yılında başlatılan ve 2026

[8] Bu çalışma, Prof. Dr. Sibel Kavuncu danışmanlığında Trakya Üniversitesi, Sosyal Bilimler Enstitüsü, Uluslararası İlişkiler Anabilim Dalı Doktora Programı'nda Kevser Ergin Ürüt tarafından yazılmakta olan "Soğuk Savaş'tan Günümüze ABD'nin Savunma Politikalarında Yapay Zekâ" başlıklı doktora tezi çalışmasından yararlanılarak hazırlanmıştır.

yılında ABD'nin resmi askeri programı haline gelen Maven Projesi incelenmiştir. Bu bölümde Proje'nin gelişim süreci, Proje'nin ardında yer alan teknik detaylar, hükümet-özel sektör ilişkisi ve Proje'nin uygulanma alanları üzerinde durulmuştur. Son olarak Maven Projesi'nin sistemleştirilerek somutlaştırılmış hali olan Maven Akıllı Sistemi'nin *(Maven Smart Sysem-MSS)* kullanıldığı Mutlak Kararlılık Operasyonu *(Operation Absolute Resolve)* ve Destansı Öfke Operasyonu *(Operation Epic Fury)* incelenmiştir.

2. DONALD TRUMP DÖNEMİ ABD SAVUNMA POLİTİKALARINDA YAPAY ZEKÂ

Donald Trump'ın ilk başkanlık dönemi 2017-2021 yıllarını, ikinci başkanlık dönemi ise 2021 yılından günümüze kadar olan kısmı kapsamaktadır. Trump'ın başkanlığının ilk yılı olan 2017'de açıkladığı Ulusal Güvenlik Stratejisi'nde ABD'nin ulusal çıkarı ve güç yoluyla barış tesisi ulusal güvenlik için en önemli unsurlar olarak belirtilmiştir. Bunun yanında, ABD'nin küresel alanda vereceği güç mücadelesine ortak olarak görülen Rusya ve Çin, Strateji Planı'nda revizyonist güçler olarak tanımlanmıştır (U.S. Department of State, 2017). Bu bağlamda revizyonist güçlere karşı ABD'nin liderliği ancak gelişen teknolojide öncü olabilmesiyle mümkün görülmektedir. Dönemin savunma bakanı Mattis, 2017 Ulusal Savunma Stratejisi'nin temel hedeflerini anlatırken ABD'nin küresel alanda üstünlüğünün tüm alanlarda aşındığını ve üstünlüğü geri kazanmanın ancak savaş alanlarında daha yıkıcı bir güce sahip olmakla mümkün olabileceğini belirtmiştir (Garamone, 2018).

Bu bağlamda Obama döneminde geliştirilen terörle mücadele odağının yön değiştirerek ABD'nin büyük güçler arenasındaki mücadelesine çevrildiği net bir şekilde anlaşılmaktadır. Ayrıca hedeflenen askeri "öldürücü güç" yapısının, ABD'nin yeni rekabet odaklı küresel vizyonunu yansıttığı söylenebilir. Söz konusu "öldürücü güç"ün elde edilmesi adına teknolojik gelişmeleri çevreleyen politikalar yoğunlaşmıştır. Bu bağlamda 2017 Savunma Strateji belgesinde bu güce sahip olmak için mevcut ortaklıkları güçlendirmek ve yeni ortaklıkları cezbetmek hedefi belirlenmiştir (Seren, 2018:4,5). 2017 yılında yine aynı hedeflerle Maven Projesi başlatılmıştır. Proje çalışmanın devamında detaylı bir şekilde ele alındığı için bu bölümde üzerinde durulmamıştır.

2018 Ulusal Savunma Stratejisi'nde ise, güvenlik ortamının teknolojinin hızla değişen tarafından etkilendiği belirtilirken yapay zekâ, savaşların kazanılmasını sağlayacak olan ve hızla gelişen teknolojiler arasında sayılmıştır (U.S. Department of Defense, 2018a: 3). Planda ayrıca savunma bakanlığı tarafından yapay zekâ sistemlerinin askeri uygulamalara uyumlaştırılacağı ve söz konusu avantajların elde edilmesi adına geniş çaplı yatırımlar yapılacağı belirtilmiştir (U.S. Department of Defense, 2018a: 7). Savunma Bakanlığı'nın 2018 yapay zekâ strateji belgesinde de aynı hedefler belirlenmiştir U.S Department of Defense, 2018b:11-17) Bu gelişmeler doğrultusunda, Haziran 2018'de yapay zekâ teknolojilerinin askeri sistemlere entegre edilmesini kolaylaştırmak ve yapay zekâ faaliyetlerini tek bir çatı altında toplamak amacıyla Savunma Bakanlığı'na bağlı Müşterek Yapay Zekâ Merkezi *(Joint Artificial Intelligence Center – JAIC)* kurulmuştur (U.S. Departmanet of Defense, 2018b: 9,10).

Bu bağlamda yapay zekaya yönelik Obama döneminde başlatılan kapsamlı stratejilerin devamlılığının Trump döneminde de sürdürüldüğü söylenebilir. Şöyle ki Obama döneminde; 12 Ekim 2016'da yayımlanan "Yapay zekanın Geleceğine Hazırlık *(Preparing For The Future Of Artificial Intelligence)*" başlıklı rapor, 13 Ekim 2016 tarihinde yayımlanan "Ulusal Yapay zeka Araştırma ve Geliştirme Stratejik Planı *(The National Artificial Intelligence Research and Development Strategic Plan)*" ve 20 Aralık 2016 tarihinde yayımlanan "Yapay zeka Otomasyon ve Ekonomi *(Artificial Intelligence, Automation, and the Economy)* raporunda yapay zekanın hem teknoloji sektörü hem kamuoyu için gelişimine bütüncül bir yaklaşımla bakılmış ve kullanımı konusunda genel bir çerçeve sunulmuştur (Bilgin ve Küçünşabanoğlu, 2023: 281).

Söz konusu çabaların yansıması Trump döneminin henüz başlarında kendisini göstermiştir. İlk olarak "Ulusal Yapay Zekâ Araştırma ve Geliştirme Stratejik Planı (*The National Artificial Intelligence Research And Development Strategic Plan)*" Trump döneminde genişletilerek "Ulusal Yapay Zekâ Araştırma ve Geliştirme Stratejik Planı 2019 Güncellemesi *(The National Artificial Intelligence Research And Development Strategic Plan:2019 Update)*" yayımlanmıştır (NITRD, 2019). Güncellemede ABD'nin gittikçe karmaşıklaşan küresel rekabet ortamında, yeni bir güç mücadelesi alanı açan yapay zekâ teknolojilerinde lider olmasının önemi vurgulanmıştır. Bu bağlamda Savunma Strateji Planı ile paralel olarak; teknoloji sektörü, özel şirketler ve kamu kurumları arasındaki ortaklıkların genişletilmesi hedeflenmiştir. Yapay zekâ alanında ABD tarafından küresel alanda elde edilen liderliğin doğrudan ulusal güvenliğe katkı sağlayacağı da belge de ayrıca ifade edilmiştir (NITRD, 2019:1-4).

2019 ve 2020 yıllarında yapay zekâ teknolojilerinin ABD ordusuna entegrasyonu için kurumsal ve yasal temellerin atıldığı söylenebilir (U.S. Department of Defense, 2019: 14,15). Yapay zekâ teknolojilerinin orduya entegrasyonuna verilen önemle bağdaşır şekilde 2020 yılında Etik Yapay Zekâ İlkeleri kabul edilmiştir. Ayrıca yapay zekanın, ABD Savunma Bakanlığı'nın en önemli teknoloji modernizasyon önceliği olduğu vurgulanmıştır

(Lopez, 2020). ABD'nin yapay zekanın küresel alanda izlenebilir, tarafsız ve yönetilebilir olması adına belirlediği ilkelerle bu alanda lider olma isteğini pekiştirmiştir.

2022 yılında yapay zekânın teorik bir kavram olmaktan yavaş yavaş çıkarılarak savaş yönetimine dahil edilmesi adına bazı adımlar atılmıştır. Bu adımlardan ilki, kabul edilen Müşterek Tüm Alanlar Komuta ve Kontrol Konsepti *(Joint All-Domain Command and Control -JADC2*) ile olmuştur (U.S. Department of Defense, 2022). Savunma Bakanlığı tarafından kabul edilen ilkelere göre; kara, deniz ve hava alanında, yani tüm askeri alanlarda, kuvvetlerin tüm takip, tespit ve silah sistemlerini tek bir iletişim şebekesinde birleştirilmesi hedeflenmiştir. Sensörlerden gelen veri, önce algılanarak yapay zekâ yardımıyla anlamlandırılmakta ve ardından en uygun silah sistemiyle eşleştirilmesi sağlanmaktadır (U.S. Department of War, 2022:4,5). Aynı yıl Müşterek Yapay Zekâ Merkezi yeni kurulan Baş Dijital Yapay Zekâ Ofisi *(Chief Digital and Artificial Intelligence Office-CDAO)* bünyesine katılmıştır (Deputy Secretary of Defense, 2021).

2025 yılında yayımlanan Ulusal Güvenlik Stratejisi'ne bakıldığında; Trump'ın hem ilk başkanlık dönemi hem de Biden yönetiminde paylaşılan "büyük güç rekabeti"nden sıyrılarak farklılaştığı görülmektedir. Buna göre Çin ve Rusya önceki stratejilerden ayrılır şekilde, acil tehdit başlıklarında ele alınmamış ve küresel nüfuz yarışından açıkça bahsedilmemiştir. Bunların yerine yeni Strateji'de küresel sistemde dengeleyici bir politika, ABD'nin çıkarını önceleyen bölgesel bir savunma politikası ve sanayileşme yatırımlarını arttırma planları öne çıkmaktadır (The White House, 2025a: 3,4). Bölgesel savunma politikasıyla kastedilen, Batı yarım kürede küresel göçün ve suç unsurlarının yayılımının tehdit olarak kabul edilmesidir (The White House, 2025a:11,15,16). Bölgesel savunma politikasının etkilerini ilerleyen dönemde yapılan müdahalelerde görmek mümkün olacaktır. Büyük güç rekabetinin ekonomik karşılıklı bağımlılıkla iç içe geçtiği yeni dönemde, ulusal güvenliğin sanayi yatırımıyla elde edilmesi hedeflenen teknolojik hakimiyet üzerine kurulması şaşırtıcı değildir (The White House, 2025a:1).

2025 yılında üretken yapay zekâ sistemlerinin bir alt türü olan Büyük Dil Modelleri'nin *(Large Language Models-LLM)* yaygınlaşmasıyla ABD'nin askeri stratejilerinde yeni bir döneme girildiği söylenebilir. Bu doğrultuda askeri amaçlarla kullanılması hedeflenen GenAI.mil Platformu hayata geçirilmiş (U.S. Department of War, 2025). Ayrıca aynı dönemde 2018 Savunma Stratejileri'ne paralel olarak, yapay zekanın yıkıcı gücüne hakim olabilmek ve savaş alanına entegrasyonunu güçlendirmek amacıyla silikon vadisiyle şirketleriyle (OpenAI, Google-Gemini, Microsoft-Copilot) ortaklıklar kurulmuştur (Urwin, 2026). Böylece yapay zekâ; askeri ağlarda, orduda ve bireysel planlama ve analiz süreçlerinde destek mekanizması haline getirilmiştir (U.S. Department of War, 2025). Eylül 2025'te Trump, Savunma Bakanlığı'nın adının Savaş Bakanlığı olarak değiştirilmesini öngören kararnameyi imzalamıştır. Kararname'ye göre Bakanlığın isminin yalnızca savunmayı değil ulusal çıkarların korunması adına daha kararlı ve savaşmaya hazır bir ABD profilini çağrıştırması hedeflenmiştir (The White House, 2025b). Söz konusu değişikliğin resmileşmesi için gerekli olan ABD Kongresi'nin kararı henüz çıkmamış olmasına rağmen kamuoyunda, açıklamalarda ve Bakanlığın resmi sitesinde değişikliğin uygulandığını görmek mümkündür. Bu nedenle çalışmanda isim karışıklığını önlemek adına 5 Eylül 2025'ten sonrasını işaret eden resmi kaynak ve atıflarda Savunma Bakanlığı, Savaş Bakanlığı olarak anılacaktır.

Söz konusu hedefler doğrultusunda, 2026 Ulusal Savunma Stratejisi'ne bakıldığında, Stratejilerde yapay zekaya yönelik politikaların ABD ordusunun yapay zekâ sistemleriyle bağdaştırılması çerçevesinde ele alınması dikkat çekicidir. Strateji'de ABD'nin dünyanın en önde gelen silah ve mühimmat tedarikçisi konumuna geri dönmesi için, savunma sanayisine yatırımın arttırılması hem ABD'nin (Anavatan savunması önceliklendirilmiştir) hem müttefiklerinin güvenliği için elzem görüldüğü belirtilmiştir (U.S. Department of War, 2026a: 8-9). Bu hedefe ulaşabilmek için yapay zekâ teknolojilerini her alanda benimseyerek ve geliştirerek Müşterek Kuvvetler'in ihtiyaç duyduğu yeniliklerin önünde duran eski politikaların değiştirilmesi hedeflenmiştir (U.S. Department of War, 2026a: 13-15).

2026 yılında Savaş Bakanlığı'nın yapay zekâ stratejilerine bakıldığında, stratejilerde; yapay zekâ öncelikli savaş gücü sistemlerinin ABD ordusu içinde iyice yaygınlaştırıldığı söylenebilir. Buna göre; özel sektör ve kamu ortaklığıyla ABD'nin küresel yapay zekâ hakimiyetinin hızlandığı yeni dönemde, cepheden geri hizmet birimlerine kadar tüm bileşenlerin "yapay zekâ odaklı" savaş gücüne dönüştürülmesi hedeflenmektedir (U.S. Department of War, 2026b).

Ayrıca hedeflenen ilerlemenin sağlanabilmesi adına gerekli görülen politika değişiklikleri için Yapay Zekâ Hızlandırma Stratejileri *(AI Acceleration Strategy)* belirlenmiştir. Savaş Bakanı Hegseth tarafından stratejilerin bir kolu olarak açıklanan Askeri Yapay Zekâ Hızlandırma Stratejisi'ne göre; eski bürokratik engeller ortadan kaldırılarak serbest bırakılacak askeri denemeler, Amerikan askeri yapay zekâ hakimiyetine görülmemiş bir başarı kazandıracaktır. Bu bağlamda Heghset'e göre tüm alanlarda yapay zekâ öncelikli savaş gücü olunması ana hedef olarak gösterilmiştir. Bu bağlamda bakanlık tarafından 3 ana alan olan; kurumsal, istihbarat ve savaş alanlarında

yedi proje başlatılmıştır. Projelerin amacı kısaca; projelerin başına atanan sorumluların direkt Savaş Bakanı'na rapor vermesiyle uzun süreli bürokrasi engellerinin aşılarak yapay zekâ teknolojilerinin hızlı bir şekilde askeri sistemlere uygulanması şeklinde özetlenebilir (U.S. Department of War,2026c).

Tüm bu sürece bakıldığında Trump'ın başkanlık dönemi savunma politikalarında yapay zekanın teorik bir kavramdan savaş alanlarına uygulanan merkezi bir unsur haline dönüştüğü söylenebilir. 2017 yılında başlatılan ve 2026 yılında Pentagon'un resmi ordu programı haline gelerek en üst düzey bütçe ve yasal statüsüne sahip olan Maven Projesi'nin ayrıca incelenmesi, Trump dönemi savunma politikalarında yapay zekanın yerinin anlaşılması açısından oldukça önemli olarak değerlendirilebilir. Bu bağlamda çalışmanın devamında Maven Projesi ele alınacak ve projenin hayata geçirildiği iki örnek olay olarak; Mutlak Kararlılık Operasyonu *(Operation Absolute Resolve)* ve Destansı Öfke Operasyonu *(Epic Fury)* incelenecektir.

3. MAVEN PROJESİ

13 Temmuz 2017'de ABD hükümeti, silikon vadisi çalışanları ve akademinin katılımıyla gerçekleştirilen ve ulusal güvenlik öncelikli teknoloji konferansı olan Defense One Tech Zirvesi'ndeki en dikkat çekici tartışmalardan biri; bilgisayar algoritmaları ve yapay zeka sistemleri ile savaşların kazanılması üzerine olmuştur. Maven Projesi'nin kurucu eş başkanı Cukor, zirvede projeyle ilgili şunları dile getirmiştir: *"İnsanlar ve bilgisayarlar silah sistemlerinin nesneleri tespit etme yeteneğini artırmak için simbiyotik olarak çalışacak"* (Pellerin, 2017). Proje'nin ismi olarak seçilen "Maven" kelimesi "uzman" anlamında kullanılmıştır. Böylece Proje'nin analistlere bilgi sunan yapay zeka uzman sistemi olarak geliştirildiği söylenebilir.

Cukor Proje'nin amacının; Maven Sistemi'nin desteğiyle birlikte Ulusal Jeo-uzamsal İstihbarat Ajansı *(National Geospatial Intelligence Agency- NGA)* analistlerinin 2017'deki iş yapma kapasitelerini 2-3 katına çıkarabilmesi olduğunu belirtmiştir (Pellerin, 2017). Cukor'un sözleri, Maven Projesi'nin temel amacını özetlerken projenin çalışma sürecine de ışık tutmaktadır. Proje kısaca, askeri hedef seçim sürecine makine öğreniminin dahil edilmesi üzerine temellendirilmektedir. Cukor'a göre Proje'nin 2017'de öncelikli hedef noktası Irak ve Suriye İslam Devleti'ne karşı yürütülen mücadelede tespit edilmesi öncelenen 38 nesne sınıfıdır. Askeri gizlilik nedeniyle söz konusu nesne sınıflarının listesi kamuoyu ile paylaşılmamış olsa da, resmi raporlarda nesnelerin belirli kategoriler altında toplandığı söylenebilir. Bu kategoriler: araçlar, yapılar ve nesneler, insanlar ve canlılar ve silah sistemleri olarak sıralanabilir. Yalnızca 12 kişilik oldukça küçük bir grupla yürütülmeye başlanan projede hedef belirleme doğruluk oranı %60'tan, yapılan güncellemelerle, bir hafta sonunda %80'e çıkarılmıştır (Weisgerber, 2017).

Proje'nin ilk yapay zeka geliştiricisi olan Google, şirket içinde yapay zekanın etiği alanında yaşanan fikir ayrılıklarıyla birlikte 2019'de sözleşme süresinin dolmasıyla Proje'den çekileceğini duyurmuştur. Bununla birlikte Şirket, yapay zekanın silah sistemlerinde yer alınmasını dışlayan yapay zeka ilkeleri yayımlamıştır (BBC, 2018). Google'ın Proje'den çekilmesinin ardından 2019 yılında Proje'nin ana yürütücüsü olarak Palantir sürece dahil olmuştur (Peterson, 2019).

2017'den 2023'e kadar Proje deneysel bir algoritma niteliğinde sürdürülmüştür. Bu süreçte 2022'ye kadar Proje'nin denetim ve yönetimi NGA sürdürmüş ve aynı yıl ABD Savunma Bakanlığına bağlı CDAO ile görev bölüşümüne gidilmiştir (Vincent, 2022). 2026 Mart ayı itibariyle tüm yetki CDAO bünyesindeki program ofisine devredilmiştir (Vincent, 2026b). 2023'te Proje kapsamında Palantir tarafından yapay zeka destekli yazılım platformu Maven Akıllı Sistemi (Maven Smart System-MSS) geliştirilmiştir. Böylece yapay zekayı askeri alana entegre etmeyi hedefleyen Proje, yazılım platformuyla sahaya uygulanan somut bir hal almıştır. 2024 Kasım ayında ise yapay zeka güvenlik araştırmaları şirketi olan Anthropic, geliştirdiği yapay zeka destekli LLM ve gelişmiş bir asistan olan Claude ile Proje'ye dahil olmuştur (Mande ve Allan, 2026). Bu ortaklıkla birlikte Claude, Palantir tarafından geliştirilen yapay zeka platformu (AIP) üzerinden kullanılabilir hale getirilmiştir (Anthropic, 2026; Palantir, 2026a). AIP altyapısı ile Claude, hükümet ve ordunun erişimi sınırlandırılmış ağlarında kullanıma açılmıştır. Söz konusu iki buluşun birleştirilmesiyle, istihbarat ve suvunma verileri güvenliği sağlanmış bir devlet ağıyla sunulmaya başlanmıştır.

Project Maven'da kullanılan LLM'ler web veri tabanlarında yer alan kitaplar, metinler; kısaca yazılı, kod ve diğer kaynaklar olmak üzere oldukça geniş bir alan üzerinde eğitilmektedir. Bu da hedefleme hızına en az beş kat artış sağlanması anlamına gelmektedir. 2025'de CDAO sorumlusu olan Sean Batir, LLM'lerin insan analistlerle fikir alışverişinde bulunarak atılacak adımlarda etkili olabileceğini belirtmiştir (Mande ve Allan, 2026). Ayrıca savaş alanı kullanımının dışında LLM'ler istihbarat paylaşımıyla ilgili idari ve hukuki süreçlerde de kullanılmaktadır. Örneğin, ülkeler arası diplomatik görüşmelerde bürokratik ve dil çevirisindeki yanlış anlaşılmaları önlemek adına süreç yavaş ilerletilirken, bu toplantılarda LLM sistemlerinin kullanımı süreci hızlandırabilmektedir. Böylece

ittifaklar arası hızlı bilgi paylaşımı sağlanmış olmaktadır. Örneğin, Dönemin Savunma Bakanı Lloyd Austin ile Japonya Savunma Bakanı Yasukazu Hamada 14 Eylül 2022'de; Hint-Pasifik'te barış, Çin'in saldırgan tavırları ve nükleer güvenlik konularında görüşmede bulunarak ittifaka olan bağlılıklarını yinelemişlerdir (Mahadzir, 2022). Görüşmeler yüzyüze ve onlarca personelin katılımıyla gerçekleşmiştir. Üstelik kullanılacak metinler askeri onaydan geçmesine rağmen ortak hedeflerin geleceği için çeviri yapan görevlilerden de onay alması gerekmektedir (Radin, 2022). Yüzyüze görüşmeler 95 dakida sürmesine rağmen tüm bu sürecin ön hazırlığı ve kontrol prosedürleri bürokratik görüşmelerin uzun sürmesini daha anlaşılır kılmaktadır.

Temmuz 2025'te ABD hükümeti ve Anthropic arasındaki ortaklık genişletilerek yenilenmiştir. Söz konusu genişletilmeyle; ulusal güvenliğin devamlılığını sağlamak adına sınırlı yapay zeka sistemlerinin üretiminin devam ettirilmesi ve hassas ve gizli veriler için *Claude.gov* platformunun kullanıma sunulması kastedilmektedir (Anthropic, 2025). Diğer yandan 2026 Şubat ayında askeri terminolojiye uygun çeviri sistemleri hem ordu içinde hem bürokratik görüşmelerde kullanılmaya başlanmıştır (Vincent, 2026a). Örnek olarak ABD Savaş Bakanı ile İtalya ve Endonezya Savunma Bakanlarının görüşmesi verilebilir. Gerçekleştirilen zirveden saniyeler sonra konusmaların diplomatik ve resmi şablonlara uygun resmi bildirileri kurumların resmi sitelerinde yayımlanabilmiştir (U.S. Department of War, 2026d).

Tüm bu gelişmelerin yanında, Antropic hükümet ile ortaklığını genişleten anlaşmaya sistemin kullanım sınırlarını çizen bazı şartlar eklemiştir. Buna göre; şirket tarafından sağlanan yapay zeka sistemleri tam otonom silah sistemlerinde ve ABD vatandaşlarını kapsayacak şekilde kitle gözetim amacıyla kullanılmayacaktır. Daha sonra hükümetle şirket arasında artan gerilim sebebiyle durum yargıya taşınmış ve Mayıs 2026'da Anthropic'in yapay zeka sistemlerinin askeri amaçlarla gizli sistemlerde kullanımı kapsam dışında bırakılmıştır (Cho ve Harris, 2026). 27 Ağustos 2026'da mahkeme, hükümet tarafından kara listeye alınmasını cezalandırma ve yasa dışı bir misilleme olarak değerlendirerek hukuka aykırı olarak nitelendirmiştir (Reuters, 2026).

ABD hükümeti ve Anthropic anlaşmazlığının diğer yanında Maven Projesi Mart 2026'da deneysel bir proje olmaktan çıkarılıp tüm askeri birimlerde kullanılmak üzere resmi bir askeri program haline getirilmiştir (Jeans, 2026). Bu gelişme, Eylül 2026 itibariyle programın devamlı bir finansmana kavuşması anlamına gelen Pentagon'un kalıcı bütçe programına dahil edilmesiyle devam etmiştir (U.S. Department of War, 2026e). Bu durum, hükümet ve ordunun yapay zeka kullanmaya başlaması gibi yüzeysel bir anlamın dışında, yapay zekanın operasyon ve karar aşamalarına dahil edilmesi anlamına gelmektedir. Proje'nin kazandığı önem, ABD'nin savaş alanında yaşadığı zorluklara getirdiği çözümlerde aranabilir.

Maven Smart Sistemi (MSS)'nin şu üç sorunu çözmek için tasarlandığı söylenebilir: yetersiz analitik kapasite, veri kaynaklarının entegrasyonunda zorluk ve kaynaklar arası hedef ilişkilendirme zorluğu (Mande ve Allan, 2026). Söz konusu sorunları, hedeflerin istenildiği kadar hızlı vurulamamasına sebep olduğu için Pentagon'un uzun zamandır çözmeye çalıştığı söylenebilir. Sorunlara daha yakından bakmak MSS'nin neden bu denli önem kazandığını anlamaya yardımcı olacaktır.

İlk olarak Afganistan (2001) ve Irak (2003) Savaşları sırasında, bugün ki kadar gelişmiş olmasa da; uydular, video kaydeden askeri kameralar ve insansız hava araçları çatışmalarla ilgili bilgi sağlayacak pek çok görüntü kaydetmiştir. Fakat elde edilen ölçekte veriyi analiz edecek sayıda personel bulunmamaktaydı. Bu durum bazı verilerin analiz edilmeden toplanmaya devam etmesine ve yok olmasına sebep olmuştur. Bu dönemde askeri verilerin kamuoyuyla paylaşılmaması sorunun boyutunu gizlese de bazı ticari uydu verilerinden çıkarımlar yapmak mümkündür. Örneğin günümüzde Google Eath'te gördüğümüz uydu görüntülerini sağlayan Digitalglobe şirketini de bünyesinde barındıran ve dünyanın en yüksek çözünürlüklü uydularını işleten Maxar Technologies şirketinin baş teknoloji sorumlusu Scott; dönemin yetersiz analitik kapasitesiyle ilgili, uydulardan sağlanan bir günlük görüntüyü tek bir analistin ancak 85 yılda inceleyebileceğini belirtmiştir (Lewis and Allan, 2022). Bu çarpıcı verilerin yanında günümüzde hem ticari uyduların hem de askeri uydu ve dronların sayısının artması sorunu derinleştirmiştir. MSS'de kullanılan yapay zekâ sistemleriyle ilk inceleme yapılarak analistlere milyonlarca veri içinden yalnızca kayda değer olanlar sunulmaktadır. Böylece basit görüntü eleme işlemleri otomatikleştirilirken insan analistler doğrulama sorumluluğunu sürdürmektedir. Bu minvalde süreç hem basitleşmekte hem de hızlanmaktadır.

İkinci sorunu oluşturan veri kaynaklarının entegrasyonunda yaşanan zorluk, ilk sorunun devamı niteliğindedir. Yukarıda bahsedildiği gibi farklı veri kaynakları olan; uydu sistemleri, kameralar, dronlar ve birçok farklı saha tarayıcısı radarlar eş zamanlı olarak elde edilen devasa bilgiyi analistlere aktarmaktadır. Bu durumda analistler farklı veri formatlarıyla çalışan söz konusu sistemler arasında bağ oluşturma ve geçiş yapma zorluğu yaşamaktaydı. MSS sistemi söz konusu sistemleri tek bir arayüzde birleştirip analistleri veri toplama ve

entegrasyon yükünden kurtararak onlara asıl önemli olan sentezleme görevini bırakmaktadır (Mande ve Allan, 2026).

Üçüncü sorunda ise, kaynaklar arası hedef ilişkilendirme zorluğu karşımıza çıkmaktadır. Söz konusu sorun, hedef kararının verilmesi için kaynaklardan elde edilen verilerden daha fazlasının gerekmesiyle meydana gelmektedir. Burada "daha fazlasıyla" kastedilen; bölgedeki diğer askeri güçlerin yetenekleri ve sınırlılıkları ya da sivil nüfusun yoğunlaştığı alanlardır. MSS bu verilerin hepsini tek bir sistem üzerinde analistlere sunmakta ve aslında verileri detaylandırırken bile hız kazandırmaktadır. CDAO sorumlusu ve aynı zamanda Maven Projesi girişimine öncülük eden Cameron Stanley, verilerin analiz edilme sürecinden hedef seçimine kadar olan süreci tek bir platformda toplayan MSS'i devrim olarak nitelendirmiştir (Palantir, 2026b).

MSS'nin ele alınan sorunların çözümünde yarattığı verimlilik en belirgin şekilde ABD ordusunun 2023-2024'te gerçekleştirdiği Scarlet Dragon tatbikatı verilerinin kamuoyuyla paylaşılmasıyla anlaşılmıştır (Probasco, 2024). Tatbikatta yer alan hedefleme biriminde sadece 20 kişi yer almasına rağmen ABD askeri tarihindeki en verimli hedefleme performansının sergilendiği belirtilmiştir. Oysa Irak Savaşı'nda söz konusu birimde 2000'den fazla personel faaliyet göstermesine rağmen benzer bir başarı elde edilememiştir (Probasco, 2024: 4).

Çalışmanın devamında MSS'in ABD hükümeti ve ordusu tarafından kullanıldığı iki örnek olay olarak Venezuela Cumhurbaşkanı Nicholas Maduro'nun yakalanmasını konu alan Mutlak Kararlılık Operasyonu'nda *(Operation Absolute Resolve)* MSS kullanımı ve ABD'nin İran'a yönelik saldırılarını konu alan Destansı Öfke Operasyonu'nda *(Operation Epic Fury)* MSS kullanımı incelenecektir.

3.1. Mutlak Kararlılık Operasyonu'nda *(Operation Absolute Resolve)* Maven Smart System-MSS Kullanımı

3 Ocak 2026'da ABD tarafından Venezuela'ya yönelik başlatılan Mutlak Kararlılık Operasyonu *(Operation Absolute Resolve)* ülkenin lideri Nicholas Maduro'nun sistematik bir şekilde evinden dakikalar içinde alınmasıyla tarihteki en hızlı ve sıra dışı askeri operasyonlardan biri olarak nitelendirilmiştir. Bunlara ek olarak MSS'nin kullanılması açısında müdahale, askeri tarih açısından yapay zekâ destekli ilk büyük operasyonlardan biri olmasıyla öne çıkmaktadır (Evans, 2026).

Maduro'nun hedef alınmasının tarihsel kökenine kısaca değinilecek olunursa dört ana sebep sayılabilir. Bunlar; narko-terörizm, jeopolitik güç mücadelesi, siyasi tanıma sorunu ve ABD iç politikasında göç krizi şeklinde sıralanabilir (Seelke, 2026). Maduro'ya yöneltilen narko-terörizm suçlamasına göre, Maduro Venezuela siyasetinde aktif bulunduğu 2000'li yıllardan itibaren uyuşturucu baronlarına koruma sağlayarak uluslararası kartellerle ilişkiler kurmuş ve ABD'ye akan uyuşturucu trafiğini sürdürerek ulusal güvenlik tehdidi haline gelmiştir (U.S. Department of Justice, 2020). İkinci kökene bakıldığında Venezuela'nın batı yarım kürenin en zengin petrol rezervlerine sahip olması jeopolitik olarak ülkeyi cazip hale getirmektedir (Bartels 2026). ABD Başkanı Trump, Venezuela'ya başlatılan operasyondan bahsederken sahip olunan petrol rezervlerini de hedefler arasında göstermiştir. Nitekim 29 Ağustos 2026'da yapılan anlaşmayla Venezuela'nın 65 milyar varilden fazla petrolü üzerinde ABD kontrolünün sağlanmasıyla söz konusu hedefe yaklaşıldığı söylenebilir (Rennolds, 2026). Üçüncü köken ise, Maduro'nun 2024 seçimlerinde usulsüzlük yaptığı iddialarıyla ABD hükümetinin Maduro'yu ülkenin lideri olarak kabul etmemesi ve demokratik meşruiyetini tanımamasıyla meydana gelmiştir (Independent, 2024). Söz konusu "tanınmama" durumu, ABD'nin uluslararası hukukta yer alan "devlet başkanlarının dokunulmazlığı" ilkesini Mutlak Kararlılık Operasyonuyla ihlal ettiği eleştirilerinin reddedilmesine zemin hazırlamaktadır (Galbraith, 2020: 511). Ayrıca Maduro'nun Venezuela'dan operasyonla alınıp New York'ta yargılanabilmesini sağlayan hukuki boşluğu da beraberinde getirmektedir. 4. kökenin ise, ABD Başkanı Trump'ın seçmenine verdiği sınır güvenliğini sağlama sözünün uzantısı olarak geliştiği söylenebilir. Maduro rejimiyle Venezuela'nın içine sürüklendiği iddia edilen; hızla artan suç oranları, çete savaşları, gıda, ilaç ve temel hizmetlerdeki kıtlık ve enflasyon gibi sebeplerle 7.6 milyondan fazla Venezuelalı göç etmiştir. Bu minvalde göç krizi dünyanın en büyük yerinden edilme krizlerinden biri olarak anılmaktadır (UNHCR, 2026). Mültecilerin en çok Latin Amerika ve Karayip ülkelerini tercih etmesinin yanında, bu ülkelerinden geçerek ABD-Meksika sınırını aşan göçmenlerin sayısı da azımsanmayacak kadar fazladır (Munoz-Pogossian ve Winkler, 2023). Bu bağlamda ABD'nin Venezuela tarafında gelişen suç trafiği ve göç krizini, 2025 Ulusal Güvenlik Stratejisi'nde de belirtildiği üzere ulusal tehdit olarak kabul ettiği söylenebilir (The White House,2025a:11).

Tüm bu sebeplerin neticesinde düzenlenen operasyonda Trump'ın açıklamasına göre; Maduro Venezuela'nın başkenti Caracas'taki yüksek güvenlikli "askeri kalesinden" oldukça "basit" bir şekilde alınmıştır (Olay, 2026). Operasyonla ilgili Trump, kurumlar arası çalışmanın önemini ve sürecin pürüzsüzlüğünü vurgulamıştır.

Operasyonun bu kadar basit ve pürüzsüz ilerleyişi ile MSS'nin "iğneyi samanlıkta bulmak için tasarlanmış olması" prensibinin uygunluğu dikkat çekicidir. Söz konusu benzetmeyi MSS'nin mühendislerinden biri olan Patric Dods MSS'nin felsefesini Mart 2026'da gerçekleşen teknoloji konferansında anlatırken kullanmıştır (Johnson, 2026). Sistemin büyük veri setlerini eleyerek samanlıktaki saman sayısını azaltması, operasyon sürecinde Maduro'nun yakalanmasını hızlandırarak kolaylaştırmış gibi görünmektedir.

Trump tarafından verilen detaylara göre Operasyon, aylarca süren askeri hazırlığın devamında 3 Ocak 2026 gecesi saat 02.00'de Caracas'a düzenlenen siber saldırının elektrik şebekesinin çökertmesi ile başlamıştır (Olay, 2026). Ardından Maduro'nun üstün güvenlikli konutuna özel ekipler tarafından gerçekleştirilen baskında Venezuela lideri çelik kapılı sığınağına geçmesine sadece "47 saniye" kala yakalanmıştır (Evans, 2026). MSS, tüm istihbaratın toplanması ve sentezlenmesi sürecinde ve operasyon sırasında görevli ekibe hız kazandırmıştır. Yapay zekanın, hedefin belirlenmesinden yakalanmasına kadar geçen sürece verilen isim olan "saldırı zincirine" eklenmesi Mutlak Kararlılık Operasyonu'nun "insan üstü" bir saldırı başarısı olarak nitelendirilmesini sağlamıştır (Lewis-Kraus, 2026).

Cukor'a göre sistemin başarısı ve avantajları, Maduro'ya yapılan saldırının Afganistan'da yaşadığı deneyimlerle kıyaslandığında daha iyi anlaşılmaktadır. Cukor'ın aktarımıyla, Afganistan'daki görevleri sırasında MSS'nin atası sayılabilecek ve Google Earth, Excell, Word ve diğer bazı askeri yazılımların kullanılabildiği ilk model bilgisayarlardan biri operasyona dahil edilmiştir. O dönem için bu oldukça ileri bir teknolojik fırsat olarak değerlendirilebilir. Cukor'a göre sinyal verileri, istihbarat raporları ve sorgu tutanaklarından elde edilen bilgiler dönemin şartlarına göre bilgi bolluğu sunsa da görevlilerin bunları anlamlı bir şekilde bir araya getirmesine olanak bulunamamıştır. Bu sebeple hem organize olarak bilginin zamanında kullanılamaması hem de hedef bolluğunu eleyecek zaman olmaması nedeniyle sivil ölümleri gereğinden fazla yaşanmıştır (Lewis-Kraus, 2026). MSS'nin tüm bu eksikleri dolduracak şekilde, görevlilere verileri organize bir şekilde ileterek gerçek zamanlı tam bir savaş alanı görüntüsü sunması operasyona hedef odaklı başarı ve hız kazandırmıştır.

Çalışmanın devamında MSS kullanımının aktif savaş durumunda nasıl kullanıldığının değerlendirilmesi açısından İran'a karşı yürütülen Destansı Öfke Operasyonu'nda *(Operation Epic Fury)* Maven Smart System-MSS kullanımı ele alınacaktır.

3.2. Destansı Öfke Operasyonu'nda *(Operation Epic Fury)* Maven Smart Sytem-MSS Kullanımı

28 Şubat 2026'da İran'ın nükleer silah geliştirmesini önlemek, ülkenin petrol ve doğal gaz kaynaklarının stratejik önemi ve rejim değişikliği gerekçeleriyle ABD ve İsrail hükümetlerinin ortaklaşa yürüttüğü Destansı Öfke *(Operation Epic Fury*) ve Kükreyen Aslan *(Roaring Lion*) adlarını taşıyan askeri operasyonlar başlatılmıştır (U.S. Department of War, 2026f; Israel Defense Force, 2026). Şubat ayı boyunca (6, 17 ve 26 Şubat'ta) ABD ve İran arasında üç tur görüşme yapılmıştır. 17 Şubat'ta gerçekleştirilen 2. görüşmede iki taraf taslak metin üzerine anlaşsa da; söz konusu anlaşma, ABD tarafının nükleer zenginleştirmenin sıfıra indirilmesi üzerindeki ısrarı nedeniyle bozulmuştur. Böylece çatışmalar artarak devam etmiştir.

İran'a yönelik ilk saldırı dalgasının yoğunluğuyla İran hava savunma sistemleri çökertilmiş ve stratejik hava üstünlüğü elde edilmiştir. Saldırıda kullanılan MSS ile hedefler hızla tespit edilip önceliklendirilmiştir. MSS'nin; uygu görüntülerini, savaş alanı radar ve sinyal verilerini ve insansız hava araçlarının video yayınlarını bir platformda birleştirerek hedefleri sınırlandırması ve silah önerilerinde bulunması operasyona daha önce görülmemiş bir hız kazandırmıştır. Bu minvalde saldırının ilk 24 saatinde 1000'den fazla hedef vurulmuştur (Dwoskin ve Duncan, 2026). Ayrıca mühimmat alanı dışında hedefleme ve karar seviyesinde ilk kez yapay zekâ sistemleri kullanıldığı için savaş "ilk yapay zekâ savaşı" olarak da nitelendirilmiştir (Brown, 2026). Bunun sebebi, Mutlak Kararlılık ve Destansı Öfke Operasyonları'nın Haziran 2025'te İran'a yönelik gerçekleştirilen Midnight Hammer Operasyonu'ndan amaç ve hedef temelli ayrılmasında aranabilir. Midnight Hammer Operasyonu'nda da MSS kullanıldığı bilinmekle birlikte yalnızca nükleer tesisler hedef alınmıştır. 2026 yılında yeniden başlatılan saldırılar da ise, İran hükümetinin zayıflatılmasını amaçlayan daha uzun saldırılar gerçekleştirildiği söylenebilir. Ayrıca yalnızca nükleer tesisler değil; siyasi figürler, füze üretim ve askeri tesisler hedef alınmıştır (Rodgers ve Schiff, 2026).

Saldırının ilk gününde İran'ın dini lideri Hamaney ve çok sayıda İranlı üst düzey yetkili öldürülmüştür (Brezar, 2026). 16 Mart'ta ABD Savaş Bakanlığı tarafından açıklanan saldırının bilançosuna göre; 7.000'den fazla hedef vurulmuş, 100'den fazla İran'a ait askeri gemi tahrip edilmiş ve 6.500'den fazla savaş uçuşu gerçekleştirilmiştir (U.S. Central Command, 2026a). 6 Nisan verilerine göre ise; 13.000'den fazla hedef vurmuş ve İran'a ait 155'ten fazla askeri gemisi batırılmıştır (U.S. Central Command, 2026b). Bu veriler ışığında Savaş Bakanı Hegseth

saldırıların her geçen gün yoğunlaştığını ve Hürmüz Boğazı'nda kurdukları hakimiyeti vurgulamıştır (Heghset, Caine Hold Press Conference, 2026). Saldırıların başlamasından 31 Temmuz 2026'ya kadar gerçekleştirilen bütün operasyonları büyük bir başarı olarak nitelendiren Trump, operasyonel kontrolün tam olarak sağlanmasının önemine vurgu yapmıştır. Ayrıca Savaş Bakanlığı'nın başarısına da vurgu yapılırken; benzer sistemler kullanılarak gerçekleştirilen Yemen ve Venezuela'daki operasyonlarda elde edilen başarıların ardında teknolojiye ve orduya yapılan yatırımların olduğu belirtilmiştir (Lopez, 2026). ABD'nin Ortadoğu'daki askeri güçlerinin başında görev alan Amiral Brad Cooper da, yapay zekâ sistemlerinin sayısız veriyi çok hızlı bir şekilde taramasının savaş durumunda düşman karşısında benzeri görülmemiş avantaj sağladığını belirtmiştir (The White House, 2026).

Ancak Destansı Öfke Operasyonu'nda hedef aralığının genişlemesi MSS sistemi için farklı sorunları ortaya çıkarmıştır. Eğitimlerde sistem tarafından hedefleme başarısı erken dönemde %60'larda iken bu oran geliştirilerek %80'e kadar çıkarılabilmiştir. İnsan operatörlerin hedefleme başarısı yavaş olmasına rağmen %84 olmuştur (Manson, 2024). Nitekim saldırıların başladığı gün olan 28 Şubat 2026'da MSS tarafından hedef listesine alındığı daha sonra Pentagon tarafından kabul edilen Shajareh Tayyebeh İlkokulu'nun vurulması, çoğu çocuk olan 175 sivilin hayatını kaybetmesine neden olmuştur. Savunma İstihbarat Teşkilatı veri tabanındaki uydu görüntülerine göre, tesis askeri tesis olarak sınıflandırılmıştır. Ancak tesisin statüsünün, en geç 2016 yılında yapılan değişikliklerle okula dönüştürüldüğü anlaşılmıştır. Söz konusu değişikliğin sisteme yansıtılmaması gibi bir ihmal, yapay zekâ sistemiyle hızla sivil kayıplara dönüşebilmiştir (Baker, 2026). Aynı gün Lamerd kentinde yer alan bir spor salonuna düzenlenen saldırıda 21 sivil hayatını kaybetmiştir (Triebert ve Ismay, 2026). Saldırıların farklı bir noktasında ise, kullanılan füzeden kopan bir parçanın sokakta oynayan 2 yaşındaki Avina Barzegar'a isabet etmesiyle sivil kayıplar yaşanmaya devam etmiştir (Triebert vd., 2026). ABD Merkez Komutanlığı'nın (CENTCOM) sivil ölümlerine gelen tepkilere yönelik yaptığı açıklamada, o gün bölgede herhangi bir saldırı düzenlenmediğini belirtilmiştir (U.S. Central Command, 2026c). Fakat İran kaynaklarına göre; 28 Şubat-3 Mart aralığında Tahran merkezine yönelik devam eden bombalama sonucunda sivil kayıplar 1.300'ü aşmıştır. Ardından hava saldırılarının yoğun olduğu 9 Mart'ta 252 sivil hayatını kaybetmiştir. 2 Eylül'de Kuhestak'ta düğün kutlamasına isabet eden füze parçaları da 4 kişinin hayatını kaybetmesine ve 67 kişinin yaralanmasına sebep olmuştur (Coughlan vd., 2026).

Ele alınan örnekler sivillerin güvenliği ve hedef alınması tartışmalarını gündeme getirirken saldırılarda yapay zekâ kullanımını ve yapay zekanın etiği tartışmalarını da alevlendirmiştir (Yager, 2026). Ayrıca söz konusu durumun, küresel yapay zekâ silahlanma yarışını tetikleyeceği yönündeki endişeleri de artırdığı söylenebilir (Stephens, 2026). BM İnsan Hakları Yüksek Komiseri Türk; bağlayıcı kurallar ve denetim mekanizmaları olmadan yapay zekanın tam otonomi kararları ve savaşta kullanılmasıyla ilgili endişelerini 7 Eylül 2026'da başlayan 63. İnsan Hakları Konseyi'nde dile getirmiştir (United Nations, 2026).

Diğer yandan tüm eleştirilerin gölgesinde, Anthropic'in kurucu ortağı ve CEO'su olan Amodei, 26 Şubat 2026'da ABD ve diğer demokrasileri savunmak ve otokratik rakiplere karşı üstünlük sağlamak için yapay zekâ kullanımının önemini vurgulamıştır. Ancak Amodei askeri kararların şirket tarafından değil, ABD hükümeti ve Savunma Bakanlığı tarafından verildiğinin altını çizmiştir. Bu açıklamanın, söz konusu tartışmalarda şirketi sorumluluğun dışına itmeye yönelik olduğu söylenebilir. Daha önce bahsedildiği üzere, şirketin askeri operasyonlarına itiraz etmemesinin yanında kullanımının sınırlanmasını istediklerini de dile getirilmiştir (Anthropic, 2026). "ABD ve diğer demokrasileri savunmak" ifadesinin, savaş alanında yapay zekâ kullanımının meşrulaştırılması yönünde bir kolaylaştırıcı niteliği taşıdığı söylenebilir. Söz konusu gerekçenin benzerinin Irak ve Afganistan Savaşları'nda da kullanıldığı söylenebilir. Bu bağlamda, o dönem kullanılan "bölgeye demokrasi götürme" gerekçesiyle, Destansı Öfke Operasyonu'nda kullanılan "demokrasiyi savunma" gerekçesinin benzerliği dikkat çekicidir. Açıklamanın devamında Amodei şirketin, dar bir vaka grubunda yapay zekanın demokratik değerleri savunmak yerine zayıflatabileceği sonucuna vardığını da belirtmiştir (Anthropic, 2026). CENTCOM sözcüsü sivillerin asla hedef alınmadığını belirtse de İran Dışişleri Bakanlığı sözcüsü Bakai, sivilleri hedef alan saldırıların savaş suçu olarak kabul edilmesi gerektiğini belirtmiştir (Coughlan vd., 2026; U.S. Central Command, 2026c).

MSS'nin saldırılara kattığı hız su götürmez bir gerçekken, söz konusu hızın yarattığı stratejik avantaj insan hakları açısından büyük bir dezavantaj riskini içinde barındırmaktadır. İngiltere'deki Queen Mary Üniversitesi'nden Prof. Elke Shwarz'a göre de; saldırılarda güç ve ölçeğe öncelik verilmesi, hedef seçiminde gereken süreyi daraltarak anlamlı hedef seçimini riske sokmaktadır (Cieslak ve Murphy, 2026). Bu durumda sivillerin güvenliği tehlikeye girebilmektedir. Palantir'in İngiltere ve Avrupa Başkanı Mosley, MSS'nin İran saldırılarında belirleyici rol oynadığını belirtirken; sistemin bir destek ekibi olarak görülmesi gerektiğini hatırlatmaktadır. Sistemin hedef belirlemede sağladığı hız düşünülürse destek ekibi olarak konumlandırılması son derece anlaşılır hale gelmektedir. Üstelik şirket saldırılardan doğacak sorumluluğun teknolojiyi kullanan kurumlara ait olduğunu her

fırsatta dile getirmektedir. Schwarz da öldürme kararının makinelere devredilmesinin sistemlere bağımlılığı arttıracağını ve insanlığı büyük bir yıkıma sürükleyeceğini vurgulamaktadır (Cieslak ve Murphy, 2026).

4. SONUÇ

Bu çalışma Donald Trump döneminde (2017-2021 ve 2021-) ABD'nin savunma politikalarında yapay zekânın yerini Maven Projesi üzerinden analiz ederek, aynı dönemin savunma politikalarını oluşturan; ulusal çıkarın öncelenmesi ve büyük güç rekabetinde ABD liderliği için yapay zekânın soyut bir kavram olmaktan çıkarılarak savaş alanına nasıl uygulandığını ortaya koymuştur. İnceleme sonucunda söz konusu dönemin savunma politikalarıyla Maven Projesi'nin gelişiminin paralellik gösterdiği çıkarımına varılabilir. 2017 yılında başlatılan Maven Projesi'nin ABD ordusunun savaş alanında liderliğini pekiştirecek şekilde geliştirildiği söylenebilir. Bu bağlamda oluşturulan MSS, yapay zekanın savaş alanında kullanımını kolaylaştırarak hedef seçiminde analistlere benzeri görülmemiş bir hız sağlamaktadır. Öyle ki Sistem, ABD ordusunun resmi askeri programı olarak yasalaştırılmıştır. 2025 yılında Savunma Bakanlığı'nın adının Savaş Bakanlığı olarak değiştirilmesi de Maven Projesi ile elde edilen yıkıcı askeri güçle aynı mesajı paylaşmaktadır. Sistemin hedef tespit güvenilirliği, kullanıldığı operasyonlarda yaşanan sivil ölümleriyle tartışılır hale gelse de sorumluluk ne ABD hükümeti ne de özel şirketler tarafından kabul edilmektedir. Üstelik tüm bu soru işaretlerinin ardında, ABD savunma politikalarında, sistemin geliştirilmesi adına bürokratik engelleri kaldırmaya yönelik adımlar atılmaya devam edilmektedir.

KAYNAKÇA

Anthropic. (2025, July 14). “Anthropic and the Department of Defense to advance responsible AI in defense operations”. 20.07.2026 tarihinde https://www.anthropic.com/news/anthropic-and-the-department-of-defense-to-advance-responsible-ai-in-defense-operations adresinden erişildi.

Anthropic. (2026, February 26). “Statement from Dario Amodei on our discussion with the Department of War”. 20.07.2026 tarihinde https://www.anthropic.com/news/statement-department-of-war adresinden erişildi.

Baker, Kevin T. (2026, February 28). “AI got the blame for the Iran school bombing. The truth is far more worrying”, *Guardian.* 21.07.2026 tarihinde https://www.theguardian.com/news/2026/mar/26/ai-got-the-blame-for-the-iran-school-bombing-the-truth-is-far-more-worrying adresinden erişildi.

Bartels, Meghan. (2026, January 7).” Why Does Venezuela Have So Much Oil? Geology”, *Scientific American.* 21.07.2026 tarihinde https://www.scientificamerican.com/article/trump-wants-venezuelas-oil-why-does-it-have-so-much/ adresinden erişildi.

BBC. (2018, June 2). “Google ‘to end’ Pentagon Artificial Intelligence Project”. 25.07.2026 tarihinde https://www.bbc.com/news/business-44341490 adresinden erişildi.

Brezar, Alexander. (2026, Şubat 28). “Trump, İran dini lideri Ali Hamaney'in öldürüldüğünü açıkladı”. *Euronews.* 25.07.2026 tarihinde https://tr.euronews.com/2026/02/28/israil-iran-dini-lideri-ali-hamaneyin-oldurulduguna-acikladi adresinden erişildi.

Brown, Michael. (2026, March 30). “The First AI War: How The Iran Conflict Is Reshaping Warfare”. *Forbes.* 27.07.2026 tarihinde

https://www.forbes.com/sites/mikebrown/2026/03/30/the-first-ai-war-how-the-iran-conflict-is-reshaping-warfare/ adresinden erişildi.

Cho, Claire Y. and Harris, Laurie. (2026, July 31). Federal Government and Anthropic: Considerations for AI Innovation and Competition. 05.08.2026 tarihinde https://www.congress.gov/crs-product/IF13217 adresinden erişildi.

Cieslak, Marc and Murphy, Matt. (2026, April 6). “ABD, İran savaşında yapay zekayı nasıl kullanıyor, teknolojiyi sunan şirket ne diyor?”, BBC. 23.07.2026 tarihinde https://www.bbc.com/turkce/articles/ckge3x8n53zo adresinden erişildi.

Coughlan, Joe and Keeanan, Claire and Gritten, David. (2026, September 2). “Iran says US strike killed four at wedding in 'war crime' as US denies targeting civilians”, *BBC.* 03.09.2026 tarihinde https://www.bbc.com/news/articles/cj06q4ynpmjo adresinden erişildi.

Deputy Secretary of Defense. (2021, December 8). Memorandum on Establishment of the Chief Digital and Artificial Intelligence Office. 28.07.2026 tarihinde https://media.defense.gov/2021/Dec/08/2002906075/-1/-1/1/MEMORANDUM-ON-ESTABLISHMENT-OF-THE-CHIEF-DIGITAL-AND-ARTIFICIAL-INTELLIGENCE-OFFICER.PDF adresinden erişildi.

Dwoskin, Elizabeth and Duncan, Ian. (2026, March 4). “Anthropic’s AI tool Claude central to U.S. campaign in Iran, amid a bitter feud”. *The Washington Post.* 05.08.2026 tarihinde https://www.washingtonpost.com/technology/2026/03/04/anthropic-ai-iran-campaign/ adresinden erişildi.

Evans, Gareth. (2026, January 4). “Spies, drones and blowtorches: How the US captured Maduro”, *BBC*. 06.08.2026 tarihinde https://www.bbc.com/news/articles/cdred61epg4o adresinden erişildi.

Galbraith, Jean. (2020, July). “U.S. Department of Justice Indicts Venezuelan Leader Nicolás Maduro on Narcotrafficking Charges”, *American Journal of International Law*. Volume 114, Issue: 3. ss. 511-518.

Garamone, Jım. (2018, January 22). "National Defense Strategy a ‘Good Fit for Our Times,’ Mattis Says", *U.S. Central Command.* 10.08.2026 tarihinde https://www.centcom.mil/MEDIA/NEWS-ARTICLES/News-Article-View/Article/1420843/national-defense-strategy-a-good-fit-for-our-times-mattis-says/ adresinden erişildi.

"Heghset, Caine Hold Press Conference". (2026, April 24). *U.S. Department of War.* 20.08.2026 tarihinde https://www.war.gov/Multimedia/Videos/videoid/1003859/ adresinden erişildi.

Israel Defense Force. (2026, April 20). *Operation Roaring Lion: The Numbers*. 10.07.2026 tarihinde https://www.idf.il/en/mini-sites/iran-israel-war-2026/articles-iran-israel-war-2026/operation-roaring-lion-the-numbers/ adresinden erişildi.

Independent. (2024, Ağustos 30). *Avrupa Birliği, Maduro'nun "demokratik meşruiyetini" tanımıyor.* 16.07.2026 tarihinde https://www.indyturk.com/node/744286/d%C3%BCnya/avrupa-birli%C4%9Fi-maduronun-demokratik-me%C5%9Fruiyetini-tan%C4%B1m%C4%B1yor adresinden erişildi.

Jeans, David. (2026, March 21). "Pentagon to adopt Palantir AI as core US military system, memo says". *Reuters.* 03.06.2026 tarihinde https://www.reuters.com/technology/pentagon-adopt-palantir-ai-as-core-us-military-system-memo-says-2026-03-20/ adresinden erişildi.

Jhonson, O'Ryan. (2026, March 13). "Pentagon AI chief praises Palantir tech for speeding battlefield strikes", *The Register.* 10.05.2026 tarihinde https://www.theregister.com/on-prem/2026/03/13/pentagon-praises-palantir-tech-for-battlefield-strike-speed/5224851 adresinden erişildi.

Lewis, James Andrew and Allan, Gregory C. (2022, October 3). "A Space Innovation Deep Dive with Maxar Technologies". *CSIS.* 13.06.2026 tarihinde https://www.csis.org/analysis/what-maven-smart-system-and-what-does-it-do adresinden erişildi.

Lewis- Krause, Gideon. (2026, April 15). "How Project Maven Put A.I. Into the Kill Chain", *The New Yorker.* 14.07.2026 tarihinde https://www.newyorker.com/books/under-review/how-project-maven-put-ai-into-the-kill-chain adresinden erişildi.

Lopez, C. Todd. (2020, February 25). "DOD Adopts 5 Principles of Artificial Intelligence Ethics", *U.S. Department of War*. 02.06.2025 tarihinde https://www.war.gov/News/News-Stories/article/article/2094085/dod-adopts-5-principles-of-artificial-intelligence-ethics/ adresinden erişildi.

Lopez, C. Todd. (2026,July 31). "Hegseth: Department Success Buoyed by Courage, Spirit, Leadership". *U.S. Department of War.* 02.09.2026 tarihinde https://www.war.gov/News/News-Stories/Article/Article/4561838/hegseth-department-success-buoyed-by-courage-spirit-leadership/ adresinden erişildi.

Mahadzir, Dzirhan. (2022, September 15). US., "Japanese Defense Chiefs Reaffirm Alliance in Pentagon Meeting". *USNI NEWS.* 18.07.2026 tarihinde https://news.usni.org/2022/09/15/u-s-japanese-defense-chiefs-reaffirm-alliance-in-pentagon-meeting adresinden erişildi.

Mande, Matt and Allan, Gregory C. (2026, June 2). "What is Maven Smart System and What Does It Do?", *CSIS.* 05.07.2026 tarihinde https://www.csis.org/analysis/what-maven-smart-system-and-what-does-it-do adresinden erişildi.

Manson, Katharina. (2024, February 28). "U.S. military operators started out skeptical about AI, but now the are the onesdeveloping and using Project Maven to identify targets on the battlefield", *Bloomberg.* 18.08.2026 tarihinde https://www.bloomberg.com/features/2024-ai-warfare-project-maven/ adresinden erişildi.

Mearsheimer, Jhon J. (2019). "Bound to Fail: The Rise and Fall of the Liberal International Order", *International Security, 43 (4): ss.7-50.*

Munoz-Pogossian, Betilde and Winkler, Aleksandra. (2023, November 27). "The Persistence of the Venezuelan Migrant and Refugee Crisis", *CSIS*, 10.06.2026 tarihinde https://www.csis.org/analysis/persistence-venezuelan-migrant-and-refugee-crisis adresinden erişildi.

NITRD. (2019 June) *The National Artificial Intelligence Research and Development Strategic Plan: 2019*

Update. 12.06.2026 tarihinde https://www.nitrd.gov/pubs/National-AI-RD-Strategy-2019-printer.pdf adresinden erişildi.

Olay, Matthew. (2026, January 3). "Trump Announces U.S. Military's Capture of Maduro", *U.S. Department of War.* 17.07.2026 tarihinde https://www.war.gov/News/News-Stories/Article/Article/4370431/trump-announces-us-militarys-capture-of-maduro/ adresinden erişildi.

Palantir. (2026a). "AIP overview". 25.07.2026 tarihinde https://www.palantir.com/docs/foundry/aip adresinden erişildi.

Palantir. (2026b, March 13). Multi-Domain AI: The Future of Command and Control I CDAO at AIPCon 9 [Video]. 07.08.2026 tarihinde https://www.youtube.com/watch?v=yrtDgoqWmgM adresinden erişildi.

Pellerin, Cheryl. (2017, July 21). "Project Maven to Deploy Computer Algorithms to War Zone by Year's End". *U.S. Department of War.* 12.08.2026 tarihinde https://www.war.gov/News/News-Stories/Article/Article/1254719/project-maven-to-deploy-computer-algorithms-to-war-zone-by-years-end/ adresinden erişildi.

Probasco, Emelia S. (2024, August). "Building the Tech Coalition: How Project Maven and the U.S. 18th Airborne Corps Operationalized Software and Artificial Intelligence for the Department of Defense". *CSET*. 03.08.2026 tarihinde https://cset.georgetown.edu/wp-content/uploads/CSET-Building-the-Tech-Coalition-1.pdf adresinden erişildi.

Radin, Andrew. (2022, October 30). "How Should the U.S. Military Share Secrets?", *RAND*. 16.08.2026 tarihinde https://www.rand.org/pubs/commentary/2022/10/how-should-the-us-military-share-secrets.html adresinden erişildi.

Rennolds, Nathan. (2026, August 29). "Trump: ABD, Venezuela'nın 65 milyar varillik petrolü için anlaşma yaptı", *Euro News.* 03.09.2026 tarihinde https://tr.euronews.com/2026/08/29/trump-abd-venezuelanin-65-milyar-varillik-petrolu-icin-anlasma-yapti adresinden erişildi.

Reuters. (2026, August 28). "US judge rules Pentagon blacklisting of Anthropic unlawful*". REUTERS.* 29.08.2026 tarihinde https://www.reuters.com/world/us-judge-rules-pentagon-blacklisting-anthropic-unlawful-2026-08-28/ adresinden erişildi.

Rodgers, Joseph and Schiff, Bailey. (2026, February 28). "Operation Epic Fury and the Remnants of Iran's Nuclear Program", *CSIS*. 11.07.2026 tarihinde https://www.csis.org/analysis/operation-epic-fury-and-remnants-irans-nuclear-program adresinden erişildi.

Romya Bilgin, Kıvılcım ve Küçükşabanoğlu, Zafer. (2023). "ABD'nin Yeni Güç Staratejisinde Yapay Zeka", *Turkish Studies-Economics, Finance, Politics,* Vol.18(1), ss. 273-289.

Seelke, Clare Ribando. (2026, January 12). *U.S. Capture of Venezuela's Nicolás Maduro: Considerations for Congress* (CRS Insight No. IN12618). Congressional Research Service. 09.08.2026 tarihinde https://www.congress.gov/crs-product/IN12618 adresinden erişildi.

Seren, Merve. (2018). "Trump Yönetimi'nin Ulusal Savunma Stratejisi", *Thinktank STM Teknolojik Düşünme Merkezi.* 15.08.2026 tarihinde https://thinktech.stm.com.tr/tr/trump-yonetiminin-ulusal-savunma-stratejisi adresinden erişildi.

Stephans, Morgan. (2026, June 4). "Fact Check Team: AI is already changing warfare, the debate now is who controls it"*, The National News Desk.* 12.08.2026 tarihinde https://thenationaldesk.com/news/fact-check-team/fact-check-team-ai-is-already-changing-warfare-the-debate-now-is-who-controls-it-software-military-leaders-systems adresinden erişildi.

The White House. (2002). *The National Security Strategy of the United States of America.* 13.04.2025 tarihinde https://2009-2017.state.gov/documents/organization/63562.pdf adresinden erişildi.

The White House. (2011). *National Strategy for Counterterrorism.* 12.05.2025 tarihinde https://obamawhitehouse.archives.gov/sites/default/files/counterterrorism_strategy.pdf adresinden erişildi.

The White House. (2025a, November). National Security Strategy. 14.06.2026 tarihinde https://www.whitehouse.gov/wp-content/uploads/2025/12/2025-National-Security-Strategy.pdf adresinden erişildi.

The White House. (2025b, September 5). *RESTORING THE UNITED STATES DEPARTMENT OF WAR.* 12.06.2026 tarihinde https://www.whitehouse.gov/presidential-actions/2025/09/restoring-the-united-states-department-of-war/ adresinden erişildi.

The White House. (2026, March 12). *Operation Epic Fury: Decisive American Power to Crush Iran's Terror Regime.* 15.07.2026 tarihinde https://www.whitehouse.gov/releases/2026/03/operation-epic-fury-decisive-american-power-to-crush-irans-terror-regime/ adresinden erişildi.

Triebert, Chiristiaan and Ismay, John. (2026, March 29). "New U.S. Missile Hit Iranian Sports Hall and School, Analysis Shows" *New York Times.* 07.08.2026 tarihinde https://www.nytimes.com/2026/03/29/world/middleeast/us-precision-strike-missile-iran-lamerd.html adresinden erişildi.

Triebert, Christian and Ismay, John and Cardia, Alexander and Abraham, Leanne and Khan, Azmat. (2026, April 10). "New Evidence Further Implicates U.S. Missiles in Strikes That Killed 21 Civilians in Iran", *New York Times.* 12.08.2026 tarihinde https://www.nytimes.com/2026/04/10/world/middleeast/iran-us-missle-strike-civilians-lamerd.html adresinden erişildi.

UNHCR. (2026, July 15). *Venezuela Crisis Explained*. 17.06.2026 tarihinde https://www.unrefugees.org/news/venezuela-crisis-explained/ adresinden erişildi.

United Nations. (2026, September 7). *AI: Türk urges action before it becomes an 'existential risk to humanity'.* 09.09.2026 tarihinde https://news.un.org/en/story/2026/09/1168288 adresinden erişildi.

U.S. Central Command. (2026a, March 16). *Operation Epic Fury Fact Sheets.* 04.06.2026 tarihinde https://media.defense.gov/2026/Mar/16/2003899496/-1/-1/1/OPERATION-EPIC-FURY-FACT-SHEET.PDF

U.S. Central Command. (2026b, April 6). *Operation Epic Fury Fact Sheets.* https://www.centcom.mil/Portals/6/Documents/Publications/260406-FactSheet.pdf?ver=ezk_KiJvld1N84sCwrTJEg%3D%3D adresinden erişildi.

U.S. Central Command. (2026c, March 31). *CENTCOM Refutes Media Claims of U.S. Strikes in Lamerd, Iran.* 12.07.2026 tarihinde https://www.centcom.mil/MEDIA/PUBLIC-RELEASES/Article/4448978/centcom-refutes-media-claims-of-us-strikes-in-lamerd-iran/ adresinden erişildi.

U.S. Department of Justice. (2020, March 26). *Nicolás Maduro Moros and 14 Current and Former Venezuelan Officials Charged with Narco-Terrorism, Corruption, Drug Trafficking and Other Criminal Charges.* 06.08.2026 tarihinde https://www.justice.gov/archives/opa/pr/nicol-s-maduro-moros-and-14-current-and-former-venezuelan-officials-charged-narco-terrorism adresinden erişildi.

U.S. Department of State. (2017, December 8). *President Trump Releases National Security Strategy*. 10.04.2026 tarihinde https://2017-2021.state.gov/president-trump-releases-national-security-strategy/ adresinden erişildi.

U.S Department of Defense. (2018a). *Summary of the 2018 National Defense Strategy. https://media.defense.gov/2020/May/18/2002302061/-1/-1/1/2018-NATIONAL-DEFENSE-STRATEGY-SUMMARY.PDF*

U.S Department of Defense. (2018b) *SUMMARY OF THE 2018 DEPARTMENT OF DEFENSE ARTIFICIAL INTELLIGENCE STRATEGY.* 10.04.2026 tarihinde https://media.defense.gov/2019/Feb/12/2002088963/-1/-1/1/SUMMARY-OF-DOD-AI-STRATEGY.PDF adresinden erişildi.

U.S. Department of Defense. (2022, March). *SUMMARY OF THE JOINT ALL-DOMAIN COMMAND & CONTROL (JADC2) STRATEGY.* 11.04.2026 tarihinde https://media.defense.gov/2022/Mar/17/2002958406/-1/-1/1/SUMMARY-OF-THE-JOINT-ALL-DOMAIN-COMMAND-AND-CONTROL-STRATEGY.PDF adresinden erişildi.

U.S. Department of War. (2025, December 9). *The War Department Unleashes AI on New GenAI.mil* Platform. 14.05.2026 tarihinde https://www.war.gov/News/Releases/Release/Article/4354916/the-war-department-unleashes-ai-on-new-genaimil-platform/ adresinden erişildi.

U.S Department of War. (2026a, January 2-3). *2026 National Defense Strategy.* 02.06.2026 tarihinde https://media.defense.gov/2026/Jan/23/2003864773/-1/-1/0/2026-NATIONAL-DEFENSE-STRATEGY.PDF adresinden erişildi.

U.S Department of War. (2026b, January 9). *Artificial Intelligence Strategy for the Department of War*. 03.06.2026 tarihinde https://media.defense.gov/2026/Jan/12/2003855671/-1/-1/0/ARTIFICIAL-INTELLIGENCE-STRATEGY-FOR-THE-DEPARTMENT-OF-WAR.PDF adresinden erişildi.

U.S Department of War. (2026c, January 12). *War Department Launches AI Acceleration Strategy to Secure American Military AI Dominance,* 05.05.2026 tarihinde https://www.war.gov/News/Releases/Release/Article/4376420/war-department-launches-ai-acceleration-strategy-to-secure-american-military-ai/ adresinden erişildi.

U.S. Department of War. (2026d, June 16). *Secretary of War Pete Hegseth hosted bilateral meeting with the Italian Republic Defense Minister His Excellency Guido Crosetto at the Pentagon.* 18.06.2026 tarihinde https://www.war.gov/News/Transcripts/Transcript/Article/4518707/secretary-of-war-pete-hegseth-hosted-bilateral-meeting-with-the-italian-republi/ adresinden erişildi.

U.S. Department of War. (2026e, May 20). *Department of War Report on Force Structure Changes for the Fiscal Year (FY) 2027 Defense Budget.* 12.06.2026 tarihinde https://search.usa.gov/search?query=FY%202027&affiliate=osd_comptroller&utf8=%26%23x2713%3B adresinden erişildi.

U.S. Department of War. (2026f, February 28). *Operation Epic Fury*. 07.06.2026 tarihinde https://www.war.gov/Spotlights/Operation-Epic-Fury/ adresinden erişildi.

Urwin, Matthew. (2026, September 9). *The Pentagon Is Going All In on AI as Big Tech Battles for Its Business.* 11.09.2026 tarihinde https://builtin.com/articles/pentagon-ai-chatbot-contracts adresinden erişildi.

Vincent, Brandi. (2022, September 9). "Amid a high-stakes transition, questions linger about Project Maven's future management". *Defensescoop*. 18.07.2026 tarihinde https://defensescoop.com/2022/09/09/amid-a-high-stakes-transition-project-mavens-future-management-remains-unclear%ef%bf%bc/ adresinden erişildi.

Vincent, Brandi. (2026a, February 3). "CDAO invests in AI-enabled translation for military-wide use". *Defensescoop*. 23.05.2026 tarihinde https://defensescoop.com/2026/02/03/ai-enabled-translation-military-use-cdao-lilt-contract/ adresinden erişildi.

Vincent,Brandi. (2026b, August 5). "Pentagon appoints new Maven Smart System program director in fresh push for C2 integration". *Defensescoop*. 10.08.2026 tarihinde https://defensescoop.com/2026/08/05/pentagon-appoints-new-maven-smart-system-program-director/ adresinden erişildi.

Yager, Sarah. (2026, April 6). "Americans Deserve Answers About Civilian Casualties in Iran", *Human Rights Watch*. 18.06.2026 tarihinde https://www.hrw.org/news/2026/04/06/americans-deserve-answers-about-civilian-casualties-in-iran adresinden erişildi.

Weisgerber, Marcus. (2017, December 21). "The Pentagon's New Artificial Intelligence Is Already Hunting Terrorists". *Defense One.* 12.05.2026 tarihinde https://www.defenseone.com/technology/2017/12/pentagons-new-artificial-intelligence-already-hunting-terrorists/144742/ adresinden erişildi.

Teknoloji Geliştirme Bölgelerinde Girişim Sermayesi Yatırım Yükümlülüğü Kapsamında Kuluçka Firmalarının Analitik Hiyerarşi Süreci ile Değerlendirilmesi[9]

Esmanur Yılmaz[1] **Dr. Öğr. Üyesi Sadiye Oktay[2]**

[1] Yıldız Teknik Üniversitesi, Sosyal Bilimler Enstitüsü, İşletme Ana Bilim Dalı, e-mail: esmanuryilmaz2016@gmail.com ORCID: 0009-0003-3816-2208

[2] Yıldız Teknik Üniversitesi, İktisadi ve İdari Bilimler Fakültesi, İşletme Bölümü, e-mail: sadiye@yildiz.edu.tr, ORCID: 0000-0003-4458-2535

Özet: Teknoloji Geliştirme Bölgeleri (TGB'ler), yenilikçi girişimlerin desteklenmesi ve yüksek katma değerli üretimin artırılması açısından kritik bir rol üstlenmektedir. Son dönemde TGB'lerde faaliyet gösteren girişimci firmalara getirilen girişim sermayesi yatırım yükümlülüğü, kuluçka firmalarına yapılacak yatırımların daha sistematik doğrultuda değerlendirilmesi ihtiyacını doğurmuştur. Ancak uygulamada yatırım kararlarının çoğunlukla subjektif yaklaşımlara dayandığı ve standart bir değerlendirme modelinin bulunmadığı görülmektedir. Bu çalışmanın amacı, TGB bünyesinde faaliyet gösteren kuluçka firmalarının girişim sermayesi yatırımı açısından değerlendirilmesine yönelik bilimsel bir karar destek modeli geliştirmektir. Bu çerçevede yatırım karar verme sürecini etkileyen faktörler; teknoloji düzeyi, Ar-Ge düzeyi, şirketin yetenekleri ve işletme becerileri, finansal modelleme ve pazarlanabilirlik gibi unsurlardan oluşmaktadır. Araştırmada, yatırım yapılacak kuluçka firmalarını değerlendirme kriterleri belirlenirken, bir devlet üniversitesine bağlı teknopark kuluçka firma komisyonu görüşleri dikkate alınmıştır. Devamında girişimcilik ve kuluçka ekosisteminde, girişim sermayesi alanında çalışmalarını sürdüren uzman kişi doğrultusunda ikili karşılaştırma matrisleri oluşturulmuş, kriterlerin ağırlıkları ve modelin tutarlılığı AHP yöntemi ile değerlendirilmiştir. Elde edilen sonuçlara göre, yatırım kararlarının verilmesi sürecinde finansal modelleme ve ticari potansiyel kriterinin ön plana çıktığı tespit edilmiştir. AHP yönteminin kullanıldığı bu modelleme ile daha ölçülebilir ve sistematik bir karar destek mekanizması oluşturulmuştur. Bu araştırma ile, TGB yönetici şirketleri ve yatırımcılar için pratik bir karar destek modeli geliştirilmesi ve akademik alana katkı sağlanması hedeflenmiştir.

Anahtar Kelimeler: Teknoloji Geliştirme Bölgeleri, Kuluçka Firmaları, Girişim Sermayesi, Analitik Hiyerarşi Süreci, Çok Kriterli Karar Verme

Abstract: Technology Development Zones (TDZs) play a critical role in supporting innovative startups and increasing high-value-added production. The venture capital investment requirement recently imposed on entrepreneurial firms operating in TGBs has created a need for a more systematic evaluation of investments in incubator firms. However, in practice, it is observed that investment decisions are largely based on subjective approaches and that there is no standard evaluation model. The objective of this study is to develop a scientific decision-support model for evaluating startup firms operating within TGBs in terms of venture capital investment. In this context, the factors influencing the investment decision-making process include the level of technology, the level of R&D, the company's capabilities and managerial skills, financial modeling, and marketability. In the study, the opinions of the incubator company committee at a technology park affiliated with a public university were taken into account when determining the evaluation criteria for incubator companies to receive investment. Subsequently, pairwise comparison matrices were created based on the guidance of an expert active in the field of venture capital within the entrepreneurship and incubator ecosystem, and the weights of the criteria and the consistency of the model were evaluated using the Analytic Hierarchy Process (AHP) method. According to the results obtained, it was determined that financial modeling and commercial potential criteria take precedence in the investment decision-making process. Using the AHP method in this modeling process has created a more measurable and systematic decision-support mechanism. This research aims to develop a practical decision-support model for TGB management companies and investors and to contribute to the academic field.

Keywords: Technology Development Zones, Incubator Companies, Venture Capital, Analytic Hierarchy Process, Multi-Criteria Decision Making

1. GİRİŞ

TGB'ler, teknoloji tabanlı üretimin artırılması, yenilikçi girişimlerin desteklenmesi ve ekonomik katma değerin yükseltilmesi açısından kritik bir rol üstlenmektedir. Girişim sermayesi, teknoloji odaklı girişimlerin büyüme ve ticarileşme süreçlerinde önemli bir finansman kaynağı olarak görülmekte, yatırımların başarı şansını artırmaktadır (Sharma ve Monika, 2015). Bununla birlikte, girişim sermayesi yatırım kararları, hem nicel hem de nitel ölçütleri içeren çok sayıda faktörü barındırdığı için Çok Kriterli Karar Verme (ÇKKV) problemidir (Belton ve Stewart, 2002; Saaty, 1980).

[9]Bu çalışma ikinci yazarın danışmanlığında yürütülmekte olan yüksek lisans tezinden türetilmiştir.

Öte yandan TGB'lerde faaliyet gösteren kuluçka firmalarının girişim sermayesi yatırımı bakımından değerlendirilmesi; girişimlerin finansmana erişimi, sürdürülebilir büyümesi ve ticarileşme süreçlerinin başarısı açısından kritik bir unsur olarak görülmektedir (Phan vd., 2005).

Mevcut uygulamalarda, TGB girişimci firmaları tarafından yapılan yatırım kararlarında çoğunlukla subjektif değerlendirmeler ön plandadır; bu durum, karar süreçlerinin tutarlılığını ve nesnelliğini zayıflatmaktadır. Yatırım karar süreçlerinde finansal modelleme ve ticari potansiyel kadar teknolojik düzey ve AR-GE seviyesi, kurumsal yetkinlik ve operasyonel beceri gibi nitel faktörler de önem taşımaktadır (Sharma ve Monika, 2015).

Literatürde, girişim sermayesi yatırım kararlarının çok sayıda kriteri aynı anda değerlendirmeyi gerektirdiği ve bu nedenle ÇKKV problemleri kapsamında ele alınması gerektiği vurgulanmaktadır (Kollmann vd., 2010). Ancak TGB'lerde kuluçka firmalarının değerlendirilmesine yönelik standartlaştırılmış ve sistematik bir modelin sınırlı olması, yatırım kararlarının karşılaştırılabilirliğini ve şeffaflığını azaltmaktadır.

AHP, karmaşık karar problemlerinde nicel ve nitel faktörlerin bütünleşik şekilde değerlendirilebilmesini sağlayan ÇKKV yöntemlerinden biridir (Saaty, 1980). AHP; karar kriterlerini hiyerarşik bir yapıda organize eder, karar vericilerin ikili karşılaştırmalar ile göreli önem değerlerini belirlemesine olanak tanır ve nihai karar ağırlıklarını tutarlı bir şekilde hesaplar. Bu özelliği ile AHP, yatırım alternatiflerinin değerlendirilmesinde kapsamlı bir çerçeve sunmaktadır.

Bu çalışmada, firmaların yatırım yapacakları kuluçka firmalarının seçim sürecinde yararlanabilecekleri sistematik bir karar destek modelinin geliştirilmesi amaçlanmaktadır. Bu doğrultuda, yatırım kararında etkili olan temel kriterler belirlenerek söz konusu kriterlerin karar sürecindeki göreli önem düzeylerinin ortaya konulması hedeflenmektedir.

Böylece çalışmayla, girişim sermayesi yatırımı yapacak firmaların yatırım kararlarını alırken kullanabileceği bir modelleme sunarak, uygulama alanında kullanılabilirlik hedeflenmiştir. Aynı zamanda akademik literatür açısından değerlendirildiğinde, kuluçka firmalarının değerlendirilmesi ile ÇKKV yöntemlerinin birlikte ele alındığı çalışmaların sınırlı olması nedeniyle, bu çalışma literatüre özgün bir katkı sunmaktadır.

2. TEKNOLOJİ GELİŞTİRME BÖLGELERİ (TGB)

2.1. TGB Kavramı

TGB'ler, üniversiteler, araştırma kurumları ve özel sektör arasında bilgi ve teknoloji transferini hızlandırmayı amaçlayan; Ar-Ge ve yenilik faaliyetlerinin yoğunlaştığı, özel teşvik mekanizmalarıyla desteklenen yapılardır. Bu bölgeler bilgi temelli üretim, yenilik projeleri ve teknoloji ticarileştirmesi konusunda etkili bir politika aracı olarak değerlendirilebilir (Phan vd., 2005).

TGB'ler 2000'lerin başından beri Türkiye'de yenilik sürecinde önemli bir rol oynamaktadır. Bu tür bölgelerin temel amacı üniversitelerde üretilen bilimsel bilgiyi ekonomik değere dönüştürmek ve yüksek teknoloji üretimini teşvik etmektir. Bu bölgelerde faaliyet gösteren firmaların büyük çoğunluğu yazılım, savunma, biyoteknoloji ve elektronik gibi yüksek katma değerli sektörlerde yer almaktadır (TÜBİTAK, 2021). Ayrıca TGB'ler; kuluçka merkezleri, hızlandırma programları ve diğer mekanizmalar aracılığıyla başlangıç aşamasındaki işletmelerin gelişimine yardımcı olmaktadır.

2.2. 4691 Sayılı Kanun Kapsamında Teşvikler

TGB'lerin Türkiye'deki yasal temeli, 4691 sayılı TGB Kanunu ile oluşturulmuştur. Bu kanun, söz konusu bölgelerin kuruluşunu, yönetimini ve bazı temel teşviklerini belirlemektedir.

Kanunun Geçici 2. maddesi kapsamında, bölgede faaliyet gösteren firmaların münhasıran Ar-Ge, yazılım ve tasarım faaliyetlerinden elde ettikleri kazançlar belirli sürelerle gelir ve kurumlar vergisinden istisna edilmektedir. Aynı düzenleme çerçevesinde, bölgede çalışan Ar-Ge ve destek personelinin ücretleri üzerinden hesaplanan gelir vergisi için de istisna uygulanmaktadır. Buna ek olarak, işverenlere yönelik sigorta primi desteği sağlanarak nitelikli istihdam teşvik edilmektedir. Tüm bu teşvikler bölgedeki firmalara bazı yükümlülükleri de doğurmaktadır.

3. GİRİŞİM SERMAYESİ VE TGB'LERDE YATIRIM YÜKÜMLÜLÜĞÜ

3.1. Girişim Sermayesi

Girişim sermayesi, yüksek büyüme potansiyeline sahip ancak finansal risk düzeyi yüksek olan girişimlere sağlanan öz sermaye temelli bir finansman türü olarak tanımlanmaktadır. Bu finansman modeli, özellikle erken aşama (early-stage) ve gelişme aşamasındaki (growth-stage) girişimlerin desteklenmesinde önemli bir rol oynamaktadır. Geleneksel finansman yöntemlerinden farklı olarak girişim sermayesi, yalnızca finansal kaynak sağlamakla kalmayıp aynı zamanda yönetsel bilgi birikimi, stratejik rehberlik ve ağ (network) desteği de sunmaktadır (Gompers ve Lerner, 2001).

Girişim sermayesi yatırımcılarının yatırım yapmadan önce dikkate aldığı çok sayıda farklı faktör bulunmaktadır. Bunun nedeni, girişim sermayesi yatırım kararlarının doğası gereği ÇKKV problemi olmasıdır (Zacharakis ve Meyer, 2000).

3.2. TGB'lerde Girişim Sermayesi Yatırım Yükümlülüğü

Türkiye'de TGB'lerde faaliyet gösteren firmalar için girişim sermayesi yatırım yükümlülüğünün yasal dayanağı, 4691 sayılı TGB Kanunu'na 28.01.2021 tarihli ve 7263 sayılı Kanun'un 6. maddesiyle eklenen Ek Madde 3'tür. Bu düzenlemeye göre 01.01.2022 tarihinden itibaren, Kanun'un geçici 2. maddesi kapsamında yıllık beyanname üzerinden istisna edilen kazanç tutarı belirli bir haddin üzerinde olan mükellefler, istisna tutarının belirli bir oranını pasifte geçici bir hesaba aktarmak ve bu tutarı ilgili yılın sonuna kadar girişim sermayesi yatırımlarında değerlendirmekle yükümlüdür (4691 sayılı Kanun, Ek Madde 3). Söz konusu had, 31.12.2025 tarihli Resmî Gazete'de yayımlanan 10803 sayılı Cumhurbaşkanı Kararı ile 01.01.2026 tarihinden itibaren geçerli olmak üzere 5.000.000 TL, oran %3 ve yıllık üst sınır 100.000.000 TL olarak belirlenmiştir (10803 sayılı Cumhurbaşkanı Kararı, 2025).

Bu kapsamda yatırımlar; girişim sermayesi yatırım fonu paylarının satın alınması, girişim sermayesi yatırım ortaklıklarına sermaye olarak konulması ya da kuluçka merkezlerinde faaliyette bulunan diğer girişimcilere doğrudan sermaye olarak konulması yoluyla gerçekleştirilebilmektedir (4691 sayılı Kanun, Ek Madde 3).

Girişim sermayesi yatırım yükümlülüğünün uygulanmasında karşılaşılan muhtemelen en önemli sorun, yatırım kararlarının öznel bir temele dayanması ve karar verme kriterlerinin standartlaştırılmamış olmasıdır. Erken aşama girişimlerdeki yüksek belirsizlik düzeyi, finansal verilerin sınırlı olması ve finansal olmayan faktörlerin değerlendirilmesindeki güçlükler nedeniyle süreç karmaşık bir hâl almaktadır (Zacharakis ve Meyer, 2000). Bunun yanı sıra mevzuatta genel çerçeve çizilmiş olmakla birlikte, uygulamaya yönelik detaylı bir değerlendirme standardının bulunmaması, yatırım yükümlülüğü bulunan firmaların karar verme sürecini zorlaştırmaktadır.

4. KULUÇKA MERKEZLERİ VE KULUÇKA FİRMALARI

4.1. Kuluçka Merkezleri ve Kuluçka Firmalarının Özellikleri

Kuluçka merkezleri, erken aşama girişimlerin hayatta kalma olasılıklarını artırmak, büyüme süreçlerini hızlandırmak ve sürdürülebilir iş modelleri geliştirmelerine katkı sağlamak amacıyla oluşturulan kurumsal yapılardır. Bu merkezler, girişimcilere yalnızca fiziksel bir çalışma ortamı sunmakla sınırlı kalmayıp; mentorluk, eğitim, profesyonel danışmanlık, iş ağı geliştirme ve finansmana erişim gibi çok boyutlu destek mekanizmaları sağlamaktadır (Hackett ve Dilts, 2004).

Kuluçka firmaları, genellikle erken aşamada bulunan, yenilikçi iş fikirlerine sahip ve yüksek büyüme potansiyeli taşıyan girişimler olarak tanımlanmaktadır. Bu girişimler, iş modellerinin uygulanabilirliğini henüz kanıtlamamış olmaları ve bunu gerçekleştirmek için sınırlı finansal kaynaklara sahip bulunmaları nedeniyle riskli işletmelerdir (Grimaldi ve Grandi, 2005). Söz konusu belirsizlik; pazar dinamikleri, müşteri davranışları ve girişimin elde edeceği gelirlerin öngörülmesindeki güçlüklerle ilişkilidir.

4.2. Kuluçka Firmalarının Değerlendirilmesi

Kuluçka firmalarının başarısı, çok sayıda içsel ve dışsal faktörün bir araya gelmesiyle şekillenmektedir. Literatürde, girişimlerin performansını belirleyen temel unsurlar arasında girişimci ekip, teknolojik yetkinlik, pazar koşulları ve

destek mekanizmalarının etkinliği ön plana çıkmaktadır (Colombo ve Grilli, 2005). Girişimci ekibin bilgi birikimi, deneyimi ve liderlik becerileri, girişimin gelecekteki gelişimini belirleyen en önemli unsurlar arasında değerlendirilmektedir (MacMillan vd., 1985; Colombo ve Grilli, 2005). Bunun yanında teknolojik yeniliğin düzeyi ve girişimin sunduğu ürün/hizmetin kullanışlılığı, girişime rekabet avantajı sağlayabilecek temel unsurlar arasında yer almaktadır (Kakati, 2003).

Bu nedenle kuluçka firmalarının değerlendirilmesi, çok boyutlu ve karmaşık bir süreçtir. Bu süreçte hem nicel (ölçülebilir) hem de nitel (öznel) kriterlerin birlikte ele alınması gerekmektedir. Literatürde, girişim değerlendirme süreçlerinin ÇKKV yaklaşımları ile analiz edilmesinin daha sağlıklı sonuçlar verdiği ifade edilmektedir (Zacharakis ve Meyer, 2000). Bu çalışmada temel alınan değerlendirme kriterleri Teknolojik Düzey ve AR-GE Seviyesi, Kurumsal Yetkinlik ve Operasyonel Beceri ile Finansal Modelleme ve Ticari Potansiyel olmak üzere üç ana başlık altında toplanmaktadır. Kriterlerin önem derecelerinin belirlenmesi ise analitik yöntemlerin kullanılmasını gerektirmekte olup AHP gibi yöntemler, karar sürecinin sistematik ve objektif bir şekilde yürütülmesine katkı sağlamaktadır (Saaty, 2008).

5. LİTERATÜR İNCELEMESİ

Girişim sermayesi yatırımlarının değerlendirilmesine yönelik literatür incelendiğinde, yatırım kararlarının çok boyutlu kriterlere dayandığı görülmektedir. Bu kapsamda yapılan çalışmalar, yatırımcıların karar süreçlerinde finansal göstergelerin yanı sıra girişimci ekip, pazar potansiyeli ve teknolojik yenilik gibi faktörleri de dikkate aldığını ortaya koymaktadır. Özellikle erken aşama girişimlerde belirsizlik düzeyinin yüksek olması, yatırım kararlarının büyük ölçüde öznel değerlendirmelere dayanmasına neden olmaktadır (Zacharakis ve Meyer, 2000).

Literatürde, girişim sermayesi yatırımcılarının karar süreçlerini modellemeyi amaçlayan çalışmalar da yer almaktadır. Tyebjee ve Bruno (1984), yatırımcıların yatırım fırsatlarını değerlendirme sürecini aşamalı bir model çerçevesinde ele almıştır. Zacharakis ve Meyer (2000) ise istatistiksel karar modellerinin girişim sermayesi yatırım kararlarının isabetini artırıp artıramayacağını incelemiştir. Bu çalışmalar, yatırım kararlarının daha sistematik bir temele oturtulması gerektiğine dikkat çekmektedir. Bununla birlikte ilgili literatürün önemli bir kısmının, yatırımcıların dikkate aldığı genel değerlendirme kriterlerinin belirlenmesine odaklandığı görülmektedir (Sharma ve Monika, 2015).

AHP, ÇKKV problemlerinde yaygın olarak kullanılan bir yöntem olup, yatırım kararlarının değerlendirilmesinde de çeşitli çalışmalarda uygulanmıştır. AHP'nin, farklı kriterlerin önemlerini belirlemede sağladığı sistematik yapı, yatırım alternatiflerinin karşılaştırılmasında önemli avantajlar sunmaktadır (Saaty, 2008). Ancak yöntemin çok kriterli karar problemlerinde etkin bir şekilde kullanıldığı görülmekle birlikte, TGB'lerde girişim sermayesi yatırım yükümlülüğü kapsamında kuluçka firmalarının değerlendirilmesine yönelik uygulamaların oldukça sınırlı olduğu anlaşılmaktadır. Özellikle mevzuat kaynaklı yatırım zorunluluğu ile analitik karar modellerinin birlikte ele alındığı çalışmaların eksikliği dikkat çekmektedir. Bu araştırma ile eksikliğin giderilebilmesi amaçlanmıştır.

Bu bağlamda literatürde üç temel boşluk öne çıkmaktadır: (i) TGB'ler özelinde girişim sermayesi yatırım kararlarını sistematik olarak ele alan modellerin yetersizliği, (ii) kuluçka firmalarının değerlendirilmesinde çok kriterli ve analitik yaklaşımların sınırlı kullanımı, (iii) mevzuat temelli yatırım yükümlülüğü ile karar destek sistemlerini bütünleştiren çalışmaların eksikliği. Bu çalışma, söz konusu boşlukları gidererek TGB bünyesindeki kuluçka firmalarının değerlendirilmesine yönelik AHP tabanlı bir karar destek modeli geliştirebilmeyi amaçlamaktadır.

6. ARAŞTIRMA YÖNTEMİ

6.1. Araştırmanın Amacı ve Önemi

Bu araştırmanın amacı, TGB'lerde faaliyet gösteren kuluçka firmalarının yatırım yönünden değerlendirilmesinde kullanılabilecek sistematik bir karar destek modeli geliştirmektir. Bu doğrultuda ÇKKV yöntemlerinden AHP kullanılarak yatırım kararlarını etkileyen kriterlerin belirlenmesi ve bu kriterlerin önem derecelerinin ortaya konulması hedeflenmiştir.

TGB' lerde faaliyet gösteren kuluçka firmaları, yüksek büyüme potansiyeline sahip olmakla birlikte, gelişim süreçlerinin doğası gereği önemli ölçüde belirsizlik ve finansal kaynak ihtiyacı barındırmaktadır. Bu durum, söz konusu firmalara yönelik yatırım kararlarında finansal göstergelerin yanı sıra farklı değerlendirme kriterlerinin de dikkate alınması gerektiğini ortaya koymaktadır. Araştırmanın önemi, yatırım kararlarını etkileyen çok sayıda

kriteri aynı değerlendirme sistemi içerisinde ele alan bilimsel ve sistematik bir model önermesidir. Geliştirilen model sayesinde yatırım değerlendirme süreçlerinde subjektif kararların azaltılması, karar verme süreçlerinin standartlaştırılması ve yatırım kaynaklarının daha etkin kullanılması mümkün olabilecektir. Akademik açıdan ise çalışma, girişim sermayesi alanında AHP yönteminin uygulanmasına yönelik literatüre katkı sunmaktadır.

6.2. Araştırma Soruları

Araştırma kapsamında aşağıdaki sorulara cevap aranmıştır:

1. Kuluçka firmalarına yönelik yatırım kararlarını etkileyen temel kriterler nelerdir?
2. Belirlenen kriterlerin yatırım kararındaki göreli önem düzeyleri nedir?
3. Yatırım değerlendirme sürecinde hangi kriterler daha yüksek önceliğe sahiptir?
4. Analitik Hiyerarşi Süreci yöntemi, kuluçka firmalarının yatırım açısından değerlendirilmesinde etkin bir karar destek aracı olarak kullanılabilir mi?
5. Geliştirilen model, yatırım kararlarının daha sistematik ve tutarlı biçimde verilmesine katkı sağlayabilir mi?

6.3. Araştırmanın Varsayımları ve Sınırlılıkları

Araştırmada, bir devlet üniversitesine bağlı teknoparkta görevine devam eden katılımcıların girişimcilik, teknoloji geliştirme ve yatırım değerlendirmesi konusunda yeterli bilgi ve deneyime sahip olduğu, sorulara tarafsız ve gerçek görüşlerini yansıtacak biçimde cevap verdikleri varsayılmıştır. Ayrıca ilgili teknopark kuluçka komisyonu tarafından belirlenen kriterlerin yatırım karar verme sürecini etkileyen temel faktörleri temsil ettiği ve AHP yönteminin kriterlerin önem derecelerinin belirlenmesinde uygun ve güvenilir sonuçlar üreteceği kabul edilmiştir.

Araştırma, yalnızca bir devlet üniversitesi teknoparkı yönetiminde görev alan kuluçka komisyonu ve girişimcilik ekosisteminin kesişiminde bulunan uzman kişinin görüşleri çerçevesinde gerçekleştirildiğinden, elde edilen sonuçların diğer TGB'lere veya farklı girişimcilik ekosistemlerine doğrudan genellenmesi mümkün olmayabilir. AHP yöntemi karar vericilerin öznel değerlendirmelerine dayandığından, tutarlılık analizi yapılmış olsa da sonuçlar katılımcıların bilgi ve deneyim düzeyinden etkilenebilmektedir. Bunun yanında sonuçlar araştırmanın gerçekleştirildiği dönem ile sınırlı olup kullanılan kriterler yatırım kararlarını etkileyebilecek tüm değişkenleri kapsamayabilir.

6.4. Araştırmanın Modeli

Bu araştırma, TGB'lerde faaliyet gösteren kuluçka firmalarının yatırım açısından değerlendirilmesine yönelik geliştirilen AHP tabanlı bir karar destek modeline dayanmaktadır. Araştırma modelinde en üst düzeyde araştırmanın temel amacı olan "Kuluçka Firmalarının Yatırım Açısından Değerlendirilmesi" yer almaktadır. İkinci düzeyde yatırım kararlarını etkileyen ana kriterler, üçüncü düzeyde ise her ana kriter altında yer alan alt kriterler bulunmaktadır. Tüm kriterler bir devlet üniversitesi teknoparkı kuluçka firma komisyonu görüşleri doğrultusunda belirlenmiş olup modelin hiyerarşik yapısı Tablo 1'de gösterilmektedir.

Tablo 1: Kuluçka Firma Değerlendirme Ana Kriterleri

	Ana Kriterler (Ana Faktörler)
Kuluçka Firma Değerlendirme Ana Kriterleri	**Teknolojik Düzey ve AR-GE Seviyesi**
	Kurumsal Yetkinlik ve Operasyonel Beceri

	Ana Kriterler (Ana Faktörler)
	Finansal Modelleme ve Ticari Potansiyel

Araştırma kapsamında, bir devlet üniversitesine bağlı teknopark bünyesinde görev alan ve girişim sermayesi alanında deneyime sahip uzman kişinin değerlendirmesi ile kriterler arasında ikili karşılaştırmalar yapılmış ve AHP yöntemi kullanılarak kriter ağırlıkları hesaplanmıştır. Böylece yatırım süreçlerinde kullanılabilecek sistematik, ölçülebilir ve tekrarlanabilir bir karar destek modeli geliştirilmiştir. Araştırmanın devamında bu ana kriterle bağlı alt kriterler de belirlenerek kriter ağırlıkları hesaplanacaktır.

6.5. Veri Analizi Yöntemi

İşletmelerin karar süreçlerinde başvurduğu güncel yaklaşımlardan biri, ÇKKV yöntemleridir. Karar verme sürecinin nicel ve nitel özellik taşıyan birden fazla kriter ile amacı eş zamanlı olarak dikkate almayı gerektirdiği durumlarda, ÇKKV yöntemleri sistematik ve bütüncül bir değerlendirme çerçevesi sağlamaktadır (Belton ve Stewart, 2002). ÇKKV yöntemleri arasında yaygın olarak kullanılanlardan biri AHP'dir. AHP, temel olarak mevcut alternatifler arasından en uygun olanın belirlenmesine dayanan bir yöntemdir (Saaty, 1980).

AHP uygulaması; karar probleminin tanımlanması, modelin kurulması, problemin ayrıştırılması, kriterler arası ikili karşılaştırmaların yapılması ve önceliklerin oluşturulması ile karşılaştırma matrislerinin tutarlılık analizlerinin yapılması şeklinde belirli aşamalarda gerçekleştirilmektedir (Oğuzlar, 2007: 125). İkili karşılaştırmalarda karar verici açısından bir kriterin diğerine göre ne kadar önemli olduğu, Tablo 2'de verilen 1-9 puanlı tercih (önem) ölçeği ile belirlenmektedir (Kuruüzüm ve Atsan, 2001: 87-88).

Tablo 2: AHP Sürecinde Kullanılan Önem Dereceleri Tablosu

Önem Derecesi	Değer Tanımları	Açıklama
1	Eşit Önemli	Her iki faktörün eşit öneme sahip olması durumu
3	Orta Derecede Önemli	1. faktörün 2. faktörden biraz daha önemli olması durumu
5	Kuvvetli Düzeyde Önemli	1. faktörün 2. faktöre göre kuvvetle daha önemli olması durumu
7	Çok Kuvvetli Düzeyde Önemli	1. faktörün 2. faktöre nazaran yüksek derecede kuvvetli öneme sahip olması durumu
9	Tamamıyla Önemli-Aşırı Düzeyde Önem	1. faktörün 2. faktöre nazaran çok yüksek derecede öneme sahip olması durumu
2,4,6,8	Ara değerler - Ortalama Değerler	İki faktör arasında yapılan tercihte küçük farklar olması durumu

Kaynak: Saaty (1994).

Karar vericinin kıyaslama yaparken tutarlı olup olmadığını ölçmek için Saaty tarafından önerilen Tutarlılık İndeksinin (CI), tesadüfilik göstergesine bölünmesiyle elde edilen Tutarlılık Oranı (CR) hesaplanmaktadır (Erkiletlioğlu, 2000: 76-77). Saaty, tutarlılık oranının üst limitini %10 olarak belirlemiştir; bu oranın üzerindeki bir değer için yargıların yeniden gözden geçirilmesi gerekmektedir (Yurdakul, 2002: 25-26). Çalışmada karşılaştırma matrislerinin hesaplanmasında Super Decisions programından yararlanılmıştır.

7. BULGULAR

Girişim sermayesi yatırım yükümlülüğü bulunan firmaların yatırım yapacakları kuluçka firmasının belirlenmesinde, öncelikle ana kriterler birbirleriyle ikili olarak karşılaştırılmıştır. Ana kriterlere ait ikili karşılaştırma matrisi ve öncelik değerleri Tablo 3'te gösterilmektedir.

Tablo 3: Ana Kriterlerin İkili Karşılaştırma Matrisi ve Öncelik Değerleri

	Teknolojik Düzey ve AR-GE Seviyesi	Kurumsal Yetkinlik ve Operasyonel Beceri	Finansal Modelleme ve Ticari Potansiyel	Kriter Öncelik Değ.
Teknolojik Düzey ve AR-GE Seviyesi	1	2	1/3	0.21
Kurumsal Yetkinlik ve Operasyonel Beceri	1/2	1	1/6	0.08

Finansal Modelleme ve Ticari Potansiyel	3	6	1	0.71

Tutarlılık Oranı (CR) = 0.031

AHP analizi sonucunda, kuluçka firmalarının girişim sermayesi yatırımı açısından değerlendirilmesinde Finansal Modelleme ve Ticari Potansiyel kriteri %71 ağırlıkla en yüksek önceliğe sahip ana kriter olarak belirlenmiştir. Bu kriteri %21 ağırlıkla Teknolojik Düzey ve AR-GE Seviyesi ile %8 ağırlıkla Kurumsal Yetkinlik ve Operasyonel Beceri takip etmektedir.

Elde edilen sonuçlar, yatırım kararlarında finansal sürdürülebilirlik ve ticarileşme potansiyelinin belirleyici olduğunu göstermektedir. Bu bulgu, girişim sermayesi yatırımlarında pazar potansiyeli, beklenen getiri, iş modeli ve finansal unsurların önemli değerlendirme kriterleri olduğunu ortaya koyan çalışmalarla genel olarak uyumludur (MacMillan vd., 1985; Gompers vd., 2020). Teknolojik Düzey ve AR-GE Seviyesi kriterinin %21'lik ağırlığı, teknolojik yetkinliğin yatırım kararlarında kritik bir faktör olduğunu ancak tek başına yeterli olmadığını göstermektedir. Kurumsal Yetkinlik ve Operasyonel Beceri kriterinin %8'lik ağırlığı ise bu kriterin önemsiz olduğu anlamına gelmemekte, yalnızca diğer kriterlere kıyasla daha düşük önceliğe sahip olduğunu göstermektedir.

Ana kriterlerin öncelik durumları ile tutarlılık oranları Tablo 4'te gösterilmektedir.

Tablo 4: Ana Kriterlerin Öncelik Durumları ve Tutarlılık

Ana Kriterler	Kriterlerin Öncelikleri	Tutarlılık Oranları (CR)
Teknolojik Düzey ve AR-GE Seviyesi	0.21	0.031
Kurumsal Yetkinlik ve Operasyonel Beceri	0.08	0.031
Finansal Modelleme ve Ticari Potansiyel	0.71	0.031

Tablo 4'te tutarlılık oranının (CR = 0.031) Saaty tarafından önerilen %10 sınırının altında olduğu görülmektedir. Buna göre karar vericinin yaptığı karşılaştırmaların tutarlı olduğu, bir başka deyişle verilen değerlerin uyum sınırları içinde yer aldığı söylenebilir.

8. SONUÇ VE ÖNERİLER

Bu araştırmada, TGB'lerde faaliyet gösteren kuluçka firmalarının yatırım yönünden değerlendirilmesinde kullanılabilecek sistematik bir karar destek modeli geliştirilmiştir. Modelde belirlenen kriterler AHP yöntemi ile analiz edilmiştir. Sonuçlar, kuluçka firmalarının yatırım açısından değerlendirilmesinde finansal ve ticari, teknolojik ve kurumsal faktörlerin önem düzeylerinin farklılaştığını göstermektedir.

Araştırmanın sonuçlarına göre "Finansal Modelleme ve Ticari Potansiyel" kriteri, %71'lik ağırlıkla en önemli kriterdir. İkinci sırada %21 ağırlıkla "Teknolojik Düzey ve AR-GE Seviyesi", üçüncü sırada ise %8 ağırlıkla "Kurumsal Yetkinlik ve Operasyonel Beceri" yer almaktadır. Buna göre kuluçka firmalarının yatırıma uygunluğu değerlendirilirken teknolojiye dayalı bir girişimin ekonomik değeri önemli bir faktördür. Teknolojiye dayalı bir girişim ürün veya hizmet yeniliği gerçekleştirmeli; ancak yatırım değerlendirmesi açısından öncelik, bu yeniliğin pazarda karşılık bulması ve ekonomik değere dönüşmesi olmalıdır.

Bu yapı, kuluçka firmalarının yatırım yapılabilirliğinin tek bir boyut veya gösterge üzerinden değerlendirilmemesi gerektiğini göstermektedir. Finansal ve ticari potansiyele verilen yüksek ağırlık, yatırım değerlendirmesinin şirketin gelecekte yaratacağı ekonomik faydalar temelinde yapıldığını ortaya koymaktadır. Teknolojik ve kurumsal faktörlere daha düşük ağırlık verilmesi ise bu faktörlerin önemsiz olduğu anlamına gelmemektedir. Teknolojik potansiyel, şirketin sunduğu yenilikçi değer önerisinin temelini oluştururken yönetim ve teknik ekibin deneyimi, bu potansiyeli gerçekleştirmede tamamlayıcı bir faktör olarak ele alınabilir.

Bu doğrultuda, TGB yönetici şirketleri ve girişim sermayesi yatırımcıları tarafından kullanılmak üzere, AHP ile elde edilen kriter ve ağırlıklara dayanan standartlaştırılmış bir yatırım ön değerlendirme sistemi geliştirilmesi önerilmektedir. Bununla birlikte geliştirilen modelin, nihai yatırım kararını tek başına belirleyen bir mekanizma olarak değil, yatırım komitesinin değerlendirmesini destekleyen bir karar destek aracı olarak kullanılması daha uygun olacaktır. Diğer bir taraftan yapılan doğru yatırım, gelişmek isteyen kuluçka firması için de ekonomik rahatlama ve sosyal bir iş ağı kazandıracaktır.

Araştırmanın bir devlet üniversitesi teknoparkı özelinde gerçekleştirilmiş olması, sonuçların değerlendirilmesinde dikkate alınması gereken bir sınırlılıktır. Gelecekte modelin farklı TGB' lerde ve daha geniş uzman gruplarının

katılımıyla uygulanması, ayrıca model sonuçlarının firmaların sonraki dönem performanslarıyla karşılaştırılması önerilmektedir.

Sonuç olarak bu çalışma, TGB' lerde girişim sermayesi yatırımları bağlamında kuluçka firmalarını değerlendirmek için çok kriterli bir yöntem ortaya koymaktadır. Önerilen AHP temelli model, kuluçka firmalarının yatırım yapılabilirliğinin sistematik ve karşılaştırılabilir biçimde değerlendirilmesine olanak sağlayan bir karar destek aracı niteliğindedir.

KAYNAKÇA

Belton, V., & Stewart, T. (2002). Multiple Criteria Decision Analysis: An Integrated Approach. Springer.

Colombo, M. G., & Grilli, L. (2005). Founders' human capital and the growth of new technology-based firms: A competence-based view. Research Policy, 34(6), 795–816. https://doi.org/10.1016/j.respol.2005.03.010

Erkiletlioğlu, A. (2000). İşletmelerde karar verme ve analitik hiyerarşi yöntemi ile bir uygulama [Yayımlanmamış yüksek lisans tezi]. Gazi Üniversitesi, Sosyal Bilimler Enstitüsü.

Gompers, P. A., Gornall, W., Kaplan, S. N., & Strebulaev, I. A. (2020). How do venture capitalists make decisions? Journal of Financial Economics, 135(1), 169–190. https://doi.org/10.1016/j.jfineco.2019.06.011.

Gompers, P., & Lerner, J. (2001). The venture capital revolution. Journal of Economic Perspectives, 15(2), 145–168. https://doi.org/10.1257/jep.15.2.145

Grimaldi, R., & Grandi, A. (2005). Business incubators and new venture creation: An assessment of incubating models. Technovation, 25(2), 111–121. https://doi.org/10.1016/S0166-4972(03)00076-2

Hackett, S. M., & Dilts, D. M. (2004). A systematic review of business incubation research. The Journal of Technology Transfer, 29, 55–82. https://doi.org/10.1023/B:JOTT.0000011181.11952.0f

Kakati, M. (2003). Success criteria in high-tech new ventures. Technovation, 23(5), 447–457. DOI: 10.1016/S0166-4972(02)00014-7.

Kollmann, T., & Kuckertz, A. (2010). Evaluation uncertainty of venture capitalists' investment criteria. *Journal of Business Research, 63*(7), 741–747. https://doi.org/10.1016/j.jbusres.2009.06.004

Kuruüzüm, A., & Atsan, N. (2001). Analitik hiyerarşi yöntemi ve işletmecilik alanındaki uygulamaları. Akdeniz İİBF Dergisi, 1(1), 83–105.

MacMillan, I. C., Siegel, R., & Narasimha, P. N. S. (1985). Criteria used by venture capitalists to evaluate new venture proposals. Journal of Business Venturing, 1(1), 119–128. DOI: 10.1016/0883-9026(85)90011-4.

Monika, & Sharma, A. K. (2015). Venture capitalists' investment decision criteria for new ventures: A review. Procedia - Social and Behavioral Sciences, 189, 465–470. https://doi.org/10.1016/j.sbspro.2015.03.195

Oğuzlar, A. (2007). Analitik hiyerarşi süreci ile müşteri şikayetlerinin analizi. Akdeniz İİBF Dergisi, 7(14), 122–134. https://dergipark.org.tr/tr/pub/auiibfd/article/359117

Phan, P. H., Siegel, D. S., & Wright, M. (2005). Science parks and incubators: Observations, synthesis and future research. Journal of Business Venturing, 20(2), 165–182. https://doi.org/10.1016/j.jbusvent.2003.12.001

Saaty, T. L. (1980). The analytic hierarchy process: Planning, priority setting, resource allocation. McGraw-Hill.

Saaty, T. L. (1994). How to make a decision: The analytic hierarchy process. Interfaces, 24(6), 19–43. https://doi.org/10.1287/inte.24.6.19

Saaty, T. L. (2008). Decision making with the analytic hierarchy process. International Journal of Services Sciences, 1(1), 83–98. DOI: 10.1504/IJSSCI.2008.017590.

TÜBİTAK (2021). Türkiye'de Teknoloji Geliştirme Bölgeleri Raporu https://tubitak.gov.tr/sites/default/files/2023 09/tubitak_2021_yili_faaliyet_raporu_1.pdf

Tyebjee, T. T., & Bruno, A. V. (1984). A model of venture capitalist investment activity. *Management Science, 30*(9), 1051–1066. https://doi.org/10.1287/mnsc.30.9.1051

Yurdakul, M. (2002). Measuring a manufacturing system's performance using Saaty's system with feedback approach. Integrated Manufacturing Systems, 13(1), 25–34. DOI: 10.1108/09576060210411486.

Zacharakis, A. L., & Meyer, G. D. (2000). The potential of actuarial decision models: Can they improve the venture capital investment decision? Journal of Business Venturing, 15(4), 323–346.

10803 sayılı Cumhurbaşkanı Kararı. (2025). Resmî Gazete, 31.12.2025.

4691 Sayılı Teknoloji Geliştirme Bölgeleri Kanunu https://www.mevzuat.gov.tr/mevzuat?MevzuatNo=4691&MevzuatTur=1&MevzuatTertip=5

7263 sayılı Teknoloji Geliştirme Bölgeleri Kanunu ile Bazı Kanunlarda Değişiklik Yapılmasına Dair Kanun. (2021). Kabul tarihi: 28.01.2021.

Son Kilometre Lojistiği: Kavramsal Çerçeve ve Literatür İncelemesi

Dr. Öğr. Üyesi. Elif GİLANLI[1]

[1] Trakya Üniversitesi / Havsa Meslek Yüksekokulu, Yönetim ve Organizasyon Bölümü, elifgilanli@trakya.edu.tr, ORCID: 0000-0001-8803-3736

Özet: Teknolojinin gelişmesiyle birlikte tüketicilerin satın alma alışkanlıklarında önemli değişimler meydana gelmiştir. Günümüzde tüketiciler, dünyanın farklı bölgelerindeki ürünlere kolaylıkla erişebilmekte ve satın aldıkları ürünler çeşitli lojistik süreçler aracılığıyla ulaştırılmaktadır. Bu durum son teslimat alanında tedarik zincirinde en kritik zorlukları beraberinde getirmiştir. Hızlı kentleşme, artan nüfus yoğunluğu, e-ticaretin yaygınlaşması ve tüketici satın alma davranışlarındaki değişimler, tedarik zincirlerinin yapısını ve işleyişini önemli ölçüde dönüştürmüştür. E-ticaretin gelişimi ile tüketicilerin sadece satın alma davranışları değil, ulaşım şekli, firma kuruluş yerinin de dönüşmesine sebep olmuştur.

Son kilometre lojistiği; son kilometre taşıma, son kilometre teslimat, son kilometre karşılama ve son kilometre dağıtım süreçlerini kapsamaktadır. Tedarik zincirinin son aşamasını oluşturan bu süreç, ürünlerin nihai tüketicilere doğru zamanda, doğru yerde ve uygun koşullarda ulaştırılmasında önemli bir rol oynamaktadır. E-ticaretin gelişimi kentsel lojistiğin gelişimine katkı sağlamaktadır. Bu çalışmanın amacı, son kilometre lojistiği ile ilgili yapılmış çalışmaları inceleyerek son kilometre lojistiğinin önemini literatür incelemesi ile ortaya koymaktır.

Anahtar Kelimeler: Teknoloji, Lojistik, Son Kilometre Lojistiği,

Last-Mile Logistics: Conceptual Framework and Literature Review

Abstract: With the development of technology, significant changes have occurred in consumers' purchasing habits. Today, consumers can easily access products from different parts of the world, and the products they purchase are delivered through various logistics processes. This situation has brought about some of the most critical challenges in the supply chain, particularly in the area of last-mile delivery. Rapid urbanization, increasing population density, the widespread adoption of e-commerce, and changes in consumer purchasing behavior have significantly transformed the structure and operation of supply chains. With the development of e-commerce, not only consumers' purchasing behaviors but also their modes of transportation and the location decisions of firms have undergone significant changes.

Last-mile logistics encompasses last-mile transportation, last-mile delivery, last-mile fulfillment, and last-mile distribution processes. As the final stage of the supply chain, this process plays a crucial role in ensuring that products are delivered to end consumers at the right time, at the right place, and under appropriate conditions. The development of e-commerce also contributes to the development of urban logistics. The aim of this study is to examine previous studies on last-mile logistics and highlight its importance through a literature review.

Keywords: Technology, Logistics, Last Mile Logistics

1. GİRİŞ

Nüfusun hızla artışı, kentleşme sürecinin hızlanması ve tüketici beklentilerindeki değişim, kentsel alanlarda gerçekleştirilen lojistik faaliyetlerin giderek daha karmaşık bir yapıya dönüşmesine neden olmaktadır. Bu noktada son kilometre lojistiğin önemi giderek artmaktadır. Bu çalışmada son kilometre lojistiği kavramsal açıdan ele alınacak olup literatür çalışmalarının incelenmesi ile önemi ortaya koyulacaktır.

2. KAVRAMSAL ÇERÇEVE

2.1. Son Kilometre Lojistiği Kavramı ve Önemi

Lojistik faaliyetlerin temel bileşenlerinden biri olan taşımacılık, insanların ve malların bir noktadan başa bir noktaya güvenli, etkin ve zamanında ulaştırılmasını sağlayan sistem ve süreçlerin bütünüdür (Nakıboğlu, 2020:286).

Son kilometre kavramı, telekomünikasyon ağlarında kullanılan bir kavramdır ve dağıtımın yapıldığı yere ve coğrafi yapıya bağlı olarak önemli ölçüde değişiklik gösterir. Son kilometre lojistiği ise tedarik zincirinin son adımıdır ve kentsel lojistiği mikro düzeydeki bir unsuru olarak ifade edilmektedir. Son kilometre lojistiği, araçların malları ilk ya da nihai depolama noktasına ulaştırılmasını kapsayan tedarik zinciri faaliyetlerinden oluşmaktadır. Son kilometre teslimat ve toplama süreçlerinde kullanılan kaynakların, operasyonların, mesafelerin ve zamanın etkin ve verimli bir şekilde yönetilmesini kapsamaktadır (Cardenas vd., 2017:9).

Son kilometre lojistiği, ürünlerin dağıtım merkezinden nihai tüketiciye ulaştırılmasını kapsayan bir süreçtir. Müşteri memnuniyetini doğrudan etkilediği için işletmelerde operasyonel ve finansal açıdan önemli bir aşamadır (https://www.mikro.com.tr, 01.10.2026).

Günümüzde lojistik bağlamında ele alınan son kilometre lojistiği/teslimatı, tedarik zincirinin en maliyetli ve verimliliğin en düşük olduğu aşamalarından biri olarak kabul edilmekte ve çevresel kaygıların da dikkate alındığı teslimat sürecinin son aşamasını ifade etmektedir (Özdemir, 2022:144).

Akıllı teknolojiler, son kilometre lojistiğinde rekabet gücünü artırırken maliyetleri azaltmakta ve sürdürülebilirliği desteklemektedir. Bu dönüşüm, ekonomik verimliliğin yanı sıra çevresel ve toplumsal sorumlulukları da gözetmektedir (Güngör vd., 2025:464).

Sadece tüketiciler için kolaylık ve ulaşım optimizasyonu gelişim göstermemiştir. Çevresel ve ekonomik baskılar da son kilometre lojistiğinin gelişiminde etken olmuştur (Demir vd., 2022:549).

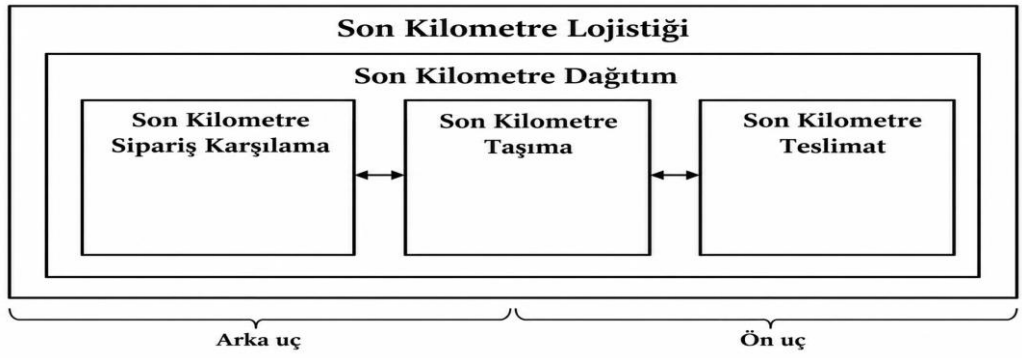
2.2. Son Kilometre Lojistik Süreçleri

Son Kilometre Lojistik sürecinde (https://www.mikro.com.tr, 01.10.2026);

- Ürünler, dağıtım merkezlerinden depolara veya kuryelere aktarılır.
- Teslimat rotaları trafik, mesafe ve zamana göre optimize edilir.
- Teslimatlar mobil cihazlar ve yazılımlar aracılığıyla gerçek zamanlı takip edilir.
- Müşteriler, teslimat zamanı ve durumu hakkında bilgilendirilir.

Son kilometre lojistiği; son kilometre dağıtım, son kilometre taşıma, son kilometre teslim ve son kilometre sipariş karşılama olmak üzere dört temel bileşenden oluşmaktadır (Olsson vd., 2019:10).

Şekil 1: Son Kilometre Lojistik Süreci



Kaynak: Olsson vd. (2019:10).

2.2.1.Son Kilometre Dağıtım

Son kilometre dağıtımı, ürünlerin son sevkiyat noktasından teslimat noktasına kadar farklı kanallar aracılığıyla yönetilmesini kapsar (Ha vd., 2022:1156).

Son kilometre dağıtım; malların dağıtım kanalları aracılığıyla tüketim noktasına ulaştırılması sürecindeki elleçleme, taşıma ve depolama faaliyetlerini kapsamaktadır (Olsson vd., 2019:11).

2.2.2.Son Kilometre Karşılama

Son kilometre karşılama, son kilometre dağıtım ağının ilk aşamasını oluşturmakta ve göndericilere yakın konumlandırılan, gönderilerin toplandığı dağıtım platformlarını ifade etmektedir (Özdemir, 2022). Bu süreç, siparişlerin teslimata hazır hâle getirilmesi ve hazırlanan gönderilerin dağıtıma çıkarılması aşamalarını kapsamaktadır. Dolayısıyla son kilometre karşılama, siparişin teslimat sürecine hazırlanarak dağıtım ağına dâhil edilmesini sağlayan önemli bir aşama olarak değerlendirilmektedir (Olsson vd., 2019:11).

2.2.3.Son Kilometre Taşıma

Son kilometre taşıma, yüklerin dağıtım platformlarında toplanıp depolanmasının ardından müşterilere ulaştırılması amacıyla gerçekleştirilen taşıma ve dağıtım faaliyetlerini kapsamaktadır. Bu süreçte, yüklerin en uygun güzergâhlar üzerinden müşterilere ulaştırılabilmesi için rota planlamasının etkin bir şekilde yapılması önem taşımaktadır. Özellikle mobil depolar ve mikro dağıtım tesislerinden yararlanılması, teslimat süreçlerinin daha verimli yürütülmesine katkı sağlarken, teslimat araçlarının da sürece uygun şekilde planlanması ve optimize edilmesi gerekmektedir (Özdemir, 2022:146).

Son kilometre taşımacılığı, malların merkezi bir aktarma noktasından hafif ticari araçlar, ağır ticari araçlar, elektrikli araçlar, bisikletler, üç tekerlekli araçlar veya dronlar gibi çeşitli araçlarla son kilometre aşamasındaki hareketine odaklanması ve gerçekleştirilmesidir. Son kilometre lojistik sisteminde kritik bir öneme sahiptir. Çünkü son kilometre taşımacılığı, son kilometre sipariş karşılama süreçleri ile son kilometre teslimatı arasındaki arayüzü oluşturmaktadır (Olsson vd., 2019:12; Ha vd., 2022:1156).

2.2.4.Son Kilometre Teslimat

Son kilometre teslimat, ürünün tedarik zincirindeki ve lojistik sürecindeki son taşıma kısmıdır. Genellikle paketin yerel depodan son kullanıcıya olan yolculuğu olarak ifade edilmektedir. Bunun yanında e- ticaretin artması lojistik sektörünüde etkilemiştir (Nakıboğlu, 2020:287).

Son aşama teslimat, bir tedarik zincirinde gönderinin son sevkiyat noktasından, alıcının onu teslim aldığı noktaya kadar gerçekleştirilen nihai taşıma süreci olarak tanımlanabilir (Ha vd., 2022:1156).

Çevrim içi satışların hızla artmasıyla birlikte, müşterilerin sipariş ettikleri ürünlere hızlı, güvenilir ve kaliteli bir şekilde ulaşmalarının sağlanması, işletmeler açısından önemli bir lojistik sorun hâline gelmiştir (Devari vd., 2017).

Çevrim içi satışların hızla artması ve küreselleşmenin etkisiyle yük taşımacılığında yeni yaklaşımların benimsenmesi giderek daha önemli hâle gelmektedir. Bu doğrultuda, gelişen teknolojiler, akıllı ulaşım sistemleri, Endüstri 4.0 ve yeni ulaşım araçlarının gelişimi yenilikçi yöntemlerle son kilometre teslimat süreçlerinin daha etkin, hızlı ve verimli bir şekilde yürütülmesi sağlanmakta ve teslimat sorunları çözümlenmek üzere ele alınmaktadır (Ranieri vd., 2018:1).

2.3. Son Kilometre Teslimat Uygulamaları

Son kilometre teslimat, tedarik zincirinin son aşamasını oluşturarak ürünlerin tüketicilere dağıtımında önemli rol oynamaktadır. Günümüzde son kilometre teslimat süreçleri satıcılar tarafından farklı yöntemler ile gerçekleştirilmektedir (Özdemir, 2022:147).

2.3.1. Mobil Depolar

Mobil depolar, kentsel alanlarda teslimatları hızlandırmak amacıyla kullanılan, depolama ve çalışma alanı sunan taşınabilir yapılardır. Şehir içi gönderiler bu depolarda toplanarak merkezi noktalardan elektrikli araçlarla dağıtılmaktadır. Bu uygulama, teslimat süreçlerini kolaylaştırırken dizel kullanımını ve buna bağlı hava kirliliğini azaltmaya katkı sağlamaktadır.

2.3.2. Kentsel Dağıtım Merkezleri

Park yeri sorunu, emisyon ve ulaşım kısıtları nedeniyle kentsel dağıtım merkezleri genellikle şehir merkezlerinin dışında konumlandırılmaktadır. Yükler ise şehir içi dağıtıma uygun araçlara aktarılarak konsolide edilmekte ve tüketicilere ulaştırılmaktadır.

2.3.3. Teslimat Noktaları ve Kilitli Teslimat Depoları

Teslimat noktaları ve kilitli teslimat dolapları, tüketicilere teslimat adresi ve zamanı açısından esneklik sağlamak amacıyla şehir merkezlerinde kullanılmaktadır. Bu uygulamalar, son kilometre teslimat maliyetlerini ve hava, gürültü gibi çevresel etkileri azaltmayı amaçlamaktadır.

2.3.4. Otonom Yer Taşıtları

Otonom araçlar, son kilometre teslimatta artan çevrim içi satışlar ve değişen tüketici beklentileri doğrultusunda kullanılmaya başlanmıştır. Bu araçlar; karbon emisyonlarının ve trafik yoğunluğunun azaltılması ile daha hızlı ve esnek teslimat yapılmasını amaçlamaktadır. 2019 yılında George Mason Üniversitesi yerleşkesinde kampüs içi kahve, yemek ve küçük alışveriş teslimatlarında kullanılan Starship araçları, otonom teslimat araçlarına örnek olarak gösterilebilir.

2.3.5. Elektrikli Yük Taşıma Araçları

Kentsel alanlarda teslimat araçlarının enerji tüketimi, emisyon, hava ve gürültü kirliliği ile trafik yoğunluğunu artırması, trafik sıkışıklığı yaratması önemli çevresel sorunlara yol açmakta ve son kilometre teslimat süreçlerini uzun vadede olumsuz etkilemektedir. Bu nedenle son kilometre teslimat süreçlerinde dizel yakıtlı araçların kullanılması yerine elektrikli araç kullanımı giderek önem kazanmaktadır.

2.3.6. Elektrikli Kargo Bisikletleri

Kentsel mal dağıtımı ve teslimatı sırasında trafik yoğunluğu, sera gazı emisyonları ve yetersiz yol kapasitesi gibi sorunlar, elektrikli bisikletleri son kilometre teslimatında çevre dostu ve kullanışlı bir alternatif hâline getirmektedir (Özdemir, 2022:148-153).

2.4. Son Kilometre Lojistiğinde Karşılaşılan Zorluklar

Son kilometre lojistiğinde en büyük zorluk; talep noktalarının genellikle yoğun trafiğin olduğu nüfusun yoğun olduğu alanlarda olması ve dağıtım merkezlerinden uzakta olmasıdır (Demir vd., 2022:558). Son kilometre lojistiğin yaşanan zorluklar şunlardır (https://www.mikro.com.tr, 01.10.2026);

- Kısa mesafelerde yakıt, iş gücü ve zaman maliyetleri artabilir.
- Trafik yoğunluğu teslimat sürelerini uzatabilir.
- Hatalı adres bilgileri ve müşteriye ulaşılamaması teslimatın tekrarlanmasına neden olabilir.
- Artan teslimat trafiği maliyetleri ve çevresel etkileri artırabilir.

3. SON KİLOMETRE LOJİSTİĞİ İLE İLGİLİ YAPILMIŞ LİTERATÜR ÇALIŞMALARI

Son kilometre lojistiği ile ilgili ulusal ve uluslararası literatürde analiz yerine literatür çalışmaları ağırlıklı yayınlar bulunmaktadır. Analiz ağırlıklı olan çalışmalara örnekler aşağıda açıklanmaktadır.

Sarıışık ve Ercoşkun (2026) e-ticaret sektöründeki gelişmeler ile moto kurye faaliyetleri arasındaki ilişkiyi araştırmayı ve kuryelerin kent içi trafik üzerindeki etkilerini ulaşım planlaması perspektifinden değerlendirmeyi amaçlamaktadır. Araştırma sonucunda elde edilen bulgular, moto kuryelerin zamana duyarlı çalışmaları ve mekânsal hareketliliklerinin mevcut ulaşım altyapılarıyla çoğu zaman uyumlu olmadığı, hem trafik güvenliği hem de kentsel yaşam kalitesi üzerinde olumsuz etkileri olduğu sonucunu ortaya koymaktadır.

İnce vd. (2026) araştırmasındaki amaç; son kilometre teslimatlarında sürdürülebilirlik algısının tüketicilerin bu hizmetleri gelecekte tercih etme niyetleri üzerindeki etkisini teşvikler ve tüketicilerin algıladıkları fedakârlık düzeyi aracılığıyla incelemektir. Araştırma sonucuna göre; çevresel sürdürülebilirlik algısının tüketici niyeti üzerinde doğrudan ve anlamlı bir etkisi olduğunu, sosyal ve ekonomik sürdürülebilirlik algılarının tüketici niyeti üzerindeki etkisinin doğrudan değil, teşvikler aracılığıyla olduğu belirlenmiştir. Bunun yanında algılanan fedakârlığın anlamlı bir aracılık rolü üstlenmediği görülmüştür. Bu bulgular, sürdürülebilir teslimat uygulamalarının benimsenmesinde yalnızca farkındalığın yeterli olmadığını; tüketici davranışlarının teşvik mekanizmalarıyla gerçekleştiği söylenebilmektedir.

Amaya vd. (2025) yaptıkları çalışmanın amacı, tüketicilerin teslimat seçeneklerini belirlerken karar verme süreçlerini etkileyen faktörleri belirlemektir. Sürdürülebilir son kilometre teslimat alternatiflerini tüketici tercihlerinde tüketiciye sunulan ek faydalarla yakından ilişkili olduğunu ve tüketicilerin kolaylık sağlayan teslimat hizmetleri için ödeme yapmaya daha istekli oldukları, ancak kendi davranışlarında değişiklik gerektiren sürdürülebilir seçeneklere karşı isteksiz oldukları sonucuna varılmıştır.

Yeni vd. (2025) çalışmasının amacı; Trabzon ili Ortahisar ilçesi için kargo otomatlarının stratejik konumlandırılmasını hedefleyen analitik bir metodoloji önerilmiştir.

Güngör vd. (2025) çalışmasında amaç, son kilometre teslimatının lojistik üzerindeki etkisini literatür incelemesi, sektör raporları ve sayısal verilerle ortaya koymaktır. Sonuca göre teknolojik dönüşümün maliyet, rekabet, sürdürülebilirlik üzerinde önemli etkileri olduğu vurgulanmıştır.

Mutlu ve Ölmez (2025) çalışmasında bibliyometrik analiz yaparak son kilometre teslimat süreçlerine yönelik geliştirilen yenilikçi yaklaşımların işletmeler ve nihai tüketiciler tarafından kabul ve benimsenme kriterlerinin, araştırılmadığı sonucuna varılmıştır.

Ha vd. (2022) yaptığı çalışmanın amacı; son kilometre lojistiği ile ilgili literatür incelemesini sistematik biçimde bibliyometrik analizle sunmaktadır. sürdürülebilirlik kavramının son kilometre sürecinin tüm aşamalarına entegre edilebilmesine rağmen, mevcut literatürün ağırlıklı olarak operasyonel düzeye odaklandığını göstermektedir.

Sonneberg vd. (2019) çalışmasının amacı, otonom insansız kara araçlarının şehir içi lojistikte son kilometre teslimatlarının maliyetlerini en aza indirmeye yönelik optimizasyon modeli önermektir. Teslimat talepleri ve trafik sıkışıklığı gibi sorunların çözümünde otonom araçların önemi vurgulanmıştır.

Bosona (2020) çalışmasının amacı, kentsel yük taşımacılığında son kilometre lojistiğinin (LML) karşılaştığı başlıca zorlukları ve müdahale fırsatlarını tipoloji analizi ile belirlemektir. Bulgular kentsel lojistiğin giderek arttığını ortaya koymuştur.

4. SONUÇ

E-ticaretin hızla gelişmesi, tüketici beklentilerinin artması lojistik sektörünün dönüşümünde önemli bir rol oynamaktadır. Tüketicilerin hızlı, güvenilir ve çevre dostu teslimat beklentilerinin artması, özellikle son kilometre lojistiğinde daha sürdürülebilir ve etkin çözümlerin geliştirilmesini ve uygulanmasını gerekli kılmaktadır (Akalan, 2025:9).

Son kilometre teslimat, tedarik zincirinin son aşamasını oluşturmakta ve ürünlerin müşterilere zamanında ve doğru şekilde ulaştırılmasını sağlamaktadır. Bu aşama, teslimat maliyetleri açısından önemli bir paya sahip olmasının yanı sıra müşteri memnuniyetini de doğrudan etkilemektedir. Özellikle artan şehirleşme, trafik yoğunluğu ve çevresel sorunlar, son kilometre lojistiğinin önemini giderek artırmaktadır (Yeni vd., 2025:1).

Kentsel yük akışı nüfus artışı, kentleşme, yoğunlaşma, küreselleşme, çevrimiçi ve çok kanallı (omni-channel) perakendecilik ile kentsel ekonomik kalkınmadan dolayı istikrarlı büyümektedir (Bosona, 2020:1).

Son yıllarda yaşanan trafik yoğunluğu ve kirlilik azaltacak çözümlere ihtiyaç duyulmaktadır. Otonom araçlar, dronlar ve yapay zekâ gibi yenilikçi teknolojiler, taşıma süreçlerini daha verimli, hızlı ve çevre dostu hale getirmektedir.

Son kilometre lojistik uygulamalarının çevresel sürdürülebilirlik açısından önemli etkileri bulunmaktadır. Çevresel etkileri azaltmak amacıyla çevresel sürdürülebilirliğe katkı sunacak olan lojistik çözümler şunlardır (https://www.mikro.com.tr, 01.10.2026):

- Elektrikli ve hibrit teslimat araçlarının kullanımı
- Bisikletli kurye sistemleri
- Konsolidasyon merkezleri ile teslimat yoğunluğunu azaltma
- Karbon ayak izi izleme sistemleri

Sonuç olarak,

- Ekonomik verimliliğin artırılması, çevresel etkilerin minimize edilmesi, lojistik sektöründe son kilometre süreçlerinin iyileştirilmesi için teknolojik yeniliklerin hızla benimsenmesi büyük bir gereklilik hâline gelmiştir.
- Son kilometre teslimat sürecinde etkili teslimat stratejileri geliştirilmelidir.
- Gelecekteki çalışmalarda sadece operasyonel ve ekonomik boyutuna değil çevresel ve sosyal sürdürülebilirlik açısından ele alınması önerilmektedir.

Son kilometre lojistiği alanında yeterli düzeyde çalışma bulunmamaktadır. Çalışmaların daha çok literatür taramasına dayalı olduğu anlaşılmaktadır. Bu alanda çalışmaların artacağı ve bu çalışmanın akademiye katkı sunacağı düşünülmektedir.

KAYNAKÇA

Akalan, K. (2025). Sürdürülebilir lojistik: Geleceğin ulaşım ve dağıtım modelleri. Tokat Gaziosmanpaşa Üniversitesi Turhal Uygulamalı Bilimler Fakültesi Dergisi, 3(1), 1-14.

Amaya, J., Encarnación, T. ve Cantillo, V. (2025). Sustainable last mile delivery alternatives: Influencing factors and willingness to use. Transportation Research Part D: Transport and Environment, 139, 104574.

Bosona, T. (2020). Urban freight last mile logistics-challenges and opportunities to improve sustainability: A literature review. Sustainability, 12(21).

Cardenas, I., Borbon-Galvez, Y., Verlinden, T., Van de Voorde, E., Vanelslander, T. ve Dewulf, W. (2017). City logistics, urban goods distribution and last mile delivery and collection. *Competition and regulation in network industries*, *18*(1-2), 22-43.

Demir, E., Syntetos, A. ve Van Woensel, T. (2022). Last mile logistics: Research trends and needs. IMA Journal of Management Mathematics, 33(4), 549-561.

Devari, A., Nikolaev, A. G. ve He, Q. (2017). Crowdsourcing the last mile delivery of online orders by exploiting the social networks of retail store customers. *Transportation Research Part E: Logistics and Transportation Review*, *105*, 105-122.

Güngör, A., Çat, M. Ve Abukalloub, A. (2025). Son Kilometre Teslimatın Lojistik Sistemler Üzerindeki Etkisi. 19. Uluslararası Güncel Araştırmalarla Sosyal Bilimler Kongresi, 4-8 Kasım 2025, 464-480.

Ha, N. T., Akbari, M. ve Au, B. (2023). Last mile delivery in logistics and supply chain management: a bibliometric analysis and future directions. Benchmarking: An International Journal, 30(4), 1137-1170.

Mutlu, H. M. ve Ölmez, S. (2025). Son kilometre teslimat kavramı üzerine bibliyometrik analiz. Beykoz Akademi Dergisi, 13(1), 277-308.

İnce, Ö., Kafadar, O. Ve Bayat, T. (2026). Son Kilometre Teslimatlarında Sürdürülebilirlik Algısı ve Tüketici Niyeti: Teşviklerin ve Algılanan Fedakarlığın Aracılık Rolü. Uluslararası Yönetim Akademisi Dergisi, 9(2), 337-357.

Nakıboğlu, G. (2020). Drone taşımacılığı ve son-adım teslimatta kullanımı. *Çukurova Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi*, *24*(2), 285-298.

Olsson, J., Hellström, D. ve Pålsson, H. (2019). Framework of last mile logistics research: A systematic review of the literature. *Sustainability*, *11*(24), 7131.

Özdemir, D. (2022). Kentsel lojistikte son kilometre teslimat ve uygulamaları. İçinde H. A. Kutlu, M. İ. Çubukçu, Aydemir, A. F. ve Karabacak E. (Editörler). Uluslararası Ticaret ve Lojistikte Güncel Yaklaşımlar ve Değerlendirmeler 3 (ss. 139-158). Efe Akademi Yayınları.

Ranieri, L., Digiesi, S., Silvestri, B. ve Roccotelli, M. (2018). A review of last mile logistics innovations in an externalities cost reduction vision. Sustainability, 10 (3), 782.

Sarıışık, B. E. ve Ercoşkun, Ö. Y. (2026). Son kilometre teslimatları ve kent içi moto kurye hareketliliğinin ulaşım planlaması açısından değerlendirilmesi. *Journal of Management Theory and Practices Research*, *7*(1), 156-179.

Sonneberg, M. O., Leyerer, M., Kleinschmidt, A., Knigge, F. ve Breitner, M. H. (2019). Autonomous unmanned ground vehicles for urban logistics: Optimization of last mile delivery operations. Proceedings of the 52nd Hawaii International Conference on System Sciences

Yeni, F. B., Uçar, E. ve Baştan, B. (2025). Sürdürülebilir Son Kilometre Teslimatları: Kargo Otomatları İçin Stratejik Konumlandırma Yaklaşımı. *Journal of Transportation and Logistics*, *10*(2), 408-429.

https://www.mikro.com.tr/last-mile-son-kilometre-lojistigi/#last-mile-son-kilometre-lojistii-nedir, 01.10.2026

Physical, Account-Based, and Digital Gold: The Evolution of Gold in the Financial Transformation Process

Rasim YILMAZ[1]

[1] Tekirdağ Namık Kemal University, Faculty of Economics and Administrative Sciences, Department of Economics, Tekirdağ/TURKEY, e-mail:rasimyilmaz@nku.edu.tr, ORCID: 0000-0002-1084-8705

Abstract: Gold has long maintained its role as a store of value, a hedge against economic uncertainty, and a safe haven asset. However, advances in financial technology and increasing digitalization have transformed the ways in which gold is accessed and invested. This study examines the evolution of gold investment by comparatively analyzing three main forms: physical, account-based, and digital gold. The analysis focuses on key dimensions such as accessibility, liquidity, cost, trust, and risk structure. The findings indicate that while physical gold provides direct ownership and strong psychological security, it is associated with storage costs and lower liquidity. Account-based gold offers transactional convenience within the banking system but exposes investors to systemic risks. Digital gold, as the most innovative form, enhances accessibility, divisibility, and liquidity, yet introduces new challenges related to cybersecurity, regulation, and platform reliability. Overall, the study highlights that each form of gold presents distinct advantages and trade-offs, reflecting the broader transformation of the financial system and evolving investor preferences in an increasingly digital environment.

Keywords: Gold, digitalization, account-based gold, physical gold, digital gold

1. INTRODUCTION

Gold has historically played a central role in monetary and economic systems as a store of value, a medium of exchange, and a safe haven asset. Its enduring appeal stems from its ability to preserve value during periods of economic uncertainty and adverse market conditions, offering investors a means of wealth protection. In this context, gold is widely recognized for its hedging properties, particularly against inflation, exchange rate fluctuations, and declining currency values. Since gold is typically priced in U.S. dollars, a depreciation in the dollar tends to increase the nominal price of gold, thereby helping investors maintain its real value. Consequently, gold has been used both as a hedge against foreign exchange risk and as a portfolio diversification tool due to its often negative correlation with the dollar.

A substantial body of literature emphasizes these characteristics, highlighting gold's role as a safe haven during financial crises and its effectiveness in mitigating market risks (Baur and McDermott, 2010; Capie et al., 2005; Dyhrberg, 2016; Maouchi et al., 2024). Over time, gold has also maintained its symbolic and economic significance as a reliable store of value and a hedge against inflation (Sujit et al., 2025).

While gold's fundamental functions have remained largely unchanged, the financial system surrounding it has undergone significant transformation. Advances in financial technology, along with globalization and financial liberalization, have expanded the ways in which gold can be accessed and traded. Traditionally held in physical form, gold is now increasingly available through account-based systems within the banking sector and through digital platforms. Digitalization, in particular, has made gold investment more accessible, liquid, and convenient, allowing investors to participate in gold markets with greater flexibility (Suchitra et al., 2025).

As a result, gold is currently offered in three primary forms: physical, account-based, and digital. The emergence of these alternative forms has not only diversified investment opportunities but also reshaped investor behavior and market dynamics. This evolution reflects a broader structural transformation in the financial system. Accordingly, this study aims to comparatively examine these three forms of gold and to analyze their respective roles within the modern financial system.

2. CONCEPTUAL FRAMEWORK

2.1. Physical Gold

Physical gold refers to tangible assets in the form of jewelry, coins, or bullion acquired from jewelers and other sources. Physical gold is widely regarded as a reliable store of wealth and a safe haven, particularly during periods of economic uncertainty. Its independence from financial intermediaries minimizes counterparty risk and

provides protection against systemic disruptions, while its tangible nature enhances investors' sense of security. It also has cultural and social uses, such as jewelry and gifts.

However, despite these advantages, physical gold investment also presents certain limitations. It requires secure storage, which may involve additional costs and safety concerns, and it is generally less liquid compared to financial instruments. Furthermore, unlike other investment assets, physical gold does not generate income or dividends, which may reduce its attractiveness for some investors (Ashalatha et al., 2023).

2.2. Account-Based Gold

Account-based gold (also referred to as a gold account or gold-backed bank account) refers to gold held in gram-based accounts at banks or other financial institutions. A gold account allows investors to save and transact in gold without physically holding it, enabling them to buy and sell gold in grams. In this system, transactions can typically be conducted 24/7 in local currency (Abas et al., 2023).

Gold accounts can be structured as Gold Current Accounts or Gold Time Deposit Accounts. While Gold Current Accounts offer flexibility for transactions, Gold Time Deposit Accounts may provide interest or profit-sharing returns based on gold holdings.

One of the main advantages of account-based gold is the elimination of risks associated with storing physical gold, such as loss or theft. It also offers ease of transaction, allowing fast and convenient buying and selling within the banking system. Investors can trade in small increments without incurring fabrication or labor costs. Additionally, these accounts often provide currency flexibility, as they are linked to local or major international currencies, enabling direct conversion.

However, such investments depend on the reliability of financial institutions and may be affected by banking crises. Compared to purchasing physical gold from jewelers, banks typically apply higher bid–ask spreads on gold transactions. Furthermore, gold transactions conducted through banks may be subject to the Banking and Insurance Transactions Tax (BITT), increasing overall transaction costs.

2.3. Digital Gold

Digital gold refers to gold-backed digital assets made available through fintech platforms and, in some cases, blockchain infrastructure, allowing investors to buy, sell, and hold gold electronically in small denominations. Unlike traditional physical ownership, investors' holdings are recorded digitally, while the underlying gold is typically stored in secure vaults by the provider on behalf of the customer (Gurbaxani et al., 2023).

A related concept is Digital Gold Currency (DGC), which represents a form of electronic money fully backed by physical gold reserves held by private entities. These systems offer an alternative to fiat currencies by linking value directly to a tangible asset, making them attractive to investors seeking stability and insulation from national monetary policies (Downey, 2026). Similarly, physically backed gold exchange-traded funds (Gold ETFs) provide investors with electronic access to gold markets via stock exchanges, eliminating the need for physical delivery while maintaining exposure to bullion prices (Gurbaxani et al., 2023; Hayes, 2025). In the cryptocurrency space, gold-backed tokens such as PAX Gold or Digix Gold Token combine the technological advantages of digital assets with the relative stability of gold, offering diversification benefits and potential protection against market volatility (Maouchi et al., 2024).

The growing range of digital gold instruments reflects the broader modernization of gold investment. These instruments offer several advantages, including high accessibility, strong liquidity, ease of trading through digital or brokerage platforms, and the ability to invest in very small amounts (Ashalatha et al., 2023). In addition, professional storage of the underlying physical gold reduces risks such as theft or loss, while many platforms enable 24/7 transactions at market prices and, in some cases, the conversion of digital holdings into physical gold.

Despite these benefits, digital gold also introduces new risks and challenges. Since many digital gold systems—particularly DGCs—are operated by private entities, investors are exposed to management risk, including poor governance, lack of transparency, weak security practices, or even fraud (Downey, 2026). Regulatory uncertainty and cybersecurity threats further increase vulnerability, while dependence on digital platforms raises concerns about reliability and operational continuity. Moreover, the fragmentation and complexity of digital gold products across different markets and platforms may limit their efficiency and broader adoption.

As investor expectations shift toward seamless digital integration, the long-term success of digital gold will depend on improving regulatory frameworks, enhancing transparency, and ensuring interoperability across platforms, thereby strengthening trust and accessibility in an increasingly digital financial ecosystem.

4. COMPARATIVE ANALYSIS

There are significant differences among physical, account-based, and digital gold across several dimensions (see Table 1):

Physical Backing: Physical gold and digital gold are fully backed by a tangible asset. Account-based gold, in contrast, does not provide physical backing in the investor's possession.

Ownership: While physical gold offers direct ownership, account-based gold provides indirect exposure through financial institutions, and digital gold serves as a digital representation of the gold.

Psychological Trust: Physical gold provides direct and visible ownership, enhancing trust. Account-based and digital gold involve third-party control. Physical gold provides the highest level of trust due to its tangible nature. Digital gold depends on trust in the platform while account-based gold depends on trust in the banking system.

Storage and Security Costs: Physical gold involves higher storage and security costs.

Commissions: Account-based and digital gold investments often involve transaction fees, withdrawal fees, taxes and transfer costs. Physical gold, once purchased, does not incur ongoing transaction costs.

Accessibility/Liquidity: Digital and account-based gold can be easily purchased and sold via mobile applications or online platforms at any time. Although physical gold can be obtained through jewelers, exchange offices, or digital channels, it is typically sold through jewelers or exchange offices. Digital gold offers the highest level of accessibility.

Accessibility in Crisis Periods: In times of global crises or systemic disruptions, physical gold provides direct access independent of financial systems. Digital and account-based gold may face technical or systemic limitations.

Risk type: Physical gold exposes investors to physical risks such as theft, loss, or damage. Account-based gold introduces systemic risk, as investors rely on the stability and credibility of the banking system. Digital gold shifts the primary risk from physical to technological and regulatory domains, including cybersecurity threats and uncertainties related to platform governance and regulation.

Table 1: Comparative Analysis

Criterion	Physical Gold	Account-Based Gold	Digital Gold
Physical Backing	Yes	No	Yes
Ownership	Direct	Indirect	Digital representation
Trust	Very high	Medium (bank-dependent)	Medium (Platform-dependent)
Storage and Security Costs	High	Low	Low
Commission Cost	Low	High	Medium
Accessibility/Liquidity	Medium	Hight	Very high
Accessibility in Financial Crises	High	Low	Medium
Risk Type	Physical risk	Systemic risk	Cyber and regulatory risk

These differences lead investors to make choices based on their risk preferences and levels of financial literacy.

5. COMPARATIVE PERCEPTION OF DIGITAL AND PHYSICAL GOLD

In recent years, a growing body of literature has examined investor perceptions of different forms of gold investment, particularly in the context of financial innovation and digitalization. These studies primarily focus on investment preferences, risk perceptions, awareness levels, and the factors influencing the adoption of modern gold investment instruments.

Menon (2020) analyzes investor perceptions of gold as an investment option under varying market conditions, based on survey data collected from 105 investors. The findings reveal that in normal market environments, investors tend to favor high-risk, high-return instruments such as stocks and mutual funds. However, during black

swan events—such as the COVID-19 pandemic—there is a marked shift toward low-risk assets, including bank deposits and gold.

The study further indicates that investors predominantly prefer physical forms of gold, such as jewelry, coins, and bars, over more modern financial instruments. This preference is largely attributed to limited awareness and understanding of alternative gold investment products.

Moreover, the results suggest that individual investors exhibit strong risk-averse behavior during periods of heightened uncertainty, reinforcing their inclination toward safer assets like gold. Key factors influencing investment decisions in gold include its perceived purity, return potential, and its role as a hedge against inflation. At the same time, limited access to information and insufficient awareness of diverse gold investment instruments remain significant challenges for investors.

Ashalatha et al. (2023), using data from 80 respondents, explored general investor perceptions toward gold as an investment. The study reports that 60% of respondents prefer physical gold, while 19% favor Gold ETFs. The findings reaffirm gold's enduring role as a store of value and a safe-haven asset, particularly during periods of economic uncertainty. Investors widely perceive gold as a hedge against inflation and currency depreciation. However, some respondents express concerns regarding gold's lack of regular income generation and its sensitivity to global market dynamics.

Gurbaxani et al. (2023) conducted a quantitative study involving 158 active investors to analyze perceptions of Digital Gold and Gold Exchange-Traded Funds (ETFs) using a five-point Likert scale. The findings indicate that convenience, security, and accessibility are the primary drivers influencing investment decisions. Conversely, factors such as operational challenges, high brokerage costs, lack of satisfaction, and low awareness act as significant barriers. The study also highlights the multidimensional nature of investor behavior by examining the relationships among these influencing factors.

Darshana and Ponnumani (2024) investigate the perceptions of digital gold among physical gold investors in Coimbatore, India, using a sample of 250 respondents. The findings indicate that, although investors generally possess limited knowledge about digital gold, interest in this investment form is increasing, largely driven by its perceived advantages such as convenience and accessibility. Nevertheless, significant barriers to adoption persist, including concerns related to security, regulatory uncertainty, and the influence of psychological biases.

Maouchi et al. (2024) found that gold-backed cryptocurrencies serve as effective diversifiers. However, their ability to act as a hedge or safe haven is contingent upon the specific type of crisis—such as the COVID-19 pandemic versus the Russia–Ukraine War—and the specific category of digital asset.

Suchitra et al. (2025) examine investor trust and perceived risk in relation to digital gold investments, with a particular focus on investors' willingness to transition from physical to digital gold based on return expectations. Drawing on data collected through convenience sampling from 75 respondents—predominantly male, aged 21–30, and largely holding postgraduate degrees in India—the study finds that trust plays a significant role in shaping risk perception. In contrast, expected returns do not appear to be a decisive factor influencing the shift from physical to digital gold.

The findings further highlight that digital gold offers notable advantages, particularly in terms of affordability and ease of liquidation. However, concerns remain regarding insufficient regulatory frameworks and the presence of storage-related charges on certain platforms. Overall, the study suggests that strengthening regulatory oversight, enhancing investor awareness, and fostering trust are critical to promoting the wider adoption of digital gold as an investment instrument.

A study by Krishnakumar and Lissy (2025), based on a sample of 100 respondents, highlights that investors view gold as a crucial safe haven and inflation hedge. A significant finding is the limited awareness among investors about alternative forms of gold investment—such as gold accounts, ETFs, and gold bullion—which often provide comparatively higher returns than physical gold. This lack of awareness highlights the need for improved financial literacy and investor education to facilitate more informed investment choices.

Ganesamurthy and Anjuka (2025) examine investor perceptions of various gold investment instruments—namely Gold ETFs, gold bonds, gold deposits, and physical gold—in Tamil Nadu in India. The study employs a descriptive research design and is based on primary data collected from 110 respondents. Its main objectives are to analyze investor perceptions of gold as an investment, identify the key factors influencing investment decisions, and assess levels of satisfaction and risk awareness across different gold investment modes.

The findings underscore that gold continues to hold a prominent position in India, not only as a symbol of wealth and cultural heritage but also as a reliable financial asset. Investors widely perceive gold as an effective hedge against inflation, with returns that tend to align with inflation rates over time. Additionally, gold is valued for its liquidity and its role as a safe investment during periods of economic uncertainty. The study concludes that, despite the availability of modern gold investment instruments, gold remains a strong and sentiment-driven investment choice. However, it highlights the need for increased investor awareness regarding alternative instruments such as ETFs and gold bonds. Furthermore, it emphasizes the importance of supportive policy measures to enhance the safety, accessibility, and overall attractiveness of gold investment options.

Nowsath and Arunprakash (2025) comparatively examine digital and physical gold as investment options, based on data collected from 53 respondents in India. The study focuses on key dimensions such as accessibility, cost efficiency, liquidity, safety, and investor preferences. It highlights that digital gold offers notable advantages, including ease of transactions, reduced storage concerns, and integration with modern financial systems. In contrast, physical gold ensures tangible ownership and benefits from long-standing cultural trust, maintaining its position as a traditional store of value.

The findings indicate that both forms of gold remain highly relevant in the contemporary financial landscape. Physical gold continues to provide stability and long-term security, while digital gold is increasingly preferred—particularly among younger and tech-savvy investors—due to its convenience and liquidity. However, digital gold is associated with challenges such as regulatory uncertainty, cybersecurity risks, and the lack of physical ownership. On the other hand, physical gold presents limitations including storage costs, lower liquidity, and slower transaction processes.

Overall, the study concludes that neither form of gold alone fully satisfies the diverse needs of modern investors. A balanced investment approach that combines both physical and digital gold may therefore be more effective in addressing the demands of an increasingly digitalized financial environment.

Jayalakshmi and Purushothaman (2025) investigated investor perceptions and behavioral patterns toward digital gold investment in Chennai, India, based on a sample of 100 respondents. Their findings reveal that investment preferences are largely driven by convenience, security, liquidity, and low minimum investment requirements. However, concerns related to regulatory uncertainty and platform-related risks remain key deterrents affecting investor confidence.

Dhurve and Chawda (2025) conducted a comparative analysis of physical and digital gold investments in Amravati city in India using data from 100 respondents. The results demonstrate a growing interest in digital gold, particularly among younger and tech-savvy investors, due to its ease of transaction and storage advantages. Nevertheless, physical gold continues to dominate investment preferences because of its cultural significance, tangibility, and perceived trustworthiness. The study further identifies inflation hedging, transaction convenience, and wealth preservation as critical determinants of investment decisions.

Devi and Kavitha (2025) approached digital gold investment from both financial and behavioral perspectives using a large sample of 700 respondents. The study finds that investment decisions are shaped not only by economic considerations such as liquidity, accessibility, and efficiency, but also by psychological factors including perceived security and emotional reassurance. This highlights the interplay between rational and behavioral drivers in investment decision-making.

Sreelakshmi (2025) analyzed investor preferences between Gold ETFs and physical gold in the Thrissur district based on data from 100 respondents. The results indicate that demographic variables such as age, income, and education significantly influence investment choices. Younger investors tend to prefer ETFs due to their liquidity and transparency, while older investors continue to favor physical gold. These findings suggest a gradual shift in investment behavior toward modern financial instruments.

Similarly, Kumar and Dinesh (2026) examined investor preferences in Coimbatore city in India using a sample of 150 respondents. Their findings suggest that while physical gold remains popular due to tradition and trust, digital gold is gaining increasing acceptance, especially among younger investors, due to its flexibility and ease of access. The study concludes that both forms of gold serve complementary roles in modern investment portfolios.

A review of current literature reveals that while physical gold remains deeply rooted in cultural and emotional traditions, digital gold is rapidly gaining traction as a modern, accessible alternative. Research based on questionnaire studies indicates that investor choice between these two options is primarily driven by a trade-off

between the tangibility and trust associated with physical assets versus the convenience and affordability offered by digital platforms.

Literature consistently identifies distinct motivations for each investment type:

Physical Gold Perception: Investors perceive physical gold as a "safe haven" and a tangible store of wealth. Its primary appeal lies in real ownership, cultural significance (especially for weddings and festivals), and a sense of certainty that does not depend on internet access or digital infrastructure. However, it is often viewed as burdened by high making charges, storage risks, and limited divisibility.

Digital Gold Perception: Digital gold is viewed as a highly convenient and liquid asset. Key perceived strengths include affordability, lack of physical storage requirements, and standardized real-time pricing. It is increasingly popular among younger, tech-savvy demographics.

Studies utilizing structured questionnaires have pinpointed specific variables that shape these perceptions:

Trust and Security: Trust in digital platforms is a significant predictor of perceived risk. While physical gold is trusted for its tangibility, digital gold faces hurdles related to cybersecurity and a perceived lack of robust government regulations.

Demographic Drivers: Age and education level significantly influence preferences. Younger investors typically prioritize accessibility and digital ease of use, whereas older investors often maintain a strong emotional attachment to physical jewelry and bullion.

Operational Advantages: Digital gold is favored for its low entry barriers and fractional ownership, which "democratizes" gold investment for lower-income groups who may not be able to afford significant upfront physical purchases.

Challenges to Digital Adoption

Despite its advantages, digital gold adoption is hindered by several factors:

Regulatory Uncertainty: A common concern among survey respondents is the "lax or ambiguous" legal framework surrounding digital gold platforms.

Lack of Awareness: Many traditional investors remain unaware of modern gold instruments like E-gold or Gold ETFs, leading them to stick with familiar physical forms.

Psychological Attachment: The inability to physically inspect gold remains a major psychological barrier for many.

Overall, the literature indicates a transitional shift in gold investment behavior from traditional to modern instruments. While physical gold continues to maintain its dominance due to cultural, emotional, and trust-related factors, digital gold and ETFs are gaining traction due to their advantages in terms of accessibility, liquidity, and cost efficiency. However, challenges such as low financial awareness, regulatory uncertainty, and trust deficits remain significant barriers to the widespread adoption of modern gold investment instruments.

6. CONCLUSION

The transformation of gold investment reflects the broader evolution of the financial system under the influence of digitalization and financial innovation. While physical gold continues to preserve its traditional role as a secure store of value and a safe haven asset, account-based and digital gold have emerged as more flexible and accessible alternatives. Each form of gold embodies a distinct balance between security, convenience, and risk. Physical gold offers independence from financial systems but entails storage and liquidity constraints. Account-based gold facilitates ease of transaction and integration within the banking system, yet remains vulnerable to systemic risks. Digital gold, on the other hand, represents the most advanced stage of this evolution, providing high accessibility, liquidity, and fractional investment opportunities.

However, the growing importance of digital gold also underscores the need for robust regulatory frameworks, enhanced cybersecurity measures, and greater transparency to build investor trust. The findings suggest that no single form of gold fully satisfies all investor needs. Instead, a diversified approach combining different forms of gold may offer a more balanced strategy. Future developments in gold markets will depend on the effective alignment of technological innovation with regulatory oversight and investor protection.

REFERENCES

Abas, A.-M., Zain, M. N. M., Yaacob, S. E., Yahaya, M. Z., & Ghani, N. A. R. N. A. (2023). A Review on Sharia-compliant Gold Savings and Investment Models in Malaysia. International Journal of Academic Research in Business and Social Sciences, 13(3), 1422 – 1433.

Ashalatha, G.M., Darshan, M., Latha, J.S., Prajwal, V., & Sridevi Rao, T.K. (2023). Investors Perception Towards Gold As An Investment, International Journal of Creative Research Thoughts, 11(9), 760-770.

Baur, D. G., & McDermott, T. K. (2010). Is gold a safe haven? Journal of Banking & Finance, 34(8), 1886–1898.

Capie, F., Mills, T. C., & Wood, G. (2005). Gold as a hedge against the dollar. Journal of International Financial Markets, Institutions and Money, 15(4), 343–352.

Darshana, B., & Ponnumani, K. (2024). Perceptions of digital gold among physical gold investors in Coimbatore city. International Journal of Research Publication and Reviews, 5(7), 1260-1266.

Devi, S.S., & Kavitha, V. (2025). Investment In Digital Gold: A Financial and Behavioral Perspective. International Journal of Creative Research Thoughts, 13(9), 365-379.

Dhurve, A.G., & Chawda, D.R. (2025). A study on physical gold vs. Digital Gold: A Comparative Analysis of Investment Preferences of the Amravati city. REST Conference Proceedings, 1(2), 26-29.

Dyhrberg, A. H. (2016). Bitcoin, gold and the dollar – A GARCH volatility analysis. Finance Research Letters, 16, 85–92.

Downey, L. (2026). Understanding Digital Gold Currency (DGC) and Its Operations. https://www.investopedia.com/terms/d/digital-gold-currency-dgc.asp

Ganesamurthy, K., & Anjuka, M. (2025). Investors Perception towards Gold ETFS, Gold Bond, Gold Deposits, and Physical Gold in Tamilnadu. International Journal For Multidisciplinary Research, 7(4),1-9.

Gurbaxani, A., Thakkar, J., Pathak, S., Mathur, A., & Raees, S. (2023). Examining factors influencing investment in Digital Gold and Gold ETF using the PCA technique. Investment Management & Financial Innovations, 20(2), 160-170.

Hayes, A. (2025). Gold ETFs and Gold Mining ETFs: What They Are and How They Work. https://www.investopedia.com/gold-and-gold-mining-etfs-8431193

Jayalakshmi, E. & Purushothaman, R. (2025). An Investigation Into Investors' Perception of investing In Digital Gold (With special reference to Chennai City). International Journal of Advance Scientific Research and Engineering Trends, 9(11),108-113.

Krishnakumar, K., & Lissy, P. (2025). A Study on Investor Perception Towards Gold As an Investment, International Journal of Research in Commerce and Management Studies, 7 (4), 403-424.

Kumar, R.S., & Dinesh, P. (2026). A Comparative Study on Digital Gold vs Physical Gold an Overview at Coimbatore City. International Journal of Research Publication and Reviews, 7(3), 1722-1729.

Maouchi, Y., Fakhfekh, M., Charfeddine, L., & Jeribi, A. (2024). Is digital gold a hedge, safe haven, or diversifier? An analysis of cryptocurrencies, DeFi tokens, and NFTs. Applied Economics, 56(60), 9158-9173.

Menon, A. (2020). Investor perception towards gold as an investment option in different market conditions. Psychology and Education Journal, 57(9), 3831-3839.

Nowsath, A.M., & Arunprakash, R. (2025). The Future of Investment: Digital Gold vs Physical Gold. International Journal of Research Publication and Reviews, 6(9), 3427-3432.

Sreelakshmi, K.B. (2025). A Comparative Study of Gold ETF and Physical Gold Investment: An Analysis of Investor Preferences in Thrissur District. International Journal of Creative Research Thoughts, 13(11), 597-599.

Suchitra, V. G., Lohith, V., & Subramanyan, B. (2025). A study on perception of investors in digital gold market. European Journal of Management, Economics and Business, 2(2), 67-71.

Sujit, A., Nadayil, D., Meena, C., & Anandamma, N. (2025). Beyond Traditional Gold: Analyzing Investment Decision Making in Digital, Physical, and Gold ETF's. In: Hamdan, A., Braendle, U. (eds) Harnessing AI, Machine Learning, and IoT for Intelligent Business. Studies in Systems, Decision and Control, vol 555. Springer, Cham. pp. 991–998.

Gold, Wealth Effects, and Inflation: Historical Evidence and Contemporary Implications for Monetary Policy in Türkiye

Rasim YILMAZ[1]

[1] Tekirdağ Namık Kemal University, Faculty of Economics and Administrative Sciences, Department of Economics, Tekirdağ/TURKEY, e-mail:rasimyilmaz@nku.edu.tr, ORCID: 0000-0002-1084-8705

Abstract: This study examines the role of gold as a driver of inflation through both historical and contemporary perspectives, with a particular focus on the wealth effect channel. Drawing on historical episodes such as the Mansa Musa's pilgrimage to Mecca and the Spanish Price Revolution, the paper illustrates how increases in the quantity of precious metals have historically led to inflationary pressures. Extending this framework to modern economies, the study explores how rising gold prices can generate a wealth effect, increasing household consumption and aggregate demand.

Referencing recent evidence from Türkiye, where gold remains a traditional store of wealth, the paper highlights how substantial gold holdings and sharp price increases have led to significant gains in household wealth. These gains have supported consumption despite tight monetary conditions, thereby complicating the disinflation process. The findings suggest that gold-driven wealth effects can act as a countervailing force to contractionary monetary policy by sustaining demand and weakening policy transmission.

Keywords: Gold Prices, Inflation, Mansa Musa, Spanish Price Revolution, Wealth Effect

1. INTRODUCTION

The famous pilgrimage of Mansa Musa to Mecca (1324–1326) and the Spanish Price Revolution serve as two prominent historical examples of how a sudden increase in gold quantity leads to inflation in the global economy. More recently, the wealth effect of gold illustrates how an increase in the price of gold can similarly drive inflationary pressures.

Mansa Musa, the ninth ruler of the Mali Empire (c. 1312–1337), is widely regarded as one of the wealthiest individuals in history, with immense riches derived primarily from Mali's control over trans-Saharan trade routes, especially in gold and salt. The empire accumulated vast gold reserves from major mining regions, forming the foundation of Musa's extraordinary wealth (Eaton, 2011; Laubscher, 2025).

Mansa Musa undertook a historic pilgrimage to Mecca between 1324 and 1326. His journey, which passed through Cairo, became legendary for its scale and extravagance. Accompanied by a caravan reportedly numbering in the tens of thousands, including slaves and attendants, Musa transported enormous quantities of gold—carried by camels and distributed generously along the route (Sutton, 1997; Cartwright, 2019). Contemporary accounts describe lavish gifts to rulers, alms to the poor, and extensive spending in local markets.

This unprecedented influx of gold had significant economic consequences. The sudden and massive influx of gold into Cairo, Mecca, and Medina led to an unprecedented surge in the money supply, triggering severe inflationary pressures (Silady, 2025). This extraordinary distribution of gold significantly reduced its value and disrupted local economies to such an extent that these major cities experienced prolonged economic instability, with effects that reportedly lasted for more than a decade. In Cairo, the massive distribution and spending of gold led to a sharp decline in its value—estimated at around 20%—triggering inflation that reportedly lasted for over a decade (Abbou, 2016; Cartwright, 2019)). Musa's actions demonstrate the scale of his wealth and highlight the economic impact that concentrated control over a key commodity like gold could exert on regional markets.

By the mid-1500s, Spain experienced the "Price Revolution," a period of intense inflation caused by a massive influx of American silver and gold. The Spanish Price Revolution of the 16th and early 17th centuries represents one of the earliest and most significant episodes of sustained inflation in economic history. Following Spain's expansion into the Americas, vast quantities of gold and silver were extracted and transported to Europe. This unprecedented influx of precious metals substantially increased the money supply, particularly in Spain, where bullion became a primary source of wealth. This unprecedented influx of precious metals substantially increased the money supply, causing prices to rise roughly 400% between 1500 and 1650, which ultimately caused Spanish domestic industries to wither, eroded real wages, and triggered a long-term economic decline (Hamilton, 1929; Bani Issa and Bani Salameh, 2025).

The abundance of gold and silver reduced their relative value compared to other goods, leading to a persistent rise in prices across the economy. Inflation was especially pronounced in regions where these metals were most concentrated (Brown, 2012). Rather than stimulating productive economic activity, the easy availability of imported wealth discouraged domestic manufacturing and export-oriented industries. Spain increasingly relied on imports, purchasing foreign goods with its bullion rather than developing its own industrial base (Fox, 1969; O'Brien et al., 1998; Bani Issa and Bani Salameh, 2025).

This imbalance contributed to a decline in economic competitiveness and weakened long-term growth prospects. As profits from American bullion diminished over time, the structural weaknesses of the Spanish economy became more apparent, accelerating imperial decline. The Price Revolution thus illustrates how excessive monetary expansion—driven by large inflows of precious metals—can generate inflationary pressures, distort economic incentives, and undermine sustainable economic development.

Historically, the inflationary impacts of Mansa Musa's 14th-century pilgrimage and the 16th-century Spanish Price Revolution demonstrate the classic Quantity Theory of Money in action. Modern economic discourse has extended this relationship to include the wealth effect, suggesting that significant appreciation in gold prices can fuel inflation by enhancing household net worth and subsequent aggregate demand.

2. THE WEALTH EFFECT OF GOLD (THE GOLD WEALTH EFFECT)

The wealth effect is a phenomenon in which individuals feel wealthier and increase their consumer spending when the value of their assets rises. These assets may include stocks, housing, gold, cryptocurrencies, or other investments.

The relationship between wealth and consumption has long been a central concern in economic theory. In an early contribution, A.C. Pigou introduced the term "wealth effect" to describe how changes in the value of assets—such as housing and financial holdings—can influence household consumption (Glickman, 2013). This idea is further grounded in the Permanent Income Hypothesis (Friedman, 1957) and the Life Cycle Hypothesis developed by Ando and Modigliani (1963).

These frameworks suggest that individuals base their consumption decisions not solely on current income, but on the present discounted value of their expected lifetime resources. Accordingly, permanent increases in wealth lead to higher consumption, whereas temporary fluctuations tend to have a limited impact on spending behavior. Together, these theories emphasize that consumption patterns are shaped by long-term expectations of income and wealth rather than short-term income changes alone.

Rising asset prices—whether in real estate, stocks, gold, or cryptocurrencies—tend to increase the wealth of homeowners and investors, which can in turn stimulate household consumption even when labor income remains unchanged. While the wealth effect has traditionally been associated with housing and equity markets, the concept has gradually expanded to include alternative assets such as gold and cryptocurrencies. Accordingly, increases in consumption driven by higher housing prices are referred to as "the housing wealth effect", those linked to stock market gains as "the stock market wealth effect", those associated with rising cryptocurrency prices as "the cryptocurrency wealth effect", and those stemming from gold price increases as "the gold wealth effect" (Cooper and Dynan, 2016).

Empirical evidence highlights important differences across asset types and regions. Peltonen et al. (2012), examining 14 emerging market economies over the period 1975–2008, find that housing wealth effects are more pronounced in countries with lower levels of financial development or income, whereas financial (stock market) wealth effects are stronger in economies with higher stock market capitalization. Their results also indicate that both housing and stock wealth effects tend to be weaker in Latin American emerging markets, while housing wealth effects have become more significant in Asian emerging economies in recent years.

Similarly, Coskun et al. (2018) analyze the relationship between wealth effects and household consumption in 11 advanced economies from 1970 Q1 to 2015 Q4. Their findings suggest that, although income remains the primary determinant of consumption, housing wealth has a positive and statistically significant impact on spending. Overall, the study concludes that housing wealth plays a more dominant role than stock market wealth in driving consumption growth in advanced economies.

The rapid growth of cryptocurrencies, particularly since the late 2010s, has prompted scholars to investigate whether gains in crypto wealth translate into changes in consumer behavior similar to those observed in traditional financial markets. Recent empirical studies provide evidence that cryptocurrencies generate a

measurable and, in some cases, sizable wealth effect. Aiello et al. (2024) shows that cryptocurrency gains significantly affect household consumption using transaction-level data from the USA. The study finds that increases in crypto wealth lead to higher discretionary spending and spill over into other sectors such as housing markets, contributing to local house price appreciation.

3. THE ROLE OF THE WEALTH EFFECT AS AN INFLATION DRIVER

The wealth effect plays an important role in shaping aggregate demand and, consequently, inflation dynamics. As consumption is a major component of aggregate demand, sustained increases in perceived wealth can exert upward pressure on prices, making the wealth effect a relevant channel in the transmission of inflation.

From a theoretical perspective, the wealth effect operates through the consumption function. In standard macroeconomic models, higher asset prices increase household net worth, which raises lifetime income expectations and encourages higher current spending. This increase in consumption demand, when not matched by a corresponding increase in supply, can lead to demand-pull inflation.

The wealth effect constitutes a significant channel through which asset price changes can influence inflation. By increasing household consumption, rising wealth can generate demand-pull inflation, particularly when asset price growth is widespread and persistent. However, the magnitude of this effect depends on factors such as household behavior, wealth distribution, and the stability of asset prices.

In Türkiye, where gold has long been regarded as a traditional store of wealth, its macroeconomic significance remains substantial. According to data from the Central Bank of the Republic of Türkiye, approximately $600 billion worth of gold is held “under the mattress,” outside the formal financial system. In addition to these informal holdings, Turkish banks are estimated to hold around $80 billion in gold through deposits and investment funds, while the central bank maintains roughly $80 billion in gold reserves. Furthermore, the surge in gold prices in 2025 is estimated to have generated a wealth increase of approximately $300 billion (Devranoglu and Erkoyun, 2026).

The doubling of the value of gold in a year has encouraged spending in Türkiye, despite annual inflation above 30%. The study by Çolak and Şamcı (2025) examines how increases in gold prices generate a wealth effect that influences household demand, particularly in housing and automobile markets in Türkiye. Following a substantial rise in global gold prices—approximately 77% between September 2023 and April 2025—households holding gold experienced significant gains in wealth. In Türkiye, where gold is a traditional savings instrument, this translated into increased consumer demand, especially in durable goods markets.

Using provincial differences in gold deposit shares, the study provides empirical evidence of a wealth effect. Regions with higher gold holdings experienced stronger increases in housing prices after late 2023, suggesting that gold-induced wealth gains contributed to rising real estate prices. Specifically, gold price increases are associated with an additional rise of around 11% in house prices in provinces with average gold savings levels.

However, the effect differs across markets due to supply conditions. In the housing sector, where supply is relatively inelastic in the short run, increased demand primarily leads to higher prices rather than higher sales volumes. In contrast, the automobile market—characterized by more elastic supply—responds with an increase in sales rather than prices.

The findings also indicate that households tend to use their gold-driven wealth directly for purchases, as reflected in the increase in mortgage-free housing transactions. This suggests that wealth gains from gold reduce reliance on credit and sustain demand even under tight financial conditions.

In sum, the wealth effect of gold can act as a countervailing force to tight monetary policy by sustaining consumption through increased household wealth, reducing reliance on credit, and supporting aggregate demand. This dynamic complicates the policy environment for central banks, as asset price movements—particularly in widely held assets like gold—can weaken the effectiveness of conventional tools aimed at controlling inflation.

4. THE GOLD WEALTH EFFECT AS A CONSTRAINT ON THE EFFECTIVENESS OF TIGHT MONETARY POLICY

The wealth effect generated by rising gold prices can partially offset—or even undermine—the intended impact of tight monetary policy. Contractionary policies, typically implemented through higher interest rates and

reduced liquidity, aim to suppress aggregate demand, lower consumption, and ultimately curb inflation. However, increases in gold prices can create an opposing force by boosting household wealth and sustaining spending.

Gold is widely held as a store of value, particularly in economies where it plays a traditional role in savings portfolios. When gold prices rise, households holding gold experience an increase in their net wealth. This can stimulate consumption through the wealth effect, even in the presence of higher borrowing costs and tighter credit conditions. As a result, households may maintain or even increase spending despite the central bank's efforts to dampen demand, thereby weakening the transmission mechanism of monetary policy.

One important channel through which this occurs is the self-financed consumption effect. Unlike credit-driven spending, which is directly constrained by higher interest rates, consumption financed through realized gains in gold wealth does not depend on borrowing. Households can liquidate gold holdings or use them as collateral, allowing them to bypass tighter financial conditions. This reduces the effectiveness of policy tools aimed at restricting credit growth (Mishkin, 2007).

Additionally, gold price increases often coincide with periods of macroeconomic uncertainty or inflation expectations. In such environments, households may perceive gold gains as a hedge against inflation and feel more financially secure, reinforcing their willingness to spend. This behavioral response can further sustain demand, counteracting the disinflationary intent of monetary tightening.

The impact of gold-driven wealth effects also depends on market characteristics. For instance, in sectors with inelastic supply—such as housing—increased demand fueled by gold wealth tends to translate into higher prices rather than higher output. This can exacerbate inflationary pressures, particularly in asset markets. In contrast, in markets with more elastic supply, such as automobiles, the effect may lead to higher sales volumes, still supporting aggregate demand even if price effects are more limited (Çolak and Şamcı, 2025).

Moreover, the distribution of gold ownership plays a crucial role. If gold holdings are widespread across households, the resulting wealth effect can have a broad-based impact on consumption. In countries where gold is a common savings instrument, this channel becomes especially significant, as a large portion of the population may simultaneously experience wealth gains.

In Türkiye, gold-driven wealth effect has contributed to the resilience of domestic demand, thereby complicating the country's already challenging disinflation process. Economists and central bank officials note that sustained consumption, supported by rising gold wealth, has weakened the effectiveness of monetary tightening and has led to a more gradual pace of interest rate reductions (Devranoglu and Erkoyun, 2026).

In sum, the wealth effect of gold can act as a countervailing force to tight monetary policy by sustaining consumption through increased household wealth, reducing reliance on credit, and supporting aggregate demand. This dynamic complicates the policy environment for central banks, as asset price movements—particularly in widely held assets like gold—can weaken the effectiveness of conventional tools aimed at controlling inflation.

5. CONCLUSION

This study demonstrates that gold can influence inflation not only through traditional monetary channels but also via the wealth effect. Historical experiences, such as those associated with Mansa Musa and the Spanish Price Revolution, illustrate how increases in the supply of precious metals can generate sustained inflationary pressures. In the modern context, however, the mechanism operates less through changes in money supply and more through asset price dynamics and household behavior.

The analysis shows that rising gold prices increase household wealth, which in turn stimulates consumption and aggregate demand. In economies such as Türkiye, where gold is widely held as a savings instrument, this effect becomes particularly significant. The substantial volume of gold held both within and outside the financial system amplifies the macroeconomic impact of price increases, making gold a key determinant of domestic demand conditions.

Importantly, the findings highlight that gold-driven wealth effects can weaken the effectiveness of tight monetary policy. By enabling self-financed consumption and sustaining spending despite higher interest rates, increases in gold wealth reduce the sensitivity of aggregate demand to monetary tightening. This complicates the disinflation process and may require policymakers to maintain restrictive policies for longer periods.

Overall, the study underscores the need for central banks to consider asset price developments—particularly in widely held assets such as gold—when designing and implementing monetary policy. As financial systems evolve and alternative assets gain prominence, wealth effects are likely to play an increasingly important role in shaping inflation dynamics and macroeconomic stability.

REFERENCES

Abbou, T. (2016). Mansa Musa's journey to Mecca and its impact on Western Sudan. Mü'temeru Tarîki'l-hacci fî İfrîkiya, 6, 19-31.

Aiello, D., Baker, S. R., Balyuk, T., Di Maggio, M., Johnson, M. J., & Kotter, J. D. (2023). The effects of cryptocurrency wealth on household consumption and investment (No. w31445). National Bureau of Economic Research. https://www.nber.org/papers/w31445

Ando, A., & Modigliani, F. (1963). The "life cycle" hypothesis of saving: Aggregate implications and tests. American Economic Review, 53(1), 55–84.

Bani Issa, M.S. and Bani Salameh, M.T. (2025) From gold to debt: comparative lessons from the Spanish Price Revolution and the U.S. post-2008 monetary policy. Frontiers in Political Science, 7:1635005. doi: 10.3389/fpos.2025.1635005

Brown, K. W. (2012). A history of mining in Latin America: from the colonial era to the present. UNM Press, USA.

Cartwright, M. (2019). The gold trade of ancient and medieval West Africa. World History Encyclopedia, 1-14.

Cooper, D., & Dynan, K. (2016). Wealth effects and macroeconomic dynamics. Journal of Economic Surveys, 30(1), 34-55. https://onlinelibrary.wiley.com/doi/full/10.1111/joes.12090

Coskun, Y., Sencer Atasoy, B., Morri, G., & Alp, E. (2018). Wealth effects on household final consumption: Stock and housing market channels. International Journal of Financial Studies, 6(2), 57. https://doi.org/10.3390/ijfs6020057

Çolak, M.S., & Şamcı, M.E. (2025). Impact of gold price-driven wealth growth on housing and automobile markets. https://tcmbblog.org/wps/wcm/connect/blog/en/main+menu/analyses/impact+of+gold+price-driven+wealth+growth+on+housing+and+automobile+markets

Devranoglu, N., & Erkoyun, E. (2026). Gold's rise cheers Turks, takes shine off anti-inflation efforts. https://www.reuters.com/world/middle-east/golds-rise-cheers-turks-takes-shine-off-anti-inflation-efforts-2026-02-27/

Eaton, R. M. (2011). From Bidar to Timbuktu: Views from the Edge of the 15th Century Muslim World. The Medieval History Journal, 14(1), 1-20.

Fox, H. B. (1969). Gold Streets and Silver Walls: The Decline and Fall of the Spanish Empire. Western Humanities Review, 23(1), 57.

Friedman, M. (1957). Theory of the consumption function. Princeton University Press.

Glickman, E. A. (2013). An introduction to real estate finance. Academic Press.

Hamilton, E. J. (1929). Imports of American gold and silver into Spain, 1503–1660. The Quarterly Journal of Economics, 43(3), 436-472.

Laubscher, P. H. (2025). The Law of Control: A Theory of Psychological Exchange and Power. Journal of Organizational Psychology, 25(3), 38-49.

Mishkin, F. S. (2007). The economics of money, banking, and financial markets (8th ed.). Pearson Education.

O'Brien, P. K., & De La Escosura, L. P. (1998). The costs and benefits for Europeans from their empires overseas. Revista de Historia Economica-Journal of Iberian and Latin American Economic History, 16(1), 29-89.

Peltonen, T. A., Sousa, R. M., & Vansteenkiste, I. S. (2012). Wealth effects in emerging market economies. International Review of Economics & Finance, 24, 155-166. https://doi.org/10.1016/j.iref.2012.01.006

Silady, A. (2025). Four People Who Single-handedly Caused Economic Crises. https://smartasset.com/insights/four-people-who-singlehandedly-caused-economic-crises

Sutton, J. E. G. (1997). The African lords of the intercontinental gold trade before the Black Death: al-Hasan bin Sulaiman of Kilwa and Mansa Musa of Mali. The Antiquaries Journal, 77, 221-242.

The Economic Implications of EU Deforestation Policies for Non-EU Countries: Trade, Compliance Costs, and Sustainable Supply Chains

Rasim YILMAZ[1]

[1] Tekirdağ Namık Kemal University, Faculty of Economics and Administrative Sciences, Department of Economics, Tekirdağ/TURKEY, e-mail:rasimyilmaz@nku.edu.tr, ORCID: 0000-0002-1084-8705

Abstract: The European Union (EU) has developed an increasingly comprehensive policy framework to address deforestation, forest degradation, biodiversity loss, and climate change, combining financial support, forest management strategies, environmental regulations, and trade-related measures. This study examines the economic implications of the EU's deforestation policies for countries outside the European Union, with particular emphasis on the European Union Deforestation Regulation (EUDR). The analysis reviews the evolution of EU forest policies, including the Common Agricultural Policy, the EU Forest Strategy for 2030, the EU Biodiversity Strategy for 2030, the Nature Restoration Law, the LULUCF framework, and the EUDR. Particular attention is given to the EUDR's due diligence, legality, traceability, and geolocation requirements for forest-risk commodities, including cattle, cocoa, coffee, palm oil, rubber, soya, and wood. The regulation is expected to influence producers and exporters in non-EU countries by increasing compliance, information, traceability, monitoring, and administrative costs, while potentially affecting market access, production practices, supply-chain organization, and trade competitiveness. At the same time, the regulation may create incentives for more sustainable production, improved forest governance, greater supply-chain transparency, and investment in deforestation-free production systems. The study argues that the economic consequences of EU deforestation policies for other countries are likely to be differentiated according to producers' capacity to meet regulatory requirements, the availability of reliable land-use and geolocation data, and the institutional and technological capacity of exporting countries. Consequently, although the EU's policies may generate additional short-term compliance costs for non-EU producers, they may also contribute to longer-term improvements in sustainable land management and international forest governance.

Keywords: European Union; Deforestation; European Union Deforestation Regulation (EUDR); International Trade

1. INTRODUCTION

Forests cover approximately 30% of the Earth's terrestrial surface, encompassing an estimated 4.06 billion hectares worldwide. This corresponds to roughly half a hectare of forest per person globally. According to the definition established by the Food and Agriculture Organization of the United Nations (FAO), a forest is defined as land extending over more than 0.5 hectares, with trees reaching a height of at least 5 metres at maturity in situ and a tree canopy cover exceeding 10%, or an equivalent level of tree stocking (European Parliament, 2026).

Forests provide a wide range of environmental, economic, and social benefits and constitute an essential component of the Earth's ecological and socioeconomic systems. They support a substantial share of global terrestrial biodiversity and play a critical role in maintaining ecosystem functions and services. Forest ecosystems contribute to climate regulation and carbon sequestration, improve air quality, and are fundamental to the purification, retention, and recharge of water resources. They also help protect soils from erosion and degradation, thereby supporting the long-term sustainability of terrestrial ecosystems. Beyond their ecological functions, forests are an important source of livelihoods and income for approximately one-quarter of the world's population. Their socioeconomic significance is particularly pronounced for indigenous peoples and local communities, many of whom have traditionally inhabited and depended upon forested areas for their livelihoods, cultural practices, and well-being (European Parliament,2022).

Despite their vital ecological and socioeconomic importance, forests are facing increasing pressure worldwide. Forest loss and degradation have emerged as major global environmental challenges, driven by a range of anthropogenic and, increasingly, climate-related pressures. Deforestation and forest degradation represent two of the most significant threats to the long-term sustainability of forest ecosystems, undermining biodiversity, ecosystem services, and the livelihoods of forest-dependent populations. Globally, approximately 420 million hectares of forest—equivalent to around 10% of the world's total forest area—were lost to deforestation between 1990 and 2020. This substantial decline underscores the scale and persistence of global pressures on forest resources and highlights the need for effective policies and sustainable forest management practices to prevent further forest loss (European Council, 2026).

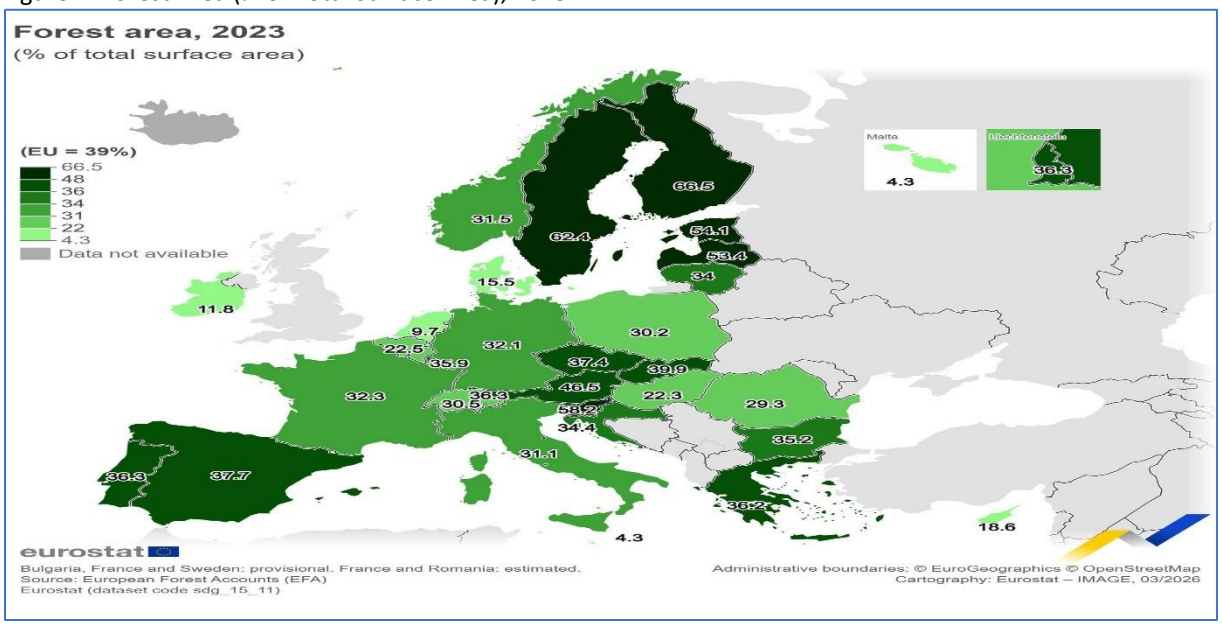
In contrast to the global trend of forest loss, the European Union (EU) has experienced a sustained expansion of forest resources. Forest area in the EU increased by approximately 5.3% between 2000 and 2021, reflecting the

region's relatively positive trajectory in forest conservation and expansion. Forest area continues to expand, biodiversity indicators show signs of improvement, and the forest-based sector remains an important contributor to economic activity in the EU. Between 1990 and 2020, Europe's forest area increased by approximately 9%, while the amount of carbon stored in forest biomass rose by 50%. Over the same period, the region's wood supply increased by approximately 40% (European Parliament,2022).

According to the State of Europe's Forests 2025 (SoEF 2025) report, Europe's forest resources have continued to expand in both extent and ecological value. Since 2020, the continent has gained approximately 2 million hectares of forest, increasing the total forest area from around 230 million to 232 million hectares. This long-term expansion is particularly evident in countries such as Spain and France, where substantial increases in forest area since 1990 have been driven largely by large-scale afforestation initiatives, including the restoration and reforestation of degraded land. The quantitative expansion of forest area has also been accompanied by an increase in the standing volume of timber. Average standing stock rose from 169 m^3 per hectare in 2020 to approximately 171.5 m^3 per hectare in 2025, representing an increase of around 45% compared with 1990 levels. At the same time, the share of Europe's forests under protection increased considerably, from 23.6% in 2020 to 26.4% in 2025 (Verstraeten and De Cuyper, 2026).

In 2023, forests covered approximately 39% of the European Union's (EU) total land area. However, forest cover is distributed unevenly across Member States, with substantial geographical disparities in both the extent and relative importance of forest resources (Eurostat, 2026) (see Figure 1).

Figure 1: Forest Area (% of Total Surface Area), 2023



Source: Eurostat (2026)

The progress achieved in forest expansion and conservation across the European Union can be attributed, to a considerable extent, to a combination of comprehensive regulatory frameworks and financial support mechanisms. EU-level regulations, together with targeted funding programs and incentives for afforestation, sustainable forest management, restoration, and biodiversity conservation, have played an important role in encouraging Member States to protect and expand their forest resources. These policy instruments have provided both the regulatory framework and the financial incentives necessary to promote long-term forest conservation and sustainable forest development.

2. EU FOREST POLICY: FROM FOREST CONSERVATION TO GLOBAL DEFORESTATION GOVERNANCE

2.1. EU FINANCIAL SUPPORT FOR FORESTRY

The Common Agricultural Policy (CAP) constitutes the principal source of European Union (EU) funding for forestry, with approximately 90% of EU financial support for forests channelled through the European Agricultural Fund for Rural Development (EAFRD). Through its rural development instruments, the CAP has

provided substantial financial resources for afforestation, sustainable forest management, forest resilience, restoration, and the prevention of forest-related damage (European Parliament, 2026).

During the 2007–2013 programming period, approximately EUR 5.4 billion from the EAFRD budget was allocated to co-finance forestry-related measures. This financial commitment increased substantially during the 2014–2020 programming period, when approximately EUR 8.2 billion in public expenditure was allocated to forestry measures. Of this amount, 27% was directed towards reforestation, while 18% supported measures aimed at enhancing forest resilience and a further 18% was allocated to forest damage prevention. In addition, dedicated support was provided for investments in the development of forested areas and the improvement of forest viability. The CAP also supported forestry, environmental, and climate services, as well as forest conservation, while other measures—including payments associated with Natura 2000 and the Water Framework Directive—provided additional support with implications for forest ecosystems (European Parliament, 2026).

Under the current 2023–2027 CAP programming period, forestry interventions are incorporated into the CAP Strategic Plans prepared by Member States under Regulation (EU) 2021/2115. The European Commission's 2023 synthesis of the national CAP Strategic Plans indicates that Member States recognize the importance of multifunctional forests and sustainable forest management. Dedicated CAP funding for forestry amounts to approximately EUR 4.2 billion, considerably less than during the previous programming period. This relatively lower level of dedicated funding partly reflects Member States' preference for addressing forestry objectives through complementary instruments, including national forest funds and state-aid schemes (European Parliament, 2026).

2.2. THE EUROPEAN UNION DEFORESTATION REGULATIONS

Forests are closely integrated into a broad range of European Union (EU) policies and initiatives, reflecting their importance for biodiversity conservation, climate change mitigation, renewable energy, and the provision of essential ecosystem services. Their strategic significance is explicitly recognized in key policy frameworks, including the EU Forest Strategy for 2030, the EU Biodiversity Strategy, the EU Nature Restoration Law, and the Renewable Energy Directive. In addition, forests constitute an important component of the EU Bioeconomy Strategy, particularly through their contribution to sustainable resource use, rural development, and employment opportunities in rural areas. Collectively, these policy frameworks demonstrate the multifaceted role of forests in advancing the EU's environmental, economic, and social objectives (Eurostat, 2026).

In July 2021, the European Commission adopted the New EU Forest Strategy for 2030, a flagship initiative of the European Green Deal that builds on the EU Biodiversity Strategy for 2030. The Strategy aims to enhance both the quantity and quality of EU forests, strengthen their protection and resilience, and promote their capacity to function as carbon sinks. By emphasizing sustainable forest management, biodiversity conservation, and climate mitigation, the Strategy establishes a comprehensive framework for strengthening the environmental, economic, and social contributions of forests across the European Union (European Parliament,2022 and 2026).

The EU Forest Strategy for 2030 aims to enhance the resilience and adaptability of Europe's forests to the changing environmental conditions, increasingly frequent weather extremes, and heightened uncertainty associated with climate change. Strengthening the capacity of forests to adapt is essential to ensuring that they can continue to perform their vital environmental, economic, and social functions. The Strategy also contributes to the EU's broader climate and biodiversity objectives, including the achievement of the EU's biodiversity targets, a reduction in greenhouse gas emissions of at least 55% by 2030, and climate neutrality by 2050. In this context, the Strategy recognizes the central and multifunctional role of forests and emphasizes the contributions of forest owners, managers, and other stakeholders across the forest-based value chain. By supporting sustainable forest management, climate resilience, biodiversity conservation, and the sustainable use of forest resources, the Strategy seeks to contribute to the transition towards a sustainable and climate-neutral economy while helping to maintain vibrant and prosperous rural communities (European Parliament, 2026).

The EU Biodiversity Strategy for 2030 establishes an ambitious framework for protecting and restoring ecosystems across the European Union, with important implications for forest conservation and management. One of its central objectives is to expand protected areas to cover at least 30% of the EU's land and sea areas by 2030, including 10% under strict protection. The Strategy also includes a commitment to plant at least three billion additional trees, thereby contributing to forest expansion, biodiversity conservation, and climate mitigation. In addition, the EU Nature Restoration Regulation (EU) 2024/1991, adopted as part of this broader policy framework, establishes binding targets for restoring degraded ecosystems, with particular emphasis on

ecosystems with significant potential for carbon sequestration and storage and for reducing the risks and impacts of natural disasters (European Parliament, 2026).

The Strategy also promotes the adoption of biodiversity-friendly approaches to forest management. In this context, the EU Programme for the Environment and Climate Action (LIFE 2021–2027), established under Regulation (EU) 2021/783, supports projects that promote "closer-to-nature forestry" practices. These approaches seek to achieve forest management objectives with the minimum level of necessary human intervention while balancing biodiversity conservation with sustainable production and other socioeconomic objectives. Together, these measures demonstrate the EU's increasing emphasis on integrating forest protection, ecosystem restoration, biodiversity conservation, and sustainable forest management within a common policy framework (European Parliament, 2026).

The European Commission presented its proposal for the Nature Restoration Law in June 2022 as a key component of the European Green Deal and the EU Biodiversity Strategy for 2030. The legislation builds on existing EU environmental policies and establishes a framework for the continuous and sustained recovery of degraded ecosystems across the EU. Its overarching objective is to enhance ecosystem resilience, contribute to climate neutrality by 2050, and strengthen Europe's capacity to adapt to the impacts of climate change. At the EU level, the framework sets a target for Member States to implement restoration measures covering at least 20% of the EU's land and sea areas by 2030, with restoration measures ultimately extending to all ecosystems requiring restoration by 2050 (European Commission, 2023).

The Nature Restoration Law also has important implications for the protection and management of European forests. It provides for the protection of remaining old-growth and primary forests, the restoration of additional forest areas, and measures to improve the biodiversity of forests managed for timber production. In particular, forest restoration is expected to contribute to increasing carbon stocks while enhancing the age structure and species diversity of forests. Complementary initiatives further strengthen this policy framework. The proposed Forest Monitoring Framework would require Member States to collect and provide consistent, detailed, and timely information on forest condition and health, while developing long-term strategies for forest maintenance and management. In addition, the EU Deforestation Regulation establishes requirements to ensure that commodities placed on the EU market, including wood, do not contribute to deforestation or forest degradation. Taken together, these measures represent a comprehensive EU approach that combines forest protection, ecological restoration, monitoring, and sustainable resource use, thereby strengthening the resilience and long-term sustainability of Europe's forests (Carter, 2024).

The European Union (EU) participates actively in a wide range of international initiatives concerning forests and climate change, including under the United Nations Framework Convention on Climate Change (UNFCCC). Alongside its participation in global negotiations aimed at reducing greenhouse gas emissions, the EU has progressively integrated agriculture and forestry into its climate policy framework. A major step in this direction was the adoption of Regulation (EU) 2018/841, which incorporated greenhouse gas emissions and removals from land use, land-use change, and forestry (LULUCF) into the EU's 2030 climate and energy framework (European Parliament, 2026).

In April 2023, the European Parliament and the Council adopted Regulation (EU) 2023/839, amending the LULUCF Regulation to establish a strengthened 2030 target aligned with the objectives of the European Green Deal. A central objective of the revised framework is to enhance the EU's capacity to remove and store carbon through land use and forestry. In particular, the Regulation seeks to increase the EU's net carbon removals by 15%, corresponding to a target of 310 million tonnes of CO_2 equivalent by 2030. By strengthening the role of forests and other land-based carbon sinks, the revised LULUCF framework represents an important component of the EU's broader strategy to achieve climate neutrality and reduce greenhouse gas emissions (European Parliament, 2026).

3. THE EU'S ROLE IN GLOBAL DEFORESTATION

The European Parliament has emphasized that the continued destruction, degradation, and conversion of forests and other natural ecosystems worldwide are closely associated with the expansion of agricultural production, alongside concerns over human rights violations. In particular, the conversion of forests to agricultural land for the production of high-demand commodities represents a major driver of global deforestation. Agricultural expansion is estimated to account for nearly 90% of global deforestation, with more than half of total forest loss attributable to the conversion of forests into cropland. Livestock grazing constitutes another major pressure,

accounting for approximately 40% of forest loss. These figures highlight the central role of agricultural land-use change in driving global forest loss and underscore the importance of integrating forest conservation objectives into agricultural and land-use policies (European Parliament, 2023).

EU consumption represents a significant driver of deforestation and forest degradation at the global level. Between 1990 and 2008, the European Union accounted for approximately one-third of globally traded agricultural products associated with deforestation. During the same period, EU consumption was estimated to have contributed to approximately 10% of global deforestation linked to the production of goods and provision of services. Without effective regulatory intervention, this pressure is expected to persist. In particular, it has been estimated that EU consumption and production of six major commodities—cattle, cocoa, coffee, oil palm, soya, and wood—could collectively be associated with approximately 248,000 hectares of deforestation annually by 2030. These figures underscore the significant global environmental footprint of EU consumption and the need for policies that address deforestation risks throughout commodity supply chains (European Parliament, 2022 and 2023).

The European Union has adopted a range of measures to reduce the global deforestation and forest degradation associated with its consumption of forest-risk commodities and products. These efforts seek not only to reduce the EU's contribution to greenhouse gas emissions and global biodiversity loss but also to promote more sustainable patterns of production and consumption, both within the Union and internationally. To maximize the effectiveness of these measures, EU policy extends beyond the regulation of supply chains serving the European market and seeks to influence global production and consumption patterns more broadly (European Parliament, 2023).

On 22 October 2020, the European Parliament adopted a resolution under Article 225 of the Treaty on the Functioning of the European Union (TFEU), calling on the European Commission to propose, pursuant to Article 192(1) TFEU, an EU legal framework aimed at halting and reversing deforestation driven by EU consumption and economic activities worldwide. The proposed framework was to be based on mandatory due diligence requirements (European Parliament, 2023).

The European Union has regulated the trade in timber and timber products through the European Union Timber Regulation (EUTR), which has been in force since 2013. The EUTR primarily relies on documentary checks and due diligence requirements to prevent illegally harvested timber from entering the EU market. However, the EUTR is being replaced by the more comprehensive European Union Deforestation Regulation (EUDR), which adopts a broader approach to addressing the environmental impacts associated with commodity supply chains. The Regulation on Deforestation-Free Products (EU) 2023/1115 aims to ensure that products consumed within the EU do not contribute to deforestation or forest degradation anywhere in the world. (Abbà, 2025).

The EUDR entered into force on 29 June 2023 and establishes requirements aimed at ensuring that relevant commodities and products placed on or exported from the EU market are not associated with deforestation or forest degradation. Its implementation is being phased in, with the regulation applying to large EU businesses from 30 December 2026 and to smaller enterprises from 30 June 2027. By extending regulatory requirements beyond timber to a wider range of forest-risk commodities, the EUDR represents a significant expansion of the EU's efforts to reduce deforestation and forest degradation linked to consumption and international trade (European Parliament, 2026).

The European Union Deforestation Regulation (EUDR) establishes requirements to ensure that, from 30 December 2026, products placed on, made available within, or exported from the EU market are not associated with deforestation or forest degradation. Under the Regulation, EU operators and importers must demonstrate that the land on which covered commodities were produced has not been subject to deforestation or forest degradation since 31 December 2020. They are also required to verify that the production of these commodities complies with the relevant legislation in the country of production. The EUDR applies to commodities identified as major drivers of global deforestation and forest degradation, including cattle, cocoa, coffee, palm oil, rubber, soya, and wood, as well as a range of products derived from these commodities. Through these requirements, the Regulation seeks to reduce the EU's contribution to global deforestation and promote more sustainable and legally compliant commodity supply chains (European Commission, 2026).

The European Union Deforestation Regulation (EUDR) introduces stringent geographic traceability requirements for commodities and products entering the EU market, with the aim of strengthening efforts to combat deforestation and forest degradation. In addition to conventional due diligence obligations, companies will be required to collect and maintain precise geolocation information on the plots of land where relevant

commodities are produced. This information will enable the traceability of products throughout the supply chain, from the location of harvesting or production to their placement on the European market. By strengthening transparency and traceability, the EUDR seeks to ensure that commodities linked to deforestation can be identified and excluded from EU supply chains (Abbà, 2025).

Companies that first place these products on the EU market or export them from the EU must be able to demonstrate that the products meet the following requirements (European Commission, 2026):

- deforestation-free
- produced in line with relevant laws in the country of production.

EU authorities will require importers to provide the following information:

- a description of relevant products and their quantities (and for wood products, the common species name and full scientific name)
- geolocations of all production locations
- production date or time range of production
- adequately conclusive and verifiable information that the relevant products are deforestation-free and were produced in compliance with the export country's relevant local laws.

EU importers use this information to submit a "due diligence statement" before the products enter the EU market. Producers and companies located outside the EU are not directly subject to the EUDR unless they place the relevant products on the EU market. Nevertheless, non-EU producers and companies may be required to provide information, including the locations where products were grown, harvested, or raised, to enable EU-based operators to fulfil their due diligence obligations (European Commission, 2026).

4. CONCLUSION

The European Union has progressively strengthened its approach to deforestation by combining forest conservation policies, financial support mechanisms, climate and biodiversity strategies, ecosystem restoration measures, and trade-related regulation. This policy framework reflects the recognition that deforestation is not only an environmental problem but also an economic and social issue involving international production, consumption, and supply chains. The EU's increasing forest area and its expanding regulatory framework demonstrate the importance attached to sustainable forest management, biodiversity conservation, carbon sequestration, and forest resilience.

The EUDR represents a major shift in the EU's approach because it extends the responsibility for addressing deforestation beyond the EU's borders and into global commodity supply chains. By requiring covered products to be deforestation-free, legally produced, traceable to their production locations, and supported by due diligence statements, the regulation introduces new obligations for companies participating in trade with the EU. The requirements for precise geolocation, production information, and verifiable evidence are particularly significant for producers and exporters in non-EU countries.

From an economic perspective, the principal short-term effect on non-EU countries is likely to be an increase in compliance and transaction costs. Producers and exporters may need to invest in traceability systems, geolocation technologies, documentation, monitoring, and verification procedures. These requirements may be particularly challenging for small-scale producers and businesses operating in countries where land registries, digital infrastructure, monitoring systems, and institutional capacities are relatively weak. Non-EU producers are not directly subject to the EUDR unless their products enter the EU market; nevertheless, they may need to provide extensive information to EU-based operators to enable them to fulfil their due diligence obligations.

The economic effects are not necessarily limited to additional costs. The EUDR can also create incentives for producers and exporting countries to improve land-use governance, supply-chain transparency, forest monitoring, and sustainable production practices. Access to the EU market may increasingly favor producers capable of demonstrating compliance with deforestation-free and legality requirements. In this respect, the regulation may encourage technological investment and institutional improvements while strengthening the integration of environmental considerations into international trade.

However, the distribution of these effects is likely to be uneven. Countries and firms with stronger institutional capacity, reliable land-use information, established traceability systems, and greater financial resources may adapt more easily to the new requirements. Conversely, producers with limited administrative and technological capacity may face higher relative compliance costs and a greater risk of losing access to the EU market. The EUDR may therefore have important implications for the competitiveness of developing-country producers and for the organization of global commodity supply chains.

Overall, the EU's deforestation policies represent an important attempt to address the global environmental consequences of European consumption. Given that EU consumption has historically contributed significantly to deforestation associated with agricultural and forest-risk commodities, policies targeting supply chains have the potential to reduce the EU's external environmental footprint. The effectiveness and broader economic consequences of these policies, however, will depend on how successfully the additional regulatory requirements are implemented and how non-EU producers, governments, and businesses adapt to them. The challenge for the EU is therefore to combine ambitious environmental objectives with mechanisms that facilitate compliance, particularly for smaller producers and countries with limited institutional capacity.

REFERENCES

Abbà, M. (2025). Europe's Anti-Deforestation Challenge: Between Ambition and Reality. https://tech4future.info/en/europe-anti-deforestation-challenge/

Carter, S. (2024). 4 Growing Threats to Europe's Forests: Logging, Bioenergy, Wildfires and Pests Europe's forests face increasing pressures. https://www.wri.org/insights/europe-forest-loss-drivers

European Commission (2023). Commission welcomes agreement between European Parliament and Council on Nature Restoration Law. https://ec.europa.eu/commission/presscorner/detail/en/ip_23_5662

European Commission (2026). Implementing the EU Deforestation Regulation (EUDR). https://green-forum.ec.europa.eu/nature-and-biodiversity/deforestation-regulation-implementation_en

European Council (2026). Forests: facts and figures. https://www.consilium.europa.eu/en/policies/forest_facts_figures/

European Parliament (2022). Deforestation: causes and how the EU is tackling it. https://www.europarl.europa.eu/topics/en/article/20221019STO44561/deforestation-causes-and-how-the-eu-is-tackling-it

European Parliament (2023). Regulation (EU) 2023/1115 OF The European Parliament and of the Council on the Union Market and the Export from the Union of Certain Commodities and Products Associated with Deforestation and Forest Degradation and Repealing Regulation (EU) No 995/2010. https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32023R1115

European Parliament (2026). The European Union and forests, Fact Sheets on the European Union – 2026. https://www.europarl.europa.eu/factsheets/en/sheet/105/the-european-union-and-forests

Eurostat (2026). Forests, forestry and logging. https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Forests,_forestry_and_logging

Verstraeten, A., & De Cuyper, B. (2026). State of Europe's forests 2025. FOREST EUROPE (Ministerial Conference on the Protection of Forests in Europe), Sweden.

ABSTRACTS

An Index-Based Assessment of Bilateral Trade and Comparative Advantages Between Slovakia and Türkiye

Ľubica Zubaľová[1] **Kristína Drieniková[2]** **Erika Jučová[3]**

Andrea Hrubšová[4]

[1] Bratislava University of Economics and Business, Faculty of Commerce, Department of International Trade, lubica.zubalova@euba.sk, ORCID: 0000-0002-6860-7568

[2] Bratislava University of Economics and Business, Faculty of Commerce, Department of International Trade, kristina.driekova@euba.sk, ORCID: 0000-0002-1976-3521

[3] Bratislava University of Economics and Business, Faculty of Commerce, Department of International Trade, erika.jurcova8@euba.sk, ORCID: 0009-0000-8462-8687

[4] Bratislava University of Economics and Business, Faculty of Commerce, Department of International Trade, anodrea.hrubsova@euba.sk, ORCID: 0009-0005-2248-8240

Abstract: The paper evaluates the development of bilateral trade between Slovakia and Türkiye over the period 2014–2023, focusing on export opportunities and the structure of the top exported commodities at the HS4 level. Using the Trade Intensity Index (TII), Revealed Comparative Advantage Index (RCA1), and Net Trade Performance Index (RCA2), we assess the dynamics and structure of mutual trade and identify sectors with the greatest scope for trade expansion. The results indicate that while trade volumes have grown, trade intensity remained below its expected level throughout the observed period. Slovakia's key export advantages lie in live animals, rubber, paper, iron, steel, and particularly automobiles and components. Türkiye, as a dynamically developing economy with a strategic geographic position, offers significant opportunities to deepen economic cooperation, particularly in the automotive and engineering sectors. While Türkiye holds significant comparative advantages in the agricultural sector, further development is constrained by the existing customs union and requires a long-term, targeted trade policy approach.

Relatively few scholars conduct comprehensive analyses of Central and Eastern European (including Slovakia's) relations with non-EU countries. Given Slovakia's need to diversify its trade partners, this study evaluates bilateral trade relations and provides a basis for identifying key sectors for further cooperation.

Keywords: Slovakia, Türkiye, bilateral trade; export structure; revealed comparative advantage

The World Economy under the Impact of the Energy Shock: Developments and Prospects

Daniel BULIN, PhD

Institute for World Economy – Romanian Academy, daniel.bulin@yahoo.com

Abstract: The paper analyses the evolution and prospects of the world economy in the period 2026-2027, marked by an energy supply shock triggered by the war in the Middle East and the blockade of transport through the Strait of Hormuz. The forecasts published in the first half of 2026 by the International Monetary Fund, OECD, World Bank and the United Nations are compared, together with private sector analyses, showing that, beyond the differences in methodology and assumptions regarding the duration of the conflict, the estimates converge towards a visible slowdown in 2026 and an only moderate recovery in 2027, conditional on the normalization of energy flows. The analysis by country groups and regions highlights a pronounced asymmetry between net energy exporters and importers, as well as the high exposure of economies with thin foreign exchange reserves, limited fiscal space and a high share of food and energy in the consumer basket. The defining feature of this period remains the superposition of the cyclical shock on top of previously accumulated structural fragilities — record public debts, persistent deficits, stock market valuations linked to investments in artificial intelligence — which amplifies the effects of the conflict and narrows the margin for reaction of economic policies.

North American Tourism and the 2026 World Cup: A Preliminary Assessment

Daniel BULIN, PhD

Institute for World Economy – Romanian Academy, daniel.bulin@yahoo.com

Abstract: This paper attempts a first assessment of the effects of the 2026 FIFA World Cup on tourism in the United States, Canada and Mexico, comparing estimates made before the tournament with available evidence after its conclusion. The edition hosted by the three countries, the largest in the competition's history, was preceded by optimistic projections regarding the number of international visitors, accommodation revenues and contribution to gross domestic product; however, the first data released after the tournament suggests a less uniform picture, in which the audience records do not seem to have been reflected to the same extent in the results of the tourism sector. The indications so far point to gains obtained on the basis of rates rather than tourist volumes, with notable differences between the three host economies, between cities and between hotel market segments. The analysis also discusses possible explanations for this gap, including high transport costs, mobility conditions and an international travel demand that was already declining before the competition, without being able to separate the contribution of each for now. The conclusions remain provisional, as complete official data is not yet available, and the experience of previous sporting events shows that credible assessments only emerge after several years; the paper therefore aims less to measure than to identify questions worth pursuing.

AI Adoption in Central and Eastern European Enterprises: A Descriptive Analysis by Firm Size

Michal Mešťan[1]

[1] Faculty of Economics, Matej Bel University, Banská Bystrica, Slovakia, michal.mestan@umb.sk, https://orcid.org/0000-0002-4974-2254

Abstract: Artificial intelligence (AI) is becoming an increasingly visible component of enterprise digitalisation, but its adoption remains uneven across European countries and firm-size classes. This paper provides a descriptive analysis of AI adoption in eleven Central and Eastern European EU Member States: Bulgaria, Croatia, Czechia, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia and Slovenia. The analysis uses Eurostat's ICT usage and e-commerce in enterprises dataset (isoc_eb_ai), focusing on enterprises using at least one AI technology. It compares overall adoption in 2024 and 2025 and examines the 2025 distribution across small (10–49 persons employed), medium-sized (50–249) and large enterprises (250+). The results show rapid but uneven diffusion. Based on the values reported by Eurostat, the unweighted CEE-11 average increased from about 9.8% in 2024 to 14.7% in 2025, remaining below the EU average of 19.95%. Firm size is associated with a pronounced adoption gradient: the 2025 CEE-11 averages were 12.2% for small, 22.0% for medium-sized and 44.9% for large enterprises. The mean large-small gap reached 32.7 percentage points. Estonia, Lithuania and Slovenia exceeded the EU average for all enterprises, while Romania, Poland and Bulgaria remained at the lower end of the regional distribution. The findings indicate that recent AI diffusion is substantial but still strongly concentrated in larger and digitally more advanced firms. The paper highlights the importance of SME-oriented measures that strengthen digital capabilities, managerial readiness, skills and access to AI-ready infrastructure.

Keywords: artificial intelligence; technology adoption; SMEs; firm size; Central and Eastern Europe

JEL Code: O33; L25; M15; O52

Assessing the Impact of Bus Fleet Electrification on the Kehlstein Line: A Physics-Based Energy Model with Monte Carlo Uncertainty Analysis

Dániel Kristóf Bedő

University of Sopron, Alexandre Lamfalussy Faculty of Economics, István Széchenyi Economics and Management Doctoral School, Sopron, Hungary

Abstract: In June 2023, Regionalverkehr Oberbayern (RVO) replaced the diesel fleet on the Kehlstein line – a 6.5 km mountain road with gradients of up to 24% leading to Germany's highest bus terminus near Berchtesgaden – with eight MAN Lion's City E 12 battery-electric buses. While research on the energy demand and life-cycle emissions of electric buses is dominated by urban networks, steep and seasonal tourist routes remain largely unexamined. This study estimates the operational greenhouse gas impact of the fleet switch using a physics-based energy model validated against publicly reported operator data, and propagates the uncertainty of twelve input parameters through a Monte Carlo simulation (N = 200,000). Three system-boundary scenarios are compared: gross tank-to-wheel, and net well-to-wheel with either the location-based German grid mix or renewable charging electricity. The results indicate that the diesel fleet would have consumed approximately 80,000 litres of fuel per year (about 87 l/100 km), as roughly 94% of the uphill energy demand is needed to overcome the elevation gain. In the main scenario (net well-to-wheel, location-based), electrification reduces emissions by a median of 177 t CO_2e per year (90% simulation interval: 139–225 t), or about 0.6 kg CO_2e per bus passenger. The embodied emissions of battery production (260–380 t CO_2e) are offset within 1.3–2.4 years. Sensitivity analysis shows that the uphill efficiency of the former diesel buses and average vehicle occupancy account for most of the uncertainty. The findings suggest that short, high-gradient tourist routes are favourable candidates for electrification, and they underline the value of operator data disclosure for tourism and natural resource management.

Keywords: electric bus, mountain public transport, greenhouse gas emissions, Monte Carlo simulation, sustainable tourism

JEL Codes: Q54, R41, L92, Z32

Progression to Master's Education: Student Motivations, Barriers, and Institutional Perspectives

Anastasia Romanova[1] **Angela Pirlog**[2]

[1] PhD, Associate Professor, The Academy of Economic Studies of Moldova, romanova.anastasia@ase.md, ORCID: https://orcid.org/0000-0003-2683-9827

[2] PhD, Associate Professor, The Academy of Economic Studies of Moldova, angela.pirlog@ase.md, ORCID: https://orcid.org/0000-0003-1137-1555

Abstract: The transition from Bachelor's to Master's education represents an important component of the development of human capital, research capacity, and professional competitiveness within higher education. While Bachelor's programmes provide foundational disciplinary knowledge and professional competencies, Master's education offers opportunities for advanced specialization, research-oriented learning, and further professional development. Understanding the factors that influence students' decisions to continue their education is therefore relevant not only to individual career trajectories but also to the strategic development of higher education institutions.

This study examines students' perceptions of Bachelor's and Master's education and analyses the principal motivations and barriers influencing progression to Master's studies at the Academy of Economic Studies of Moldova (ASEM). The empirical component is based on an online survey, explored students' intentions regarding further education, their perceptions of the benefits of Master's studies, and the factors influencing their decision to continue or discontinue their academic trajectory.

The findings indicate that the majority of surveyed students intend to pursue Master's education. Career development and the acquisition of advanced knowledge represent the principal motivating factors. At the same time, students identify several barriers that may prevent or delay continuation, including financial constraints, the intention to enter the labour market immediately after completing Bachelor's studies, academic fatigue, and personal responsibilities. The results therefore indicate that progression to Master's education is determined by the interaction of academic aspirations, career expectations, and socio-economic circumstances.

From an institutional perspective, the findings point to the importance of strengthening the connection between Master's programmes and labour market needs, expanding academic mentoring, providing flexible study opportunities, increasing access to internships and applied research, and developing appropriate forms of financial support. Such measures may contribute to increasing the attractiveness and accessibility of postgraduate education and strengthening the role of universities in developing qualified human resources for a knowledge- and innovation-based economy.

The study provides an institutional case perspective on the transition from Bachelor's to Master's education and identifies areas in which higher education policies and institutional practices can support students' continued academic and professional development.

Keywords: Academic Progression, Higher Education, Master's Education, Student Motivation, University Development

When There Is No Untreated Region: Predetermined Exposure and Causal Measurement of Regional Resilience

Alexandru-Costel MANOLEA[1] **Andreea-Oana Iacobuță-Mihăiță[2]**

[1] Alexandru Ioan Cuza University, Faculty of Economics and Business Administration, Iași, Romania, alexandru.manolea@student.uaic.ro

[2] Alexandru Ioan Cuza University, Faculty of Economics and Business Administration, Iași, Romania, andreea.iacobuta@uaic.ro

Abstract: Many economic shocks affect a large number of regions at the same time, but their effects can vary from one to another. In this context, it becomes difficult to use the classic distinction between affected and unaffected regions, as all regions are exposed to some extent. Building on this research question, this article aims to analyze the extent to which differences in vulnerability before a shock can explain subsequent differences in regions' ability to withstand and recover from it.

Methodologically, the approach tracks the evolution over time of the more vulnerable regions and compares it with that of the less vulnerable regions within the same national context. This allows distinguishing common national changes from regional particularities and observing resilience through concrete economic indicators. Resilience captures the initial loss associated with higher vulnerability, while recovery shows whether the difference between regions subsequently diminishes.

Through this approach, the article aims to provide a clear and applicable methodological framework for analyzing regional resilience in situations where there is no group that remains completely unaffected, but where there are significant differences between regions prior to the emergence of the shock.

Keywords: regional resilience, predetermined exposure, gas exposure

JEL Codes: R11, C21, C23

İşgücü Piyasasının Düzenlenmesi ve Sosyal Koruma Mekanizmaları

Ruhangiz Aliyeva

Azerbaycan Üniversitesi, Bakü, Azerbaycan, ruhangiz.aliyeva@au.edu.az, ORCID: 0000-0001-5744-9042

Özet: Bu makale, Azerbaycan Cumhuriyeti'nde iş piyasası politikası ve sosyal koruma mekanizmaları arasındaki etkileşimi analiz etmektedir. İş piyasasının dinamikleri, istihdam ve işsizlik seviyeleri ile sosyal koruma politikasının iş piyasası üzerindeki etkisi istatistiksel göstergeler temelinde değerlendirilmektedir. Makale, hem devlet istihdam girişimlerinin hem de sosyal koruma programlarının iş piyasasındaki rolünü incelemektedir. İş piyasası politikası ve sosyal koruma mekanizmaları, modern devletlerin sosyo-ekonomik politikasının temel direkleridir. İş piyasası politikası, işgücünün çalışma koşullarını güçlendirmeyi, istihdamı genişletmeyi ve işsizliği azaltmayı amaçlarken, sosyal koruma mekanizmaları vatandaşların sosyal güvenliğini sağlayarak yaşam standardını korur. Bu unsurların etkileşimi, özellikle dinamik bir iş piyasasında sosyal istikrarın korunması için büyük önem taşımaktadır. Devlet istihdam hizmetleri tarafından sunulan mesleki eğitim programları, işsizlik dönemlerinde vatandaşların daha uygun becerilerle iş piyasasına yeniden entegrasyonunu sağlamaktadır. Bu mekanizma, sosyal korumanın işgücü piyasası politikasına entegrasyonunun etkili bir örneğidir. Sosyal koruma programları, işgücü piyasasında düşük gelirli vatandaşlara sosyal destek sağlayarak, işgücü piyasasının sosyal adalet ilkelerine daha uygun şekilde işlemesini destekler. Azerbaycan Cumhuriyeti'nde işgücü piyasası politikası ve sosyal koruma mekanizmaları karşılıklı etki ve destek ilişkisi içindedir. İstihdamı artırmak ve düşük işsizlik oranını korumak, sosyal koruma sisteminin verimliliğini artırırken, sosyal koruma programları işgücü piyasasının yapısal değişikliklere uyumunu güçlendirir. Devlet tarafından uygulanan politikalar, işgücü piyasasında istikrarı ve sosyal adalet ilkelerinin korunmasını sağlayarak sosyal refahın artmasına olumlu etki eder.

Anahtar Kelimeler: İşgücü piyasası politikası, sosyal koruma mekanizmaları, istihdam, işsizlik, sosyal koruma

Regulation of the Labor Market and Social Protection Mechanisms

Abstract: This article analyzes the interaction between labor market policy and social protection mechanisms in the Republic of Azerbaijan. The dynamics of the labor market, employment and unemployment levels, as well as the impact of social protection policy on the labor market are assessed based on statistical indicators. The article examines the role of both state employment initiatives and social protection programs in the labor market. Labor market policy and social protection mechanisms are the main pillars of the socio-economic policy of modern states. Labor market policy aims to strengthen the working conditions of the workforce, expand employment and reduce unemployment, while social protection mechanisms protect the standard of living by ensuring the social security of citizens. The interaction of these elements is of great importance for maintaining social stability, especially in a dynamic labor market. Vocational training programs offered by state employment services ensure the reintegration of citizens into the labor market with more appropriate skills during periods of unemployment. This mechanism is an effective example of the integration of social protection into labor market policy. Social protection programs support the labor market to function more in accordance with the principles of social justice by providing social support to low-income citizens in the labor market. Labor market policy and social protection mechanisms in the Republic of Azerbaijan are in a mutual influence and support relationship. Increasing employment and maintaining a low unemployment rate increase the efficiency of the social protection system, while social protection programs strengthen the adaptation of the labor market to structural changes. The policies implemented by the state have a positive impact on increasing social welfare by ensuring stability and protection of the principles of social justice in the labor market.

Keywords: Labor market policy, social protection mechanisms, employment, unemployment, social protection,

Azerbaycan'da Eğitim Düzeyinin Kadın İstihdamına Etkisi

Ruhangiz Aliyeva

Azerbaycan Üniversitesi, Bakü, Azerbaycan, ruhangiz.aliyeva@au.edu.az, ORCID: 0000-0001-5744-9042

Özet: Günümüzde kadınların işgücü piyasasına katılımı, sosyo-ekonomik kalkınmanın temel göstergelerinden biri olarak kabul edilmektedir. Kadın istihdam düzeyini etkileyen başlıca faktörlerden biri de eğitimdir. Azerbaycan bağlamında, eğitim seviyesinin kadın istihdamına etkisi bilimsel ve analitik bir bakış açısıyla incelenmiştir. Makale, eğitim seviyesinin kadınların işgücü piyasasına entegrasyonu, meslek seçimi, ücret fırsatları ve kariyer ilerlemesi üzerindeki etkisini teorik ve analitik bir bakış açısıyla ele almaktadır. Analiz, artan eğitimin kadınların istihdam olanaklarını genişlettiğini, kayıt dışı istihdam riskini azalttığını ve cinsiyet eşitliğinin sağlanmasında olumlu bir etkiye sahip olduğunu göstermektedir. Makale ayrıca, gelişmekte olan ülkelerde eğitim ve kadın istihdamı arasındaki mevcut sorunları ve gelecek beklentilerini de incelemektedir. Kadın istihdamı, toplumun ekonomik potansiyelinin gerçekleştirilmesinde önemli bir rol oynamaktadır. Kadınların işgücü piyasasına aktif katılımı, yoksulluğun azaltılması, sosyal refahın iyileştirilmesi ve sürdürülebilir kalkınmanın sağlanması için koşullar yaratmaktadır. Bu süreçte eğitim, kadınların bilgi, beceri ve mesleki yeterliliklerinin oluşumunda kilit bir belirleyici unsur olarak rol oynamaktadır. Eğitim seviyesi arttıkça kadınların işgücü piyasasındaki konumu güçlenmekte ve ekonomik bağımsızlıkları artmaktadır. Analiz, yüksek eğitim seviyesinin kadınların işgücü piyasasındaki aktivitesini artırdığını, ancak cinsiyet eşitliğinin hala bazı sosyo-ekonomik engellerle karşı karşıya olduğunu göstermektedir. Sosyal, ekonomik ve kültürel gelişmenin temel göstergelerinden biri olan eğitim, bireysel ve kolektif olarak işgücü piyasasına erişimi belirler. Özellikle kadınlar için, eğitim seviyesinin artması işgücü piyasasına entegrasyonu güçlendirir ve cinsiyetler arasında eşit fırsatların gerçekleşmesi için koşullar yaratır. Azerbaycan gibi gelişmekte olan ülkelerde bu ilişki daha da önemli bir sosyal politika aracıdır. Eğitimli kadınlar işgücü piyasasına daha aktif olarak katılır ve daha istikrarlı iş fırsatlarına sahip olurlar. Bununla birlikte, cinsiyet farklılıkları ve işsizlik oranındaki farklılıklar bazı zorlukların var olduğunu göstermektedir. Devlet politikasında eğitim ve istihdam programlarının koordinasyonu, işgücü piyasasında cinsiyet eşitliğinin güçlendirilmesi ve mesleki eğitim fırsatlarının genişletilmesi başarıyı artırmaya katkıda bulunabilir.

Anahtar Kelimeler: eğitim seviyesi, kadın istihdamı, işgücü piyasası, cinsiyet eşitliği, sosyal refah

The Impact of Education Level on Female Employment in Azerbaijan

Abstract: In modern times, women's participation in the labor market is considered one of the main indicators of socio-economic development. One of the main factors affecting the level of women's employment is education. In the context of Azerbaijan, the impact of education level on women's employment is investigated from a scientific and analytical perspective. The article examines the impact of education level on women's integration into the labor market, choice of profession, wage opportunities and career advancement from a theoretical and analytical perspective. The analysis shows that increasing education expands women's employment opportunities, reduces the risk of informal employment and has a positive impact on ensuring gender equality. The article also examines the existing problems and prospects between education and women's employment in developing countries. Women's employment plays an important role in realizing the economic potential of society. The active participation of women in the labor market creates conditions for poverty reduction, improving social welfare and ensuring sustainable development. In this process, education acts as a key determinant in the formation of women's knowledge, skills and professional competencies. As the level of education increases, women's position in the labor market strengthens and their economic independence increases. The analysis shows that a high level of education increases women's activity in the labor market, but gender equality still faces certain socio-economic obstacles. Education, being one of the main indicators of social, economic and cultural development, determines individual and collective access to the labor market. For women in particular, increasing the level of education strengthens integration into the labor market and creates conditions for the realization of equal opportunities between the sexes. In developing countries such as Azerbaijan, this relationship is an even more important social policy tool. . Educated women participate more actively in the labor market and have more stable job opportunities. However, gender differences and differences in the unemployment rate indicate that some difficulties exist. Coordination of education and employment programs in state policy, strengthening gender equality in the labor market and expanding vocational training opportunities can contribute to increasing success. **Keywords:** level of education, women's employment, labor market, gender equality, social welfare

Institutional Moderation of Fiscal Policy in High-Informality Economies: Distributional, Asymmetric, and Spatial Evidence from the EU-27

Cristian Popescu **Anca-Emilia Iojă**

Abstract: The shadow economy undermines fiscal capacity and hinders institutional reinforcement. However, empirical research on the link between taxation and informality often assumes a linear, symmetric, and spatially isolated relationship that does not reflect the pronounced institutional heterogeneity of the European Union.

This study jointly tests these hypotheses for the EU-27 over the period 2003–2022, using Schneider's (2022) estimates of the shadow economy. The analysis employs two methodological approaches: quantile panel regression and spatial section-error models. The main finding highlights the role of institutional moderation: the tax burden has no measurable effect at the lower quantiles of the informality distribution, but becomes significant at the upper tail, where all six dimensions of the WGI significantly reduce its marginal impact. In contexts where fiscal institutions lack credibility, tax cuts are perceived as temporary, and economic agents remain in the informal sector.

The spatial estimation confirms cross-border dependence ($\lambda = 0.681$) and a distinct institutional-fiscal regime in Eastern Europe. This paper contributes to the literature by unifying distributional heterogeneity and spatial dependence within an institutional moderation framework, thereby reinterpreting how fiscal policy is transmitted in economies with high levels of informality.

Keywords: shadow economy, tax burden, institutional quality, fiscal credibility

JEL Classification: C23, E02, H26, O17.

The Socioeconomic Paradox of Modern Development Economic Well-Being versus Social and Psychological Costs

Amir Veliu

Faculty of Economics – University of Mitrovica "Isa Boletini"

Abstract: Modern economic and technological development has brought about increases in productivity, income, consumption, employment, opportunities, and access to technology, creating new conditions for improving the material standard of living. However, an increase in economic well-being does not necessarily correspond to a proportional increase in social and psychological well-being. This is the main reason why we chose to address this topic. Therefore, this paper seeks to examine this contradiction of the socioeconomic paradox of modern development, analyzing the relationship between economic progress and the costs that may emerge within the social, psychological, technological, and generational dimensions of individual life.

The analysis focuses on six main dimensions. From an economic perspective, income, inequality, consumption, and employment are examined; from a social perspective, interpersonal relationships, family, isolation, and social status are analyzed; while from a psychological perspective, feelings of inferiority, social and economic pressure, stress, and life satisfaction are addressed. Attention is given to the impact of digitalization and social media on communication patterns, perceptions of success, and social comparison. This paper also examines generational changes in lifestyle by comparing transformations in values, consumption, work, relationships, and social expectations across generations. Finally, the political and public dimension is addressed, with a focus on the role of institutions in developing aims not only to promote economic growth but also to foster the comprehensive well-being of individuals and society.

The aim of this paper is to assess whether modern development should be measured solely through economic indicators or whether a broader approach is required, one that also incorporates the quality of social relationships, psychological wellbeing, and the impact of technological transformation. The paper seeks to argue that real wellbeing cannot be reduced solely to increases in income and consumption, as economic progress may coexist with new forms of inequality, social pressure, isolation, and individual dissatisfaction. For this reason, sustainable development requires a balance between economic performance, social cohesion, and psychological well-being.

Keywords: modern development, economic well-being, social costs, psychological well-being, inequality, digitalization, social media, generational changes, public policy.

Migrant entrepreneurship and technological innovation: A literature review of theoretical perspectives and empirical evidence

Elnur Alaskarli

Ekonomická university v Bratislave, The Faculty of Economics and Finance, The Department of Economics,
elnur.alaskarli@euba.sk, ORCID: https://orcid.org/0009-0006-5261-1171

Abstract: This study reviews the literature on migrant entrepreneurship and technological innovation, focusing on how migration, entrepreneurial characteristics, and business conditions relate to innovation in the technology sector. It is divided into four main sections. In the first chapter, various aspects of Schumpeterian innovation, the diffusion of innovations, and the "Technology Adoption Model" are discussed in order to understand how technologies are created, diffused, and adopted. In the second section, aspects of push-pull factors, the aspirations-capabilities framework, and economic migration are analyzed to understand migration and its relationship to the entrepreneurship. The third section reviews the characteristics of technology entrepreneurs. It includes the role of innovation on the development and success of the business. The last section reviews the literature to assess the contributions of migrants to technology through patenting, the R&D, and startup activities, , and case studies involving immigrant entrepreneurs and technology company executives are also discussed. This section presents findings based on an assessment of transnational networks, as well as information on the financial, cultural, and institutional barriers to entrepreneurial activity. It demonstrates that immigrants' contributions to technology depend on the entrepreneur's own abilities and the environment in which the business is established.

Keywords: migrant entrepreneurship; technological innovation; migration theories; technology sector

Infinite Intelligence on a Finite Planet? The Environmental, Energy, Technological, and Economic Limits of AI Growth

Dr. jur. Szabolcs Diósi, PhD[1]

[1] University of Pécs, Faculty of Law, diosi.szabolcs@ajk.pte.hu

Abstract: Artificial intelligence is often presented as a technology whose development has no foreseeable limits. Behind the rapid improvement of AI systems, however, lies an increasingly expensive and resource-intensive physical infrastructure composed of data centres, power plants, electricity grids, semiconductor manufacturing facilities, and global supply chains. As models become more capable and their use expands, their development and operation require growing amounts of energy, water, raw materials, and capital. This paper therefore asks whether the continued expansion of artificial intelligence can remain sustainable on a planet with finite resources.

The study first examines the electricity demand of the rapidly growing data-centre sector and the wider environmental costs associated with training and operating advanced AI models. Particular attention is given to water consumption, greenhouse gas emissions, pressure on electricity grids, and the critical raw materials required for semiconductor production. It also considers the increasing concentration of advanced chip manufacturing among a small number of companies and regions. This concentration has turned access to computing infrastructure into a major geopolitical issue, dominated by competition between the United States and China, while Europe occupies an increasingly peripheral position.

The paper then analyses the economic structure of the current AI investment cycle, in which chip manufacturers, cloud providers, and model developers have simultaneously become one another's suppliers, customers, investors, and financiers. The fragility of this model is illustrated by the approximately USD 600 billion in infrastructure investment planned by leading technology companies for 2026, despite the fact that the new generation of AI based on large language models has yet to demonstrate durable profitability.

Finally, the study argues that even if the environmental, technological, and economic constraints of AI development could be overcome, a more fundamental question would remain: whether these systems will make society better. Their effects on education, labour markets, the online information environment, social inequalities, and modern warfare suggest that the limits of AI growth cannot be understood solely as technical obstacles. They must also be examined as questions of political choice, social responsibility, and the distribution of technological benefits and costs.

Keywords: Artificial Intelligence; Data Centres; Energy Consumption; Semiconductor Supply Chains; Sustainable AI Development

Regulating Forests for Recreation in the EU: Perspectives for Forest-Based Ecotourism

Ildikó Dósa[1] **Csaba Bálint Illés[2]**

[1] Doctoral School of Management and Business Administration, John von Neumann University, Hungary, dosaildiko@gmail.com, ORCID: 0009-0006-3983-8240

[2] Doctoral School of Management and Business Administration, John von Neumann University, Hungary, illes.b.csaba@nje.hu, ORCID: 0000-0001-9546-2897

Abstract: European forests provide a wide range of environmental, economic and social functions, among which recreation and nature-based tourism are becoming increasingly important. The Treaty on the Functioning of the European Union (TFEU) does not contain any specific provisions on forests. That means there is no common EU forest policy, and responsibility for forest management lies primarily with the Member States. Nevertheless, the EU has established an EU Forest Strategy and supports a number of measures that have a significant impact on forests both within and outside the European Union. There are also many regulations that are closely connected to the forestry sector and significantly influence it.

At the same time, forest-based ecotourism is shaped by a complex regulatory and policy environment in which forest management, rural development and nature conservation objectives interact. Although, similarly to the absence of a common EU forest policy, the European Union does not have a specific regulatory framework dedicated exclusively to forest recreation or forest-based ecotourism, several EU policy and legal instruments directly or indirectly affect their development.

The aim of this study is to examine how the current EU regulatory and policy framework addresses the recreational function of forests and to identify regulatory opportunities that may facilitate the sustainable development of forest-based ecotourism and active tourism. Particular attention is given to the integration of recreational use into the multifunctional role of forests and to the relationship between development opportunities and environmental requirements.

The study applies qualitative policy and regulatory analysis. The analysis focuses primarily on the following key EU instruments: the New EU Forest Strategy for 2030, the Common Agricultural Strategy 2023-2027, Commission Regulation (EU) 2022/2472 concerning State aid in the agricultural and forestry sectors and in rural areas, Regulation (EU) 2024/1991 nature restoration (NRL) in line with the EU Biodiversity Strategy and the guidance on Sustainable rural mobility in support of ecotourism'.

The analysis is expected to reveal both opportunities and potential regulatory gaps in the current EU framework. Based on the findings, the study considers how recreational functions could be more coherently integrated into EU forest-related policies, creating favourable conditions for forest-based ecotourism and active tourism while safeguarding biodiversity, ecosystem resilience and sustainable forest management.

Keywords: forest recreation; forest-based ecotourism and active tourism; EU forest policy; regulatory framework; development

Teknolojik İşsizlik Tartışmasında Kuramsal Süreklilik Sorunu: Yapay Zekâ ve Emek Piyasası Yazınının Bibliyometrik Çözümlemesi (2002–2026)

Dr. Öğr. Üyesi Vildan YAVUZ AKINCI

Özet: Teknolojik işsizlik, iktisat yazınının en eski tartışmalarından biri olup Ricardo'nun 1821 yılında Principles'ın üçüncü baskısına eklediği makine bölümüne kadar geri götürülebilir. Makineleşmenin emek talebini kalıcı olarak azaltıp azaltmayacağı sorusu, klasik iktisatta telafi mekanizmaları kuramının doğmasına yol açmıştır. Tartışma Marx'ta eleştirilmiş, Hicks'te uyarılmış yenilik kavramıyla mikro temele oturmuş ve Vivarelli'de modern sistematiğine kavuşmuştur. Buna karşılık yapay zekânın emek piyasasına etkisini inceleyen güncel yazının bu kuramsal birikimle ne ölçüde ilişki kurduğu sistematik olarak incelenmemiştir. Bu çalışmada, söz konusu ilişkinin niteliği bibliyometrik yöntemle ölçülmektedir. Web of Science veri tabanında konu alanında "artificial intelligence" ve "labor market" terimlerinin birlikte arandığı tarama 559 kayıt vermiş, başlık ve özet incelemesi sonucunda emek piyasası sonucuyla ilgisi bulunmayan 127 kayıt elenmiş ve 432 kayıt çözümlemeye alınmıştır. Kayıtların başlık, özet, anahtar kelime ve kaynakça alanları ayrıştırılarak literatürün yıl, coğrafya, yöntem ve atıf yapısı haritalandırılmıştır. Bulgular, literatürün yüzde 56'sının 2025-2026 yıllarına ait olduğunu, yüzde 40'ının henüz atıf almadığını ve 432 çalışmanın 318 farklı dergiye dağıldığını göstermektedir. Toplam 7.600 atfın yüzde 69,6'sı yalnızca 20 çalışmada toplanmakta, nedensellik çıkarımına elverişli tasarıma sahip çalışmaların payı ise yüzde 4,6'da kalmaktadır. Derleme çalışmalarının sayısı bunun iki katıdır. Kaynakça çözümlemesi, klasik kuramsal birikimin yazında temsil edilmediğini ortaya koymaktadır. Telafi mekanizmaları kuramı, Sismondi, Braverman ve Pasinetti hiç anılmamakta olup Ricardo, Marx, Hicks ve Schumpeter onun altında sayıda geçmektedir. Buna karşılık Frey ve Osborne (2017) tek başına 113 kez anılmaktadır. Coğrafi dağılımda Çin 67 çalışmayla öne çıkarken Türkiye tek çalışmayla temsil edilmektedir. Çalışma, yazının görev temelli model çerçevesinde yoğunlaştığını, telafi mekanizmalarının koşulluluğu sorusunun ihmal edildiğini ve ikame ile tamamlayıcılığın rakip önermeler yerine aynı sürecin ardışık evreleri olarak ele alınması gerektiğini savunmaktadır.

Anahtar Kelimeler: Teknolojik İşsizlik, Yapay Zekâ, Emek Piyasası, Telafi Mekanizmaları, Bibliyometrik Analiz

JEL Kodları: J23, J24, O33, B12, E24

The Problem of Theoretical Continuity in the Technological Unemployment Debate: A Bibliometric Analysis of the Artificial Intelligence and Labour Market Literature (2002–2026)

Abstract: Technological unemployment is among the oldest debates in economics, traceable to the chapter on machinery that Ricardo added to the third edition of the Principles in 1821. The question of whether mechanisation permanently reduces labour demand gave rise to the theory of compensation mechanisms in classical economics; the debate was criticised by Marx, given microfoundations through Hicks's concept of induced innovation, and systematised in modern form by Vivarelli. The extent to which the current literature on the labour market effects of artificial intelligence engages with this accumulated theory has not, however, been examined systematically. This study measures that engagement bibliometrically. A Web of Science topic search combining "artificial intelligence" and "labor market" returned 559 records; title and abstract screening excluded 127 records without labour market outcomes, leaving 432 records for analysis. Title, abstract, keyword and cited-reference fields were parsed to map the corpus by year, geography, method and citation structure. The findings show that 56 per cent of the corpus dates from 2025–2026, 40 per cent has yet to receive a citation, and the 432 studies are dispersed across 318 journals. Of the 7,600 total citations, 69.6 per cent accrue to only 20 studies, while the share of studies employing designs suited to causal inference remains at 4.6 per cent, half the number of review articles. Reference analysis reveals that classical theory is absent: compensation theory, Sismondi, Braverman and Pasinetti are never cited, and Ricardo, Marx, Hicks and Schumpeter appear fewer than ten times each, whereas Frey and Osborne (2017) alone is cited 113 times. China accounts for 67 studies, while Türkiye is represented by one. The study argues that the literature has concentrated within the task-based framework, has neglected the conditionality of compensation mechanisms, and should treat substitution and complementarity as successive phases of a single process rather than as competing propositions.

Keywords: Technological Unemployment, Artificial Intelligence, Labour Market, Compensation Mechanisms, Bibliometric Analysis

JEL Codes: J23, J24, O33, B12, E24

Girişimcilik, İnovasyon ve STEM Eğitimi Ekseninde Bir Bibliyometrik Analiz: Web of Science Veri Tabanı Üzerinden Bir İnceleme

Doç. Dr. Yasin Akkuş[1]

[1] Trakya Üniversitesi, Uzunköprü Meslek Yüksekokulu, Yönetim ve Organizasyon Bölümü, yasinakkus@trakya.edu.tr, ORCID: https://orcid.org/0000-0003-3225-4251

Özet: Girişimciler, ekonomik büyümenin en dinamik aktörleri arasında yer almaktadır. Finansal, ticari, coğrafi ve siyasi sınırların giderek silikleştiği küresel dünyada, inovasyona dayalı iş fikirleri ve girişimler her geçen gün daha fazla öne çıkmaktadır. Bu durum, girişimci ekosisteminin hem nicelik hem de nitelik olarak geliştirilmesi ihtiyacını doğurmaktadır. Girişimci sayısını (niceliği) artırmak görece daha kolaydır ve kısa vadeli politikalarla mümkündür. Buna karşın girişimcilerin niteliklerini artırmak, oldukça zor ve uzun vadeli programlar gerektirir. Sayısal artışı tetiklemek için finansal teşvikler gibi reaktif unsurlar yeterli olabilirken; niteliksel gelişim için proaktif davranmak ve girişimcinin tüm yaşam döngüsünü ele almak şarttır. Niteliksel dönüşümün sağlanamadığı bir ekosistemde, sadece sayısal artışa odaklanmak politika yapıcıların hedeflediği inovatif büyümeyi üretemez. Nitekim inovatif girişimciliği artırmaya yönelik desteklere rağmen beklenen sıçramanın yaşanmamasındaki temel nedenin, niteliksel gelişimin yetersiz kalması olduğu değerlendirilmektedir. Niteliksel gelişim, bireyin eğitim hayatıyla başlamakta ve yaşam boyu sürmektedir. Günümüzde girişimci yetkinliklerinin inşasında yükseköğretim düzeyinin geç kaldığı; bu sürecin ortaöğretim, hatta ilköğretim seviyesinden başlatılması gerektiği vurgulanmaktadır. Benzer şekilde, inovasyon odaklı düşünme becerisi de yetişkinlik öncesi eğitimle doğrudan ilişkilidir. Bu düşünce yapısının gelişmesinde ise bilim, teknoloji, mühendislik ve matematiği (STEM) odağına alan eğitim modellerinin kritik bir rol oynadığı görülmektedir. Bu çalışma kapsamında, Web of Science (WoS) veri tabanında yer alan makalelerden yola çıkılarak; girişimcilik, inovasyon ve STEM kavramlarını ortak paydada buluşturan araştırmaların bibliyometrik analizi gerçekleştirilmiştir. Arama ve filtreleme süreçleri sonucunda, belirlenen kriterlere uygun 61 yayına ulaşılmıştır. Analiz bulguları, bu alandaki yayınların son on yılda yükselen bir trende girdiğini ve özellikle gelişmiş ülkelerde yoğunlaştığını göstermektedir. Ayrıca araştırmalarda; ana kavramların yanı sıra toplumsal cinsiyet, girişimcilik eğitimi, ekonomik büyüme ve girişimcilik niyeti gibi temaların da öne çıktığı tespit edilmiştir.

Anahtar Kelimeler: Girişimcilik, İnovasyon, STEM, Bibliyometrik analiz

A Bibliometric Analysis Centred on Entrepreneurship, Innovation and STEM Education: A Study Based on the Web of Science Database

Abstract: Entrepreneurs are among the most dynamic drivers of economic growth. In a globalised world where financial, commercial, geographical and political boundaries are becoming increasingly blurred, innovation-driven business ideas and ventures are gaining prominence with each passing day. This situation highlights the need to develop the entrepreneurial ecosystem in terms of both quantity and quality. Increasing the number of entrepreneurs (quantity) is relatively easier and can be achieved through short-term policies. By contrast, enhancing the quality of entrepreneurs is considerably more challenging and requires long-term programmes. Whilst reactive measures such as financial incentives may suffice to trigger numerical growth, proactive action and a holistic approach to the entire entrepreneurial lifecycle are essential for qualitative development. In an ecosystem where qualitative transformation has not been achieved, focusing solely on numerical growth cannot produce the innovative growth that policymakers aim for. Indeed, it is assessed that the fundamental reason for the failure to achieve the expected leap, despite support aimed at increasing innovative entrepreneurship, lies in the inadequacy of qualitative development. Qualitative development begins with an individual's educational life and continues throughout their lifetime. It is emphasised that higher education has lagged behind in building entrepreneurial competencies; this process must be initiated at secondary school level, or even at primary school level. Similarly, the ability to think in an innovation-focused manner is directly linked to pre-adolescent education. It is evident that educational models focusing on science, technology, engineering and mathematics (STEM) play a critical role in the development of this mindset. Within the scope of this study, a bibliometric analysis was conducted on research that brings together the concepts of entrepreneurship, innovation and STEM, based on articles from the Web of Science (WoS) database. As a result of the search and filtering processes, 61 publications meeting the specified criteria were identified. The findings of the analysis indicate that publications in this field have followed an upward trend over the past decade and are particularly concentrated in developed countries. Furthermore, the research revealed that, alongside the core concepts, themes such as gender, entrepreneurship education, economic growth and entrepreneurial intention also feature prominently.

Keywords: Entrepreneurship, Innovation, STEM, Bibliometric Analysis

G20 Ülkelerini Ayırt Eden Refah Boyutları: 2026 Legatum Prosperity Index Üzerinden Karar Ağacı Analizi

Prof. Dr. Dilek Altaş Karaca[1] **Doç.Dr. Aysen Şimşek Kandemir[2]**

[1] Marmara Üniversitesi / İktisat Faültesi, Ekonometri Bölümü, dilekaltas@marmara.edu.tr, https://orcid.org/000-0001-5103-9018

[2] Kocaeli Üniversitesi / Hereke Ö.İ. Uzunyol Meslek Yüksekokulu, aysens@kocaeli.edu.tr, https://orcid.org/0000-0001-5020-1183

Özet: Günümüzde ülkelerin gelişmişlik düzeylerinin değerlendirilmesinde yalnızca ekonomik göstergelerin değil, bireylerin yaşam koşullarını ve toplumların sosyal ve kurumsal yapısını yansıtan çok boyutlu refah göstergelerinin de dikkate alınması önem taşımaktadır. Legatum Prosperity Index (Legatum Refah Endeksi), ülkelerin refah düzeylerini yalnızca ekonomik göstergeler üzerinden değil, ekonomik, sosyal ve kurumsal koşulları birlikte dikkate alarak çok boyutlu biçimde değerlendiren uluslararası bir ölçüm aracıdır.

Bu çalışmanın amacı, 2026 Legatum Prosperity Index kapsamında yer alan temel refah boyutlarının G20 ülkelerini G20 dışı ülkelerden ayırt etmedeki göreceli önemini belirlemektir. Çalışmada, endekste yer alan 161 ülke için 10 temel boyuta ilişkin veriler kullanılmış ve G20 ile G20 dışı ülkelerin sınıflandırılmasında etkili olan boyutlar CRT (Classification and Regression Tree) algoritmasına dayalı karar ağacı ile analiz edilmiştir. G20 ülkelerinin örneklem içerisindeki oranının G20 dışı ülkelere göre daha düşük olması nedeniyle sınıf dengesizliğinin model üzerindeki etkisini azaltmak amacıyla iki sınıf için eşit önsel olasılıklar kullanılmıştır. Modelde maksimum ağaç derinliği üç olarak belirlenmiştir. Bulgular, karar ağacının ilk sınıflandırma aşamasında G20 ve G20 dışı ülkeleri ayırmada en etkili boyutun Devletin Bütünlüğü olduğunu göstermiştir. Değişkenlerin göreceli önem düzeyleri incelendiğinde, Yaşam Standardı (%100) en yüksek normalize edilmiş önem değerine sahip temel boyut olarak belirlenmiş; bunu Devletin Bütünlüğü (%89,7) ve Ekonomik Özgürlük (%80,4) izlemiştir. Ailelerin Bütünlüğü (%60,4) ve Muhalefet Özgürlüğü (%46,3) orta düzeyde göreceli öneme sahipken, diğer temel boyutların göreceli önem düzeyleri daha düşük bulunmuştur. Model, G20 ülkelerinin %94,7'sini doğru şekilde sınıflandırmıştır. Sonuç olarak, Yaşam Standardı, Devletin Bütünlüğü ve Ekonomik Özgürlük boyutlarının G20 ülkelerini G20 dışı ülkelerden ayırt etmede diğer boyutlara kıyasla daha yüksek göreceli öneme sahip olduğu belirlenmiştir.

Anahtar Kelimeler: Karar Ağacı, CRT, Sınıflandırma Analizi, Legatum Prosperity Index,G20

Vizyoner Liderliğin Çalışan Performansına Etkisi: Bilecik İlinde Bir Alan Araştırması

Gürkan VARDAR[1] **Dr. Öğr. Üyesi Saniye HAYDAROĞLU[2]**

[1] Bilecik Şeyh Edebali Üniversitesi, İİBF, İşletme, gurkanvrdr09@gmail.com, ORCID: 0009-0000-4941-1650

[2] Bilecik Şeyh Edebali Üniversitesi, İİBF, İşletme, saniye.secgin@bilecik .edu.tr, ORCID: 0000-0001-6480-3601

Özet: Bu araştırmanın amacı, vizyoner liderliğin çalışan performansı üzerindeki etkisini incelemektir. Günümüz örgütlerinde artan rekabet ve değişen çalışma koşulları, çalışanların örgütsel amaçlar doğrultusunda yönlendirilmesinde liderlik yaklaşımlarının önemini artırmaktadır. Bu bağlamda vizyoner liderlik; çalışanlara anlamlı bir gelecek perspektifi sunması, motivasyonu desteklemesi ve bireysel hedeflerle örgütsel hedefler arasında uyum sağlaması bakımından çalışan performansını etkileyebilecek önemli bir liderlik yaklaşımıdır. Araştırma, Bilecik ilinde farklı sektörlerde görev yapan 232 beyaz yakalı çalışanın katılımıyla gerçekleştirilmiştir. Nicel araştırma yaklaşımının benimsendiği çalışmada veriler anket yöntemiyle toplanmıştır. Değişkenler arasındaki ilişkinin yönünü ve düzeyini belirlemek amacıyla korelasyon analizi, vizyoner liderliğin çalışan performansı üzerindeki etkisini ortaya koymak amacıyla ise regresyon analizi uygulanmıştır. Analiz sonuçları, vizyoner liderlik ile çalışan performansı arasında pozitif ve anlamlı bir ilişki bulunduğunu ve vizyoner liderliğin çalışan performansı üzerinde pozitif ve anlamlı bir etkiye sahip olduğunu göstermiştir. Araştırma, vizyoner liderlik ile çalışan performansı arasındaki ilişkiyi Bilecik ilinde farklı sektörlerde görev yapan beyaz yakalı çalışanlar bağlamında incelemesi bakımından literatüre katkı sağlamaktadır. Elde edilen bulgular doğrultusunda, çalışan performansını geliştirmeyi amaçlayan işletmelerin yöneticilerinde vizyon oluşturma, bu vizyonu çalışanlara etkili biçimde aktarma ve çalışanları ortak hedefler doğrultusunda harekete geçirme becerilerini desteklemeleri önerilmektedir.

Anahtar Kelimeler: Vizyoner liderlik, Performans, Beyaz yakalı çalışanlar

The Impact of Visionary Leadership on Employee Performance: A Field Study in Bilecik Province

Abstract: This study examines the impact of visionary leadership on employee performance. Increasing competition and changing working conditions in today's organizations highlight the growing importance of leadership approaches in guiding employees toward organizational objectives. In this context, visionary leadership is a significant approach that can influence employee performance by offering a meaningful perspective on the future, supporting motivation, and ensuring alignment between individual and organizational goals. The research was conducted with the participation of 232 white-collar employees working in various sectors in the province of Bilecik. Adopting a quantitative research approach, data were collected via a questionnaire. Correlation analysis was used to determine the direction and extent of the relationships between variables, while regression analysis was used to reveal the effect of visionary leadership on employee performance. The results of the analysis showed that there is a positive and significant relationship between visionary leadership and employee performance, and that visionary leadership has a positive and significant effect on employee performance. The study contributes to the literature by examining the relationship between visionary leadership and employee performance in the context of white-collar employees working in various sectors in the province of Bilecik. In light of the findings, it is recommended that organizations aiming to improve employee performance support their managers' abilities to formulate a vision, communicate this vision effectively to employees, and motivate employees to act in line with shared objectives.

Keywords: Visionary leadership, Performance, White-collar workers

Yeşil Finans ve Sürdürülebilir Kalkınma Amaçları Çalışmalarının Bibliyometrik Analizi

Doç.Dr. Pınar AVCI[1]

[1] Tekirdağ Namık Kemal Üniversitesi, Marmaraereğlisi Meslek Yüksekokulu, Pazarlama ve Reklamcılık Bölümü, pavci@nku.edu.tr, ORCID: 0000-0001-9480-8016

Özet: Son yıllarda, doğa üzerine global ısınma, iklim değişikliği ve ekonomik faaliyetlerin olumsuz etkilerini dengelemek en önemli konulardan biridir. Sürdürülebilir ve çevre dostu projelerde ve teknolojilerdeki yatırımlar olan yeşil finans, sürdürülebilir büyüme ile ekonomiye yön vermede temel rol oynamaktadır. Aynı zamanda yatırım yapılabilir getiriler ve çevresel açıdan pozitif sonuçlar ortaya çıkaran yeşil finans çevre dostu yatırımlarını arttırarak çevreye zararlı yatırımları azaltarak sürdürülebilir kalkınma amaçlarını diğer bir deyişle hedeflerini sağlamayı desteklemektedir. Bu bize yeşil finansın güçlendirilmesi ve yenilikçi finansal araçların teşvik edilmesi, ekolojik riskleri en aza indirirken 2030 Sürdürülebilir Kalkınma Hedeflerine doğru ilerlemeyi kolaylaştırdığını göstermektedir. Bu bağlamda bu çalışma, dünya literatüründe yer alan yeşil finans ve Sürdürülebilir Kalkınma Amaçları (SDGs) ile ilgili araştırmaların bibliyometrik analizini yapmayı amaçlamaktadır. Bu analizde temel alınan çalışmalar, 2015-2025 döneminde ve Scopus'daki dergilerde yayınlanan makaleleri kapsamaktadır. Analizden elde edilecek sonuçlar, çevre dostu yatırımların arttırılarak çevresel baskının ve bozulmanın minimize edilmesini sağlayarak sürdürülebilir kalkınma hedeflerini gerçekleştirmeyi teşvik edilmesi gerektiğini işaret etmektedir. Bu bulgular hem politik yapıcılara hem de yatırımcılara önemli tavsiyeler sunmaktadır.

Anahtar Kelimeler: Anahtar Kelime, Anahtar Kelime, Anahtar Kelime

İş Yeri Yalnızlığı ve Tükenmişlik Sendromu Arasındaki İlişkide Örgütsel Dedikodunun Düzenleyici Rolü

Dr. Burcu Yiğit[1]

[1] Bağımsız Araştırmacı, brcygt@hotmail.com, ORCID: 0000-0002-2071-0099

Özet: Günümüz iş yaşamının fazlasıyla rekabete dayalı, dinamik ve karmaşık yapısında çalışanlar; iş yerinde kendilerini zaman zaman yalnız hissedebilmektedir. İşyeri ve sosyal çevresinde hissedilen yalnızlık kişileri olumsuz etkileyebilmektedir. Son yıllarda, iş yeri yalnızlığı kavramı örgütsel davranış alanında sıkça çalışılan güncel konulardan biri olmuştur.

Öngörülen çalışma modelinde, iş yeri yalnızlığı yaşayan kişilerin daha fazla tükenmişlik sendromu yaşayabilecekleri öne sürülmüştür. İş yerinde kendisini yalnız hisseden çalışan; daha fazla zihinsel, fiziksel ve bedensel olarak tükenmektedir. İş yeri yalnızlığı ve tükenmişlik sendromu arasındaki pozitif ilişkiye ek olarak, kurumlarda resmi olmayan iletişim biçimi olan örgütsel dedikodu kavramının düzenleyici rolüne yönelik öneri sunulmuştur. Çalışmanın yapıldığı dönem itibariyle, ilgili literatürde değişkenlerin ikili olarak ele alındığı çalışmalar tespit edilmiştir. Ancak üç değişkenin bir arada olduğu çalışmaya rastlanmamıştır. Buradan yola çıkarak, çalışmada iş yeri yalnızlığı ve tükenmişlik sendromu arasındaki ilişkide örgütsel dedikodunun rolünün incelenmesi ve buna yönelik genel bir çerçeve sunulması amaçlanmıştır.

Anahtar Kelimeler: İş Yeri Yalnızlığı, Tükenmişlik Sendromu, Örgütsel Dedikodu

Waiting for the Next Amnesty: Tax Compliance and the Tanzi Effect in Türkiye

Dilara Çakmakoğlu[1]

[1] Recep Tayyip Erdoğan University, Faculty of Economics and Administrative Sciences, Department of Public Finance, Rize, Türkiye, dilara.teber@erdogan.edu.tr, ORCID: 0000-0003-2002-7529

Abstract: The purpose of the study is to analyse the effects of recurring tax amnesties on voluntary tax compliance and, in turn, on the net fiscal effect of inflation. Türkiye, where tax amnesties have been implemented at frequent intervals under high inflation, is taken as the reference case. The analysis is conceptual in nature and is based on the Allingham-Sandmo framework and the tax morale literature.

Tax amnesties are generally justified on the grounds of raising revenue in the short run. However, the repetition of amnesties may lead taxpayers to expect that non-compliance will not be costly in the long run. In this respect, postponing tax liabilities in anticipation of a new amnesty appears to be a rational behaviour for the taxpayer. It has to be noted that such a delay has a particular importance under inflation. Inflation reduces the real value of tax revenues collected with a lag, which is referred to as the Tanzi effect in the literature. On the other hand, inflation also reduces the real value of public expenditures fixed in nominal terms, which is referred to as the reverse Tanzi or Patinkin effect. The net effect of inflation on the budget balance, therefore, depends on the relative magnitudes of these two effects.

The study argues that recurring amnesties strengthen the revenue-side erosion by lengthening the effective collection lag, while leaving the expenditure side unaffected. The loss of revenue becomes larger provided that tax debts in restructuring programmes are updated at rates below the inflation rate. Such an outcome implies that the net effect of inflation turns against the budget balance as the frequency of amnesties increases. Thus, the short-run revenue gains of amnesties may conceal a long-run fiscal cost, which is likely to be underestimated when inflation is not taken into consideration. The study is completed with policy implications for emerging economies with chronic inflation, such as limiting the frequency of amnesties, indexing tax debts to inflation and increasing the credibility of tax enforcement.

Keywords: Tax amnesty, voluntary tax compliance, Tanzi effect, reverse Tanzi effect, public finance

From Attractiveness to Image and Loyalty: The Dynamics of Istanbul as a Brand City*

Zinnet Arıcı Tarakçı[1] **Kamer Ilgın Çakıroğlu[2]**

[1] Recep Tayyip Erdogan University Institute of Graduate Studies, Department of Business Administration, zinnet_arici21@erdogan.edu.tr, ORCID: https://orcid.org/0000-0003-1776-2215

[2] Recep Tayyip Erdoğan University, Faculty of Economics and Administrative Sciences, Department of Business Administration, kamerilgin.cakiroglu@erdogan.edu.tr, ORCID: https://orcid.org/0000-0002-3294-9275

Abstract: The pursuit of differentiation accelerated by globalization has transformed cities from mere places of residence into strategic actors in national and international competition. Cities' cultural and natural assets, together with their infrastructure, safety, education, healthcare, and social amenities, play a decisive role in shaping branding strategies. City image, formed through individuals' perceptions of these attributes, integrates the city's multilayered character, facilitates differentiation, and contributes to the development of enduring bonds between individuals and the city. This study aims to determine the effects of the attributes constituting Istanbul's city brand attractiveness on city brand image and city brand loyalty. By examining attractiveness, image, and loyalty within an integrated model, the study seeks to contribute to the city branding literature and guide decision-makers in identifying priorities for strengthening Istanbul's brand value.

A descriptive research design was adopted, and the target population comprised individuals residing in Istanbul. Participants were selected through judgmental sampling, a non-probability sampling technique. Data were collected through an online survey between December 29, 2024, and February 19, 2025, and 397 valid questionnaires were included in the analysis. Statements measuring city attractiveness, city brand image, and city brand loyalty were evaluated using a five-point Likert scale. Data analysis involved frequency and descriptive statistics, exploratory factor analysis, and consistent partial least squares structural equation modeling (PLSc-SEM). The statistical significance of the path coefficients was assessed through bootstrapping with 10,000 subsamples.

The findings indicate that infrastructure positively influences both vibrant image (β=0.588; p<0.001) and original-symbolic image (β=0.536; p<0.001). Price and value (β=0.211; p=0.012), recreational opportunities (β=0.211; p=0.010), and outdoor activities (β=0.318; p<0.001) positively affect unique image. Furthermore, safety (β=0.217; p=0.006), recreational opportunities (β=0.413; p<0.001), and unique image (β=0.300; p=0.022) are significant predictors of city brand loyalty. The model explains 52.2% of the variance in city brand loyalty. The results suggest that Istanbul's brand city strategy should jointly prioritize infrastructure, safety, recreational and outdoor opportunities, and the development of a unique city image.

Keywords: City Branding, City Brand Attractiveness, City Brand Image, City Brand Loyalty, Istanbul.

Çekicilikten İmaja ve Sadakate: İstanbul'un Marka Şehir Dinamikleri

Özet: Küreselleşmenin hızlandırdığı farklılaşma arayışı, şehirleri yalnızca yaşam alanı olmaktan çıkararak ulusal ve uluslararası rekabette stratejik aktörlere dönüştürmüştür. Şehirlerin kültürel ve doğal zenginlikleri ile altyapı, güvenlik, eğitim, sağlık ve sosyal yaşam olanakları, marka stratejilerinin biçimlenmesinde belirleyici rol oynamaktadır. Bu unsurların bireylerin zihnindeki yansıması olarak oluşan şehir imajı ise şehrin çok katmanlı yapısını bütünleştirerek farklılaşmasına ve şehirle kalıcı bir bağ kurulmasına katkı sağlamaktadır. Bu araştırmanın amacı, İstanbul'un şehir marka çekiciliğini oluşturan unsurların şehir marka imajı ve şehir marka sadakati üzerindeki etkilerini belirlemektir. Çalışma, çekicilik, imaj ve sadakat yapılarını bütünleşik bir modelde ele alarak şehir markalaşması literatürüne katkı sunmayı ve karar alıcılara İstanbul'un marka değerini güçlendirecek öncelikler konusunda yol göstermeyi amaçlamaktadır.

Tanımlayıcı araştırma tasarımının benimsendiği çalışmanın ana kütlesini İstanbul'da yaşayan bireyler oluşturmuştur. Katılımcılar, tesadüfi olmayan örnekleme yöntemlerinden yargısal örnekleme yoluyla belirlenmiştir. Veri, 29 Aralık 2024–19 Şubat 2025 tarihleri arasında çevrim içi anket aracılığıyla toplanmış ve 397 geçerli anket analize dâhil edilmiştir. Ölçüm aracında şehir çekiciliği, şehir marka imajı ve şehir marka sadakatine ilişkin ifadeler beşli Likert ölçeğiyle değerlendirilmiştir. Verinin analizinde frekans ve tanımlayıcı istatistiklerin yanı sıra açıklayıcı faktör analizi ile tutarlı kısmi en küçük kareler yapısal eşitlik modellemesi (PLSc-SEM) kullanılmış; yol katsayılarının istatistiksel anlamlılığı 10.000 alt örneklemli bootstrap yöntemiyle değerlendirilmiştir.

Bulgular, altyapının canlı imajı (β=0,588; p<0,001) ve orijinal-sembolik imajı (β=0,536; p<0,001) güçlendirdiğini göstermektedir. Fiyat ve değerler (β=0,211; p=0,012), dinlenme olanakları (β=0,211; p=0,010) ve açık hava etkinlikleri (β=0,318; p<0,001) özgün imajı pozitif yönde etkilemektedir. Ayrıca güvenlik düzeyi (β=0,217; p=0,006), dinlenme olanakları

* This study is derived from the master's thesis entitled "A Research on the Effect of City Brand Attractiveness on City Brand Image and City Brand Loyalty in terms of Creating a Brand City: The Case of Istanbul", completed at the Recep Tayyip Erdoğan University Institute of Postgraduate Education.

(β=0,413; p<0,001) ve özgün imaj (β=0,300; p=0,022), şehir marka sadakatinin anlamlı belirleyicileridir. Model, sadakat değişkenindeki varyansın %52,2'sini açıklamıştır. Sonuçlar, İstanbul'un marka şehir stratejisinde altyapı, güvenlik, dinlenme ve açık hava olanakları ile özgün şehir imajına birlikte odaklanılması gerektiğini ortaya koymaktadır.

Anahtar Kelimeler: Şehir Markalaşması, Şehir Marka Çekiciliği, Şehir Marka İmajı, Şehir Marka Sadakati, İstanbul.

Dijital Platformlarda Şeffaflık ve Hesap Verebilirlik Krizi: Avrupa Birliği Düzenlemeleri Bağlamında Veri Raporlama Standartları Üzerine İnceleme

Doç. Dr. Kenan Duman

İstanbul Ticaret Üniversitesi, İletişim Fakültesi, Medya ve İletişim Bölümü, kduman@ticaret.edu.tr, ORCID: https://orcid.org/0000-0001-5338-9150

Özet: Dijital platformlar, son çeyrek yüzyılda kullanıcıların gündelik hayatının önemli bir parçası hâline gelmiştir. Başta Google, X, Meta ve TikTok olmak üzere çok sayıda platform gerek uluslararası gerekse ulusal bağlamda hukuki ve etik tartışmaların içerisinde yer almaktadır. Veri hukuku, gizlilik, şeffaflık, pazar rekabeti, dezenformasyon, manipülasyon gibi hukuki ve etik sorunlar önemli konular arasında sayılabilir. Bu çalışma, küresel dijital platformların son dönemde başta kıta Avrupası olmak üzere uluslararası alanda tartışılan verilerinin şeffaflığını, hesap verebilirliğini ve raporlama standartlarını Avrupa Birliği (AB) düzenlemeleri bağlamında tartışmayı amaçlamaktadır. Çalışmada Google, X, Meta ve TikTok platformları örnekleri üzerinden, platformların veri raporlama standartları, algoritmik şeffaflık düzeyleri ve düzenleyici çerçevelere uyum çalışmaları incelenmiştir. Çalışmanın ana sorusu dijital platformların veri raporlama standartları, şeffaflık ve hesap verebilirlik mekanizmaları Avrupa Birliği düzenlemeleri bağlamında ne kadar etkili olmakta ve bu platformların veri egemenliği üzerindeki yapısal güçleri sınırlandırabilir midir? Çalışmanın alt soruları ise platformların veri raporlama standartları nasıl uygulamakta ve sundukları şeffaflık raporları hangi açılardan sınırlı ya da yetersizdir? Avrupa Birliği yasalarının platformların veri şeffaflığı ve hesap verebilirlik uygulamalarını nasıl dönüştürmekte ve bu düzenlemelere platformlar ne ölçüde uyum sağlamaktadır? Çalışmanın yöntemi literatür taramasıdır. AB'nin ilgili düzenlemeleri, platformların yayımladığı raporlar ve veri politikaları incelenmiştir. Çalışmanın sonucunda dijital platformların hesap verilebilirlik bağlamında veri raporlama standartlarını çoğunlukla kendileri belirledikleri ve kendi düzenlerine devam etme çabasında oldukları görülmüştür. Ayrıca dijital platformların veri raporlama ve şeffaflık bağlamında benzer yapısal sınırlılıklar taşıdığı görülmektedir. Avrupa Birliği'nin yasal düzenlemeleri platformları daha şeffaf ve hesap verebilir olmaya zorlamaktadır. Bu düzenlemeler sonucunda platformların kullanıcı lehine değişimleri gözlemlense de bunlar sınırlıdır. Platformların yasal düzenlemeleri çoğunlukla minimum oranda uyguladıkları görülmektedir. AB düzenlemeleri son dönemde olumlu bir gelişme olsa da platformların yapısal gücünü değiştirmede yetersiz kalmaktadır. Küresel ve ulusal anlamda güçlü demokrasi oluşturmak için platformlar özelinde daha güçlü, bağlayıcı ve erişilebilir veri şeffaflığı uygulamalarına ihtiyaç bulunmaktadır.

Anahtar Kelimeler: Veri egemenliği, platformlar, şeffaflık, hesap verebilirlik

Transparency and Accountability Crisis on Digital Platforms: An Examination of Data Reporting Standards in the Context of European Union Regulations

Abstract: Digital platforms have become a significant part of users' daily lives over the last quarter century. Numerous platforms, particularly Google, X, Meta, and TikTok, have been at the center of both international and national legal and ethical debates. Issues such as data law, privacy, transparency, market competition, disinformation, and manipulation constitute some of the major concerns in this context. This study aims to discuss the transparency, accountability, and data reporting standards of global digital platforms within the framework of European Union (EU) regulations, which have recently become a major topic of international debate, particularly in continental Europe. The study examines the data reporting standards, levels of algorithmic transparency, and compliance efforts with regulatory frameworks of platforms such as Google, X, Meta, and TikTok. The main research question of the study is: To what extent are the data reporting standards, transparency, and accountability mechanisms of digital platforms effective within the context of European Union regulations, and can these mechanisms limit the structural power of platforms over data sovereignty? The sub-questions of the study are as follows: How do platforms implement data reporting standards, and in what ways are the transparency reports they provide limited or insufficient? How do European Union laws transform the transparency and accountability practices of digital platforms, and to what extent do platforms comply with these regulations? The methodology of the study is based on a literature review. Relevant EU regulations, transparency reports published by platforms, and data policies have been analyzed. The findings reveal that digital platforms largely determine their own data reporting standards within the framework of accountability and attempt to maintain their existing operational order. Furthermore, digital platforms exhibit similar structural limitations regarding data reporting and transparency practices. European Union regulations compel platforms to become more transparent and accountable. Although some user-oriented changes have been observed as a result of these regulations, these transformations remain limited. The findings indicate that platforms generally implement legal regulations at a minimum compliance level. While EU regulations represent a positive development in recent years, they remain insufficient in altering the structural power of platforms. In order to establish stronger democracies at both global and national levels, there is a need for more robust, binding, and accessible data transparency practices specifically targeting digital platforms.

Keywords: Digital platforms, transparency, accountability, data reporting standards, European Union regulations, algorithmic transparency.