A Technology Acceptance Analysis for mHealth Apps: The Case of Turkey

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Abstract: The acceptance of mHealth (mobile health) apps has been on the increase throughout the world as well as in Turkey. There are two main indicators of mHealth success and acceptance, such as mHealth apps users' satisfaction level and intention to use mHealth apps. In this context, the factors, including ease of use, trust, privacy, usefulness, and information quality are critical to analyze how they affect the acceptance of the mHealth apps by the Turkish users, and their satisfaction level with mHealth apps. Thus, the main objectives of this study are to (1) to explain how users perceive and use mHealth apps with technology acceptance analysis, (2) investigate whether the usefulness or uselessness of mHealth apps depends on user feelings about mHealth apps, (3) analyze the impacts of ease of use, trust, privacy, usefulness and information quality on mHealth users' satisfaction and intention, and (4) identify users' attitudes towards mHealth apps and their satisfaction level with mHealth apps in Turkey. A total of 282 participants from Turkey completed a survey analyzing the ease of use, trust, privacy, usefulness and information quality of mHealth apps to specify the reasons for mHealth acceptance. Statistical techniques were employed for data analysis. This study provides some managerial implications and scholarly recommendations to increase the acceptance of mHealth apps as well as helping mHealth apps designers to recognize the factors that influence the intention to adopt mHealth.

Keywords: Health Industry, mHealth Apps, e-Pulse, Technology Acceptance

1. INTRODUCTION

Having become indispensable elements of our daily lives, new technological developments are immediately accepted and quickly spread in some industries. However, some of them have encountered resistance and have not come a long way. Some approaches can help to understand user acceptance behaviors. Why do users accept or reject the technology presented? What are the causes of their behavior? In order to come up with answers to these questions, some models are used to demonstrate how technology acceptance takes place.

One of the new technology developments is the new mobile communication technology having its impacts from business to healthcare services. The mobile communications market in Turkey has witnessed an expansion from 1994 onwards. Three GSM operators (Turkcell, Vodafone and Turk Telekom) provide mobile communication services at a rate of 4.5G. By the end of June 2018, 100% of the Turkish population had embraced mobile phones, and according to Turkish Statistical Institute (2018), the number of mobile phone subscribers in Turkey has surpassed 79 million (79.538.960). The new mobile communication technology and 4G and 4.5G (5G-5th Generation forthcoming) mobile system have enabled higher data rate, faster internet connection, lower latency, more energy saving, less cost, higher system capacity and more device connectivity. Smart mobile phones equipped with these features offer significant advantages for users. Therefore, advances in mobile communication technology have generated innovative ways of getting health services via mHealth apps (mobile health), as well. Besides, there is a new delivery channel for health services after the Internet: mobile smart mobile phones/tablets loaded with mHealth apps will be linked to hospital systems anywhere, and so mHealth apps will offer abundant potential in improving healthcare synchronization among patients, doctors and healthcare institutions.

mHealth is defined as the health practice supported by mobile smart phones and other wireless devices by World Health Organization (Kay et al., 2011). In other words, mHealth can be defined as the collection and use of health data through mobile technologies, such as smart mobile phones, tablets and personal digital assistants, to process a large volume of health-related and lifestyle information not only for patients but also

for doctors (Kay et al., 2011). In the Mobile Health Report of TUSIAD (the Turkish Industry and Business Association), mobile health is defined as raising awareness of the community, making warnings against diseases through SMS messages, video teleconferences and televisit applications, and sending medical data from portable or wearable devices (Tezcan, 2016). Though a wide range of mHealth apps exist in Turkey, e-Pulse is the most popular one developed by Turkish Ministry of Health in 2015 (e-nabız, Personal Health System, 2018).

e-Pulse was selected as the "Best Health Practice" at the 2016 World Summit Awards, which was awarded under the United Nations World Information Society Initiative (WSA-Mobile Award 2016). e-Pulse is a medical system in which the entire data processing systems of all the medical institutions are integrated to keep individuals' records by Turkish Ministry of Health. Through computer and mobile platforms, mHealth apps users are able to gain access to their lab results, diagnosis-prescription-medicine details, medical imaging outputs, information for emergency situations, reports and medical records including all the specifications related to the examinations. Moreover, the users can also allow their doctors and relatives to view their health records under particular guidelines (WSA-Mobile Award 2016). According to Ministry of Health, there are 8 million active members in e-Pulse system in June 2018, which can be deemed as a great increase in the number of e-pulse system users. Just as the number of active members still does not suffice, there is not enough research output for mHealth apps acceptance analysis in Turkey. Thus, it is crucial to identify Turkish users' attitudes towards mHealth apps and their intention to use mHealth apps. If users are not satisfied with these apps, their attitudes towards them may turn out to be negative, and they might not want to utilize mHealth apps. Therefore, some issues should be addressed to find out their attitudes and intention to use mHealth apps. To this end, the present study is divided into two sections. The first section provides an overview of the conceptual framework of mHealth apps and technology acceptance analysis, whereas the second section presents the research methodology and the findings of the research including correlation and regression analyses.

2. CONCEPTUAL FRAMEWORK

2.1. Technology Acceptance Analysis

Technology is increasingly and significantly being embedded in our daily lives and acts as a necessity as well as a facilitator. New technology developments, such as the Internet and mobile communication, have offered an alternative way of delivering service and brought several advantages, including cost minimization and time saving. Just as the Internet itself is a trendy issue, studying technology acceptance has recently been a popular topic, too. In order to understand technology acceptance, several theories have been proposed, including Theory of Reasoned Action (Ajzen and Fishbein 1980), Technology Acceptance Model (Davis, 1989), Theory of Planned Behavior (Ajzen, 1991), Diffusion of Innovation (Rogers, 1983), Decomposed Theory of Planned Behavior (Taylor and Todd, 1995), Technology Acceptance Model 2 (Venkatesh and Davis, 2000), Unified Theory of Acceptance and Use of Technology (Venkatesh et al., 2003) and Technology Acceptance Model 3 (Venkatesh and Bala, 2008), to name a few. Moreover, scholars have used one theory or sometimes blended an array of acceptance theories in an attempt to elaborate the notion of technology acceptance. For example, many models exist in studying new technology acceptance for internet banking (Bhattacherjee, 2001), online-banking (Pikkarainen et al., 2004), internet banking adoption (Kesharwani and Bisht, 2012), m-shopping among consumers in Germany (Groß, 2015) and French consumers' adoption of self-service technology (Demoulin and Djelassi, 2016).

At this point, Technology Acceptance Model proves one of the most common research models envisaging technology use and acceptance through discerned usefulness and ease of use as well as perceived opinions on using technology or a technological system. Grounded in reasoned action theory and planned behavior theory, this model was developed by Fred D. Davis in 1985 and finally validated by new scales in 1989, 2000, and 2008 (Davis, 1989; Venkatesh and Davis, 2000; Venkatesh and Bala, 2008). Later on, it has been exploited in a wide range of research in several contexts that tries to gain an insight into the technology acceptance behavior. For Davis (1989), perceived usefulness refers to the extent to which an individual feels that using a specific technology will boost his/her performance. Perceived usefulness plays a key role in almost every study related to new technology acceptance, such as Davis (1989) and Pikkarainen et al. (2004). In

addition to Davis's technology acceptance model (1989), Venkatesh and Davis (2000) come up with unified theory of acceptance and use of technology and postulate that ease of use, usefulness, importance of their social status, professional jobs and benefits to users are some of the critical factors in adopting and accepting new technologies. While Bhattacherjee (2001) employ expectation-confirmation theory for internet banking approval, Pikkarainen et al., (2004) suggest that the major factors affecting the acceptance of online-banking were discerned usefulness and information offered on the website. Kesharwani and Bisht (2012) extended the technology acceptance model by incorporating different variables, such as confidence, risk perception, social impacts, website design and discerned behavioral control, to investigate the influence of these constructs on the acceptance of online banking. Their findings reveal that perceived risk adversely affect behavioral intention of online banking acceptance just as confidence exerts a negative influence on perceived risk. Making use of an adapted technology acceptance model, Groß (2015) suggests that perceived satisfaction and confidence in m-vendor, apart from the typical factors in the technology acceptance model, change users' intention to get involved in m-shopping. Demoulin and Djelassi (2016) hold that usage frequency along with situational factors, such as discount coupons, time pressure, length of line, basket size and staffed checkouts, influence consumer decision while making use of self-service technology in a shopping trip. They further claim that perceived behavioral control is of utmost importance in determining behavioral intention, and then comes perceived usefulness, need for interaction and perceived ease of use and enjoyment.

2.2. Technology Acceptance Analysis in mHealth Industry

New developments in mobile communication technologies and the Internet have greatly facilitated our daily life and become instrumental tools in meeting people's needs. Nowadays, diseases can be diagnosed and treated in a shorter time than ever before thanks to medical technologies. These new developments are receiving special attention today as they can potentially minimize the limited access to medical services, increase patient satisfaction in addition to decreasing healthcare costs. In line with these developments, healthcare services using information technology come to be designated as telemedicine, telehealth, telecare, or electronic health, and recently mHealth have appeared as an additional notion (Lee and Han, 2015). The underlying reasons driving mHealth developments may range from saving time to access to thorough individual health information. Moreover, mHealth undeniably offers a wide array of benefits to mHealth apps users as well as to health institutions.

mHealth is different from traditional health services because it enables faster healthcare supply, delivers comparatively less healthcare charge, enables larger access to healthcare facilities, and provides more convenience (Chatterjee et al., 2009). It also offers individualized medical solutions, well-timed medical services, site-based information, and mobility as long as it is used appropriately (Kahn et al., 2010).

In the related literature, a growing body of research has been put into mHealth apps acceptance due to the aforementioned advantages. For example, Luxton et al. (2011) provide an overview of smart mobile phone use in behavioral health care, weigh the options for fusing mobile technology into medical practice, and mention smart mobile phone and mHealth apps bringing new capabilities for telemental health, especially in clinical practices. Mohamed et al. (2011) explored and analyzed the technology adoption of smart phones from users' opinions and experience in addition to the factors influencing the intention to exploit mHealth apps. Their results indicate that a well-structured technology design can raise the intention to use mHealth apps, and that perceived usefulness significantly outweighs the perceived ease of use in determining the intention to use mHealth apps. Mohamed et al. (2012) argue that eHealth technology design significantly and directly correlates with intention to use mHealth informatics, and that a well-informed eHealth technology design potentially enhances the intention to use mHealth. Mohr et al., (2014) analyze eHealth and mHealth interventions by using the behavioral intervention technology model. This model devises a map which can translate medical intentions into behavioral strategies, apps features, and delivery systems in a way that promotes the design. Iliger et al. (2014) analyze the use and acceptance of mobile devices in clinical contexts at large along with the discerned

barriers during the introduction of the technology and come up with a thorough picture both from the eye of patients and doctors. They conclude that patients and doctors view the use of mobile devices differently, and the perceived differences mainly result from age and educational level. Chib et al. (2015) review 53 mHealth-related studies from developing countries and identify a number of gaps in the perception of mhealth interventions. They argue that the emerging mHealth field is gradually drawing attention in developing countries, but only through a more systematized approach to propagation of the results can this field achieve reliability and the trust of physicians and state authorities. Analyzing confidence, the privacy–personalization conflict, and the effects of age in mHealth acceptance, Guo et al. (2016) suggest that confidence can moderate the effects of discrened personalization and confidentiality reservations about acceptance intention. They further state that acceptance intention to mHealth is chiefly dictated by discerned personalization among younger users, whereas confidentiality concerns does not exert any influence on acceptance intention among elder users. Therefore, privacy concerns changed in terms of respondents' age groups. Investigating the diabetic patients in Bangladesh, Canada, and the USA for mHealth acceptance behavior, Dwivedi et al. (2016) point out that it is largely driven by psychological, technological, social, marketing artefacts and intercultural influences, and that these three countries display remarkable cultural differences by Hofstede's criteria. Hoque and Sorwar (2017) devise a theoretical approach centered on the unified theory of acceptance and use of technology to specify the major factors determining old-aged users' intention to accept and use mHealth apps. They conclude that behavioral intention to employ mHealth services is significantly influenced by performance and effort prospects, social influence, technology concerns, and reluctance to change. Further, they state that there is no significant correlation between the facilitating situation and behavioral intention to use mHealth apps. Demir and Arslan (2017) assess mobile technologies as a solution to diverse problems in healthcare by using mHealth apps, analyze the usability of such apps in hospitals, and conclude that these apps are usable for hospitals in Turkey despite some disadvantages. Exploring the popularity of mHealth apps use and pertaining demographic factors as well as the well-being status of the elderly in Germany, Rasche et al. (2018) report that 16.5% of the participants use these apps, while 37.5% use only general apps, and 46.0% do not use mHealth apps at all. In other words, mHealth apps are adopted by older adults in Germany mainly for exercise-related purposes. Moreover, the researchers identify some challenges related to mHealth apps, such as distrust, privacy worries, and misdiagnosis concerns. Scott et al. (2018) assess the challenges in adopting mHealth by means of a meta-analysis in some research databases and classify the challenges as country-specific, organization-specific, patient-specific, and medical-staff and programmer-specific barriers. Hussain et al. (2018) discuss the security problem inherent in mHealth apps with android software, and come up with mHealth Apps Security Framework to make mHealth apps and user data safer. Although mHealth has gained increasing traction and many mHealth apps exist on the market (Top 10 Mobile Health Practices Recommended by Doctors, 2018), scholarly research on which mHealth users' attributes and factors dictate the adoption behavior of mHealth apps in Turkey still does not suffice.

3. RESEARCH METHODOLOGY

The main objective of the research is to explore the factors that influence the intention to adopt mHealth in Turkey. The conventional adoption theories may not provide a holistic and meaningful solution for mHealth acceptance notion. Besides, perceived ease of use and perceived usefulness, trust, privacy, information quality, intention to use, attitudes and satisfaction should be taken closely into consideration in the analysis of mHealth acceptance. For these purposes, the primary data containing all the factors related to mHealth apps, ranging from ease of use to satisfaction was collected through the survey method. There are 29 questions in two parts. In the first part, there are 5 questions to profile the respondents as gender, age, income, education background and mobile phone brand names. In the second part, there are 24 questions to analyze the factors that influence the intention to use mHealth apps. The scales were adapted from previous researches, most of which have already achieved their validity and reliability (Ajzen and Fishbein 1980; Davis, 1986; Davis, 1989; Venkatesh and Davis, 2000; Venkatesh et al., 2012; Pikkarainen et al., 2004; Mekic and Özlen, 2014; Barutçu et al., 2015; Groß, 2015; Sun and Chi, 2018).

The survey sample frame was the person who possesses and uses mHealth apps. By using convenience sampling method, 300 people, also the current users, were requested to participate in the survey. Afterwards, all the questionnaires were distributed to mHealth apps users and then collected. 18 questionnaires were excluded in the analysis because of some missing data. Finally, 282 questionnaires were included for mHealth apps acceptance analysis. The reliability of the survey was calculated with the Cronbach alpha reliability coefficient. The reliability value was established as 0,928 for 24 interval scale questions. SPSS 15.0 for Windows was used to analyze data with descriptive statistics, correlation and regression analysis.

4. THE FINDINGS

As seen respondents' profile in Table 2, the findings show that 52,8% of the respondents were female while 47,2% were male. Further, 23% were under 20 years old, whereas 38,3% were aged between 21 and 30. 28% had High School Degree, while 33,7% had undergraduate degree. Among the 282 respondents, 45% of the respondents' monthly income was below 2000 TL, while 33,7% had 2001-4000 TL monthly income, and 17% earned 4001-6000 TL per month. In terms of the respondents' mobile phone brand name, 48,2% had Samsung, whereas 14,9% had Apple-IPhone, and 11,3% had Huawei.

Descriptive statistics of mHealth apps questions are seen in Table 2.

Table 1. Respondents' Profile

Gender	**N**	**%**	**Education Level**	**N**	**%**
Female	149	52,8	Elementary School Degree	18	6,4
Male	133	47,2	High School Degree	79	28,0
Total	282	100	Associate Degree	64	22,7
Age	**N**	**%**	Undergraduate Degree	95	33,7
≤ 20	65	23,0	Graduate Degree	26	9,2
21-30	108	38,3	**Total**	282	100
31-40	52	18,4	**Mobile Phone Brand Name**	**N**	**%**
41-50	34	12,1	Apple-IPhone	42	14,9
≥ 51	23	8,2	Samsung	136	48,2
Total	282	100	LG	11	3,9
Monthly Income	**N**	**%**	Vestel	17	6,0
≤ 2000 TL	127	45,0	Huawei	32	11,3
2001- 4000 TL	95	33,7	Sony	16	5,7
4001- 6000 TL	48	17,0	Casper	8	2,8
≥ 6001 TL	12	4,3	Others ……	20	7,1
Total	282	100	**Total**	282	100

Table 2. Descriptive statistics for statements about mHealth apps

	Statements about mHealth apps	Mean	Std. Deviation
Perceived ease of use	Learning to use mHealth apps is easy for me	4,2057	0,8687
	My interaction with mHealth apps is clear and understandable	4,1312	0,6539
	It is easy for me to become skillful at using MHealth apps	4,0000	0,7355
	Using mHealth apps is not frustrating	4,1950	0,6913
	I am able to browse mHealth apps with ease.	4,1631	0,6439
	Overall, I find mHealth apps easy to use	4,1312	0,6700
Trust	I trust in the technology mHealth apps is using	3,8440	0,7478
	I trust in mHealth apps as a healthcare systems	3,8582	0,7922
Privacy	I am not worried about my personal information in mHealth apps	3,7624	0,9415
	I trust in the ability of mHealth apps to protect my privacy	3,7730	0,8634
Perceived usefulness	Using mHealth apps enhances my effectiveness of utilizing health services	4,0142	0,7497

	Using mHealth apps makes it easier for me to utilize healthcare services	4,0745	0,6297
	Using mHealth apps enables me to access my health data more quickly	4,1986	0,5231
	I find mHealth apps useful in aiding my health decisions.	4,0532	0,6205
	Using mHealth apps makes it easier for me to satisfy my health needs.	3,8121	0,8115
	Overall, mHealth apps is useful for me to utilize healthcare services	4,3085	0,5789
Information quality	I have generally received enough information about my medical examinations	3,7447	0,8471
Attitudes	It is a good idea to use mHealth apps	4,2305	0,6084
	I feel using mHealth apps is a wise choice	4,0071	0,7058
Intention to use	It is likely that I will continue to use mHealth apps in the future.	4,1596	0,7154
	I would likely use mHealth apps to get better healthcare services	4,1702	0,8000
	I intend to continue mHealth apps in the future.	4,2057	0,6371
Recommendation	I would recommend the others to use mHealth apps	4,3440	0,7150
Satisfaction	I am satisfied from mHealth apps and service	4,2553	0,6303

As seen in Table 2, descriptive statistics indicate that a majority of the mHealth apps users find mHealth apps easy to use, and believe that using mHealth apps would be free of effort. In terms of perceived usefulness of mHealth apps, descriptive statistics point to a high proportion, and respondents believe that the use of mHealth apps will improve the effectiveness of receiving healthcare services. Just as respondents find mHealth apps less reliable with respect to trust, they consider mHealth apps as less credible in protecting their personal information. Therefore, respondents expect authorities to increase the reliability of mHealth apps and demand to protect their personal information. In terms of information quality, respondents think mHealth apps do not provide enough information about their health conditions, so they ask for well-structured mHealth apps with new features and hope to receive more detailed information about their health conditions. When it comes to attitudes towards mHealth apps, respondents hold positive attitudes and feel that using mHealth apps is a wise choice and good idea for their health status. As for intention to use mHealth apps, respondents intend to continue mHealth apps in the future to receive better healthcare services. In terms of their recommendations for mHealth apps, respondents, who are also satisfied with mHealth apps and services, suggest potential users to use these apps.

The correlations among the perceived ease of use, perceived usefulness, trust, privacy, information quality, attitudes towards mHealth apps, intention to use mHealth apps, recommendation to potential users and satisfaction level from mHealth apps were illustrated in Table 3. The findings show that there are positive relationships between them, and the correlations of all variables were significant at $p<0.01$ level. This reveals that there is a linear relationship between dependent and independent mHealth factors required for multiple regression analysis.

Table 3. Correlations among mHealth Apps variables

	Mean	Std. Deviation	Ease of use	Usefulness	Trust	Privacy	Information quality	Attitudes	Intention	Recommendation	Satisfaction
Ease of use	4,1377	,50113	1	,571*	,541*	,342*	,385*	,518*	,357*	,342*	,463*

Usefulness	4,0768	,48830	,571*	1	,629*	,460*	,555*	,631*	,606*	,490*	,638*
Trust	3,8511	,72265	,541*	,629*	1	,707*	,464*	,342*	,414*	,389*	,463*
Privacy	3,7677	,82668	,342*	,460*	,707*	1	,304*	,213*	,237*	,280*	,155*
Information quality	3,7447	,84705	,385*	,555*	,464*	,304*	1	,505*	,588*	,357*	,456*
Attitudes	4,1188	,56206	,518*	,631*	,342*	,213*	,505*	1	,687*	,456*	,632*
Intention	4,1785	,64193	,357*	,606*	,414*	,237*	,588*	,687*	1	,548*	,652*
Recommendation	4,3440	,71495	,342*	,490*	,389*	,280*	,357*	,456*	,548*	1	,515*
Satisfaction	4,2553	,63025	,463*	,638*	,463*	,155*	,456*	,632*	,652*	,515*	1

* Correlation is significant at the 0.01 level (2-tailed).

As seen in Table 4, the first part of multiple regression analysis identifies the relationship between user satisfaction level from mHealth apps and ease of use, trust, privacy, usefulness and information quality of mHealth apps. The R^2 value of 0,493 indicates that 49,3% of the variance in user satisfaction level from mHealth apps can be explained by ease of use, trust, privacy, usefulness and information quality of mHealth apps with a significant F value of 53,767 ($p < 0,05$). The results shown in Table 4 indicate that ease of use, trust, usefulness, information quality of mHealth apps, apart from privacy, are significantly correlated. There is a positive relationship between ease of use, trust, usefulness, and information quality of mHealth apps. mHealth user satisfaction is also positively and strongly influenced by them. However, mHealth apps user satisfaction is negatively influenced the privacy of mHealth apps. This entails that users are worried about the security of personal data in the mHealth apps, yet they trust the mHealth apps although they have low reliability to mHealth apps. The second part of multiple regression analysis identifies the relationship between intention to use mHealth apps and ease of use, trust, privacy, usefulness and information quality of mHealth apps. the R^2 value of 0 ,465 indicates that 46,5% of the variance in the intention to use mHealth apps can be explained by ease of use, trust, privacy, usefulness and information quality of mHealth apps with a significant F value of 47,934 ($p < 0,05$). Similarly, intention to use mHealth apps is positively influenced by ease of use, trust, usefulness, information quality of mHealth apps, and negatively influenced by privacy of mHealth apps. The third part of regression analysis identifies the relationship between attitudes towards mHealth apps and user satisfaction level with mHealth apps. The R^2 value of 0,400 reveal that 40% of the variance in the attitudes towards mHealth apps can be explained by user satisfaction level with a significant F value of 186,587 ($p < 0,05$). mHealth apps user satisfaction positively influences users' intention for mHealth apps. In a similar vein, as seen in the fourth and fifth part of the regression analysis in Table 4, user satisfaction with mHealth Apps influences users' recommendation to the potential mHealth apps users and their intention to use mHealth apps strongly.

Table 4.Multiple Regression/Regression Analysis for the mHealth apps

Dependent	**Independent**	**R**	**R^2**	**F**	**Beta***	**T**	**Sig.**
1. Satisfaction from mHealth apps	Perceived ease of use	,702	,493	53,767	,198	2,789	,016
	Trust				,290	3,978	,000
	Privacy				-,346	-5,678	,000
	Perceived usefulness				,495	6,867	,000
	Information quality				,114	2,168	,031
2. Intention to use	Perceived ease of use	,682	,465	47,934	,203	2,907	,005
	Trust				,170	1,928	,043
	Privacy				-,109	-1,745	,082
	Perceived usefulness				,426	6,584	,000
	Information quality				,363	5,723	,000

3. Attitudes towards mHealth apps	Satisfaction from mHealth apps	,632	,400	186,587	,632	13,660	,000
4. Recommendation to the other mHealth apps users	Satisfaction from mHealth apps	,515	,265	101,178	,515	10,059	,000
5. Intention to use mHealth apps	Satisfaction from mHealth apps	,652	,425	207,292	,652	14,398	,000

*β, standardized path coefficients

To sum up, perceived ease of use, trust, privacy, perceived usefulness and information quality are the major factors that affect satisfaction and intention to adopt mHealth apps. mHealth users' satisfaction level with mHealth apps had the strongest effect on attitudes towards mHealth apps, recommendation to the other mHealth apps users, and intention to use mHealth apps. Turkish mHealth users are quite satisfied with perceived ease of use, trust, perceived usefulness and information quality of mHealth apps; however, they seemed not to be satisfied with privacy problem for their personal health data, which could also affect their intention to use mHealth apps. Therefore, in order to increase mHealth apps user satisfaction, mHealth apps designers and developers should handle the negative attitudes towards privacy and security problem of personal health data.

5. MANAGERIAL IMPLICATIONS AND CONCLUSIONS

In this study, the mHealth users' satisfaction and mHealth apps existing users' behavioral intention to use mHealth apps are analyzed. The survey results indicate that ease of use, trust, usefulness, information quality positively influence users' satisfaction and intention to use mHealth apps, yet privacy concerns negatively affect both satisfaction level and intention. Therefore, as Luxton et al., (2011) mention, the privacy of patients and data security that mHealth apps offer must be meticulously considered. However, Guo et al. (2016) believe that acceptance intention to mHealth is mostly determined by discerned personalization for potential young users, whereas privacy concerns do not exert any significant influence on acceptance intention for potential elder users. Therefore, privacy concerns could be changed in terms of respondents' age group, and privacy worries and personalization produce not only adverse but also favorable effects on intention to use mHealth, and trust is of primary importance in offsetting the privacy–personalization conflict in mHealth users' intentions.

According the survey results and analysis, ease of use, trust, usefulness, information quality of mHealth apps are likely to produce positive impacts both on the satisfaction with mHealth apps and on intention to accept mHealth apps services. The results of the regression analysis carried out for four of the five factors reveal that ease of use, trust, usefulness, information quality of mHealth apps turn out to be the most powerful factors in helping to figure out the use of mHealth apps. Trust and Privacy stand out as keywords in mHealth apps using because their absence potentially prevent users from utilizing mHealth apps. In the light of all the information presented thus far, one can safely arrive at the conclusion that mHealth apps users' intention and satisfaction with mHealth apps are significantly influenced by ease of use, trust, usefulness, information quality of mHealth apps, and that mHealth apps designers should probe deep into privacy concerns. In order to popularize mHealth apps among users, the mHealth user needs to (1) know about and use the mHealth apps, (2) understand what kind of benefits can be brought by these apps and services, and finally (3) feel at ease about privacy and security-related problems. In addition, mHealth users should be able to trust the mHealth apps, protect their personal health information, and perceive it as privacy. Furthermore, the advantages of using mHealth apps should be explained to wider groups through advertising and public relations campaigns. The present findings may not cover all doctors, and further studies should analyze them within the framework of technology acceptance models with structural equation model. The future studies should be able to include larger samples and wider regions to generalize these survey results and investigate privacy and data security problems from all perspectives.

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