

Modern Information Technologies As An Opportunity For Development And Integration Of Innovative Small And Medium Enterprises In Clusters

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Abstract: Recent trends in social and economic development clearly indicate that corporate competitiveness and growth opportunities are becoming increasingly dependent on additional opportunities offered by the information and communication technologies and concentration. Different regional conditions are fixed, at least in the short term, for example the physical and climatic conditions, location of the region, socio-demographic factors, the unemployment rate and so on. And most of the main characteristics of the separate regional environment, as the qualification of the work force, level of technological and managerial know-how, social and institutional structures are also relatively stable. Therefore, opportunities to accelerate the development should be looking at additional perspectives offered by information and communication technologies and clusters of enterprises, including SMEs, in related industries.

Key words: small and medium enterprises, cluster, information and communication technologies.

1. Introduction

Issues related to the identification and regulation of the distribution and concentration of knowledge at regional level are the most complex, controversial and insufficiently studied. In this context arises the need for implementation of a specific policy that would allow for development of optimal solutions in the planning of regional infrastructure and in such a way as to promote the development and accession of new small and medium enterprises (SMEs) to these processes. The studied problem is located at the intersection of many scientific fields, in particular theories of management, theories of complex systems, theories of regional economy, investment theories, theories of entrepreneurship and others. The analysis of changes and trends of development in the main indicators are based on research conducted in 2008 (Minchev 2008), which analyzed the conditions in the six planning regions in Bulgaria, enabling the formation of clusters. In this study identified regional micro-clusters and made comparative analysis on the regions and economic activities in order to demonstrate the positive cluster effects in the operation of SMEs when associated with the cluster. Currently the planning regions in Bulgaria have changed and have a different territorial scope. Logically the question arises how these changes affect the ability of SMEs to integrate and develop in a cluster in order to derive additional benefits from such a position.

The idea of regional concentration is old. Many economists have reached the conclusion that companies with similar or related activities are often localized in the same region. For the first time term “industrial zone” is used in defining values and norms shared by relocalized companies (Marshall 1890). The main foundations of spatial concentration are:

- Economies of specialization, as a result of the concentration of companies, are able to attract and maintain specialized suppliers.
- The association (cluster) of workers with specific skills and abilities attracts companies that in their turn attract and create specialized jobs.
- Technological innovations from outside, the accumulation of knowledge and information flow between participants depend on the possibilities of mobility of workers and on the networks built.

2. Information and Communication Technologies – Opportunity for the Development of Innovative Small and Medium Enterprises

If questions about the need for higher information and communication Technologies (ICT) in big business have been resolved to a significant degree for a long time, in the SMEs are still found cases of misunderstanding of the nature and importance of

well-functioning information system for business development. Recently in the country there is a trend of moving towards business management software in an effort to find effective tools for controlling essential to the competitiveness parameters in the period of economic crisis – the cost of production, customer relationships, optimize business processes, channels for distribution and supply. As a result, regardless of redundant ICT budgets, automation of business processes of companies became one of the priority areas for the application of ICT in the business: CRM (Customer Relationship Management); ERP (Enterprise Resource Planning); BI (Business Intelligence); ECM (Enterprise Content Management); SCM (Supply Chain Management); HRM (Human Resource Management).

In times of economic crisis is definitely noticed an increased interest in software solutions, upgrading the basic functionality of ERP systems, for example CRM and systems for generating reports and analysis. And the emergence and rapid spread of "cloud services" solved the issue with the biggest hurdle in the way of using business software from SMEs – the price and quality of service. It is obvious that cloud computing is the right solution for optimizing the costs of ICT infrastructure and quickly reach advanced technologies. Global trends indicate that the use of software as a service enjoys considerable interest in several areas – maintenance of communications and collaboration, office applications, segment of CRM systems, ERP software and systems for logistics solutions (Nenkov and Ibryam 2012; Nenkov and Ibryam 2013). In recent years more and more companies devote increased attention to the development of adequate ICT infrastructure to provide them with better quality in customer service, better productivity, more efficient management of financial, material and human resources. More often companies refer to software for BI and cloud computing (SaaS – Software as a service, IaaS – Infrastructure as a service, PaaS – Platform as a service), which make them more responsive towards the clients' needs and help them better manage their supply lines (Nenkov and Momchev 2011; Nenkov and Momchev 2012).

Analysts agree that the market for cloud services will expand. According to the research company Forrester Research, for example, in 2020 the market for such services will be worth \$ 241 billion., which is \$ 200 billion higher than in 2011. Most of the disputes for large or small companies

should take into account the fact that the comparative contribution to innovation to the one and the other group varies from sector to sector, depending on factors such as cost of capital, the requirements for research and development , optimum size of production and so on.

There is no agreement on these differences. There are two main conflicting hypotheses. The first, which is more widely accepted, considers the dimensional structure of regional factors, as determining (Fothergill and Gudgin 1982). The level of business formation is related directly to employment in small businesses. This suggests that large companies are weak incubator for new business owners compared to small businesses. The second key hypothesis (Gould and Keeble 1984) defines the professional structure of the local workforce as a major factor. This hypothesis implies that the increase in the share of regional workforce with managerial, professional, technical or other non-manual qualifications would increase the level of incorporation of new business in the region. This suggests that people doing no-hand work are better prepared to start a new business.

One of the most important and difficult to measure aspects of the abilities of the region to accumulate knowledge is the presence of certain cultural prerequisites like atmosphere of cooperation, silently accepted rules of conduct for companies, enabling the development of trust that is the basis for innovative interactions.

Large and small businesses develop different types of innovation, have different cluster determinants and are dependent on different policy. Large companies are more suitable for large research projects. They use more systematic knowledge and SMEs rely more on the so-called tacit knowledge. Radically new innovations, developed in the small business sector, use more tacit knowledge, which requires face to face contact – something very typical of SMEs, while complementary innovations, developed by large companies, use mainly systematic knowledge. It is necessary for starting and managing their own processes of research and development. Tacit knowledge stands at the exit of the processes of research and development and systematization is at the entrance. As a result there is no need for large companies to be located near institutions, related to knowledge, other sources of innovation or partners, while for SMEs the geographical proximity is very important.

The main conclusion to be made is that the majority of owners of SMEs are an element and enjoy the benefits of access to the local technological expertise and accumulated knowledge. We should not underestimate the role of the movement of specialized workforce in the local labor market. This process actively supports the tacit exchange of technological know-how. In support of these processes during the last years they began to widely use various ICT or in other words – how to most effectively use the global network for their interests and goals with minimum resources and lack of trained ICT professionals. To save a lot of disappointment and the collapse of attempts to online commerce, SMEs need to turn for help to specialized companies or centers for supporting small businesses that can provide free technology, solutions and resources. This can help owners of SMEs with the creation and hosting of Web site, development of online store, order processing, marketing and management.

One of the way to improve SME management is applying of Artificial Intelligence (AI) technologies. Evaluating the success potential does firstly imply a thorough estimation of whether the providable functionality actually fits with management tasks that are practically relevant (Strohmeier and Piazza 2015). Moreover, given that management already disposes of a broader set of well-established techniques for a broader set of management tasks, the intended application of an AI technique has to be compared with already existing techniques because any AI technique needs to be more effective (improved results) and/or more efficient (less implementation effort) than the already established techniques; otherwise, an application is useless (Strohmeier and Piazza 2015).

Developing a domain-driven application constitutes a second necessary step (Strohmeier and Piazza 2015). The adaption of any AI technique to a practical management task constitutes a voluminous and challenging task sui generis that requires both deep management knowledge and deep AI knowledge. An excellent possibility to realize this is to directly embed AI functionality in domain-specific HR information systems (Strohmeier and Piazza 2013) that allows HR professionals to apply the AI technique within their familiar domain context without having sophisticated technical and/or methodical AI skills (Strohmeier and Piazza 2015).

Second component of ICT is communicative technologies to management of SME. One of the

biggest problems in the use of Web in the business of medium and especially the smaller enterprises, that are dominant in Bulgaria, is the low level of ICT training of the owners and employees (Nenkov and Ibryam 2012; Nenkov and Momchev 2011; Nenkov and Momchev 2012). Realistic is the use of all Web 2.0 services in the SMEs (Varbanov 2011):

1. Presence in blogs that present the enterprise.
2. Social networks, not just Facebook and Twitter, but also regional and national networks where users exchange opinions, share their experiences on the Internet for various goods and services.
3. Twitter for connection of the company with customers and visitors in real time through the Web, special applications or mobile phones and instant distribution of information for buyers.
4. Private Wiki, which works on the basis of collective intelligence, and where buyers can share impressions, ask questions and receive answers publicly, to reinforce the trust and retain buyers.

Marketing as well as promotion and development of the brand, in the social Networks and mobile applications with constantly rising number of users, is becoming a growing global trend.

More and more Bulgarian companies take into account the growing importance of social media in business contacts and finding new customers. 38% currently set social media in their marketing mix, with 31% in the previous three years, according to a survey of Regus Group (Sharpe 2014) among 16,000 senior business managers worldwide. Establishing contacts in person continues to be the best practice for new business, despite the decrease of 11% compared with the previous period. However, the growing importance of sites for professional communication as BranchOut, Viadeo and Xing comes out top in the survey, which is confirmed by the increasing number of users, as on LinkedIn, they reached more than 135 million.

Globally, 71% of employees in small business establishments believe that establishing contacts in person will be essential for the acquisition of customers in the next three years, compared with 61% of workers in large enterprises. "The rise of social networks of business media means that nowadays they are just as an important tool for finding new customers as the contacts in person",

said Andre Sharpe, global director of product and business development in Regus (Sharpe 2014). Examples of studies of such important connections, supporting the spread of knowledge in innovation systems can be found in many countries. Feldman (Feldman 1994) clearly proves that SMEs rely heavily on knowledge and research, but from external sources, while large companies are able to direct their own research. Therefore localization to external sources of knowledge or the possibility of contact through some kind of ICT is extremely important for SMEs.

3. The Bulgarian Know-how in the Cluster Case. Situation in 2015

Bulgaria became a champion in Europe in number of clusters – policy in merging companies, scientific and professional organizations, which is generously subsidized by Brussels in order to improve business competitiveness. So lured by EU funding and the absence of rules and a vision for development of the sector cluster in the country reached a record number for Europe from 226 in 2014 and already 261 clusters in July 2015, according to the Commercial Register and BULSTAT.

For comparison, in Romania, which is twice as large and has double the companies, there are around 50 clusters, as the active ones are not more than a dozen. In neighboring Serbia, which is comparable to Bulgaria, there are around 30 clusters, as five or six pull forward. In Austria, which is also comparable by territory and population as us, clusters are around 30. In Germany there are 107 clusters, and in France – 102. Data is from the Association of Business Clusters (Association of business clusters 2015).

Most projects provide for the establishment of the cluster, development of website, company logo, marketing research, analysis of target markets, costs for salaries. To avoid artificial cluster formation on the principle to absorb some money, the European Commission wants each new cluster initiative to be supported by market predictability and analysis of regional competitive advantages, available specific knowledge and local specialization. In our country, however, there are always loopholes for the European rules. So over 80% of the clusters, approved for funding, are created immediately before the distribution of money and with a minimum number of participants – seven companies. Moreover, most

do not involve scientific or non-governmental organizations or local bodies, which is not typical for cluster structures.

The problems are related to the lack of a realistic assessment of the state of clusters as an organization, content, effectiveness, to define the need for appropriate funding or support for the operational programs and especially of the "Competitiveness" program. To stop the abuse and false clusters, that have arisen, now the game rules are changing. This programming period provides for the introduction of a national accreditation system for clusters and a variety of tools to assist them. ABC proposal (Association of business clusters (2015) is to separate clusters to start-up, developing and developed, each type has a different tool for supporting in the current programming period. The financial resources should be allocated as about 20% of the funds are for start-up clusters, 30% for developing and the rest – for developed. Such is the European practice. Evaluation of clusters will be on several criteria, which will carry points for defined problems of the cluster, the objectives pursued, development of new products and programs for stepping into new markets.

1. The following conclusions are imposed:
2. The existence of clusters has a positive impact on the number of innovations. Innovation, knowledge and technology distributing are the most important factors for developing companies in the cluster.
3. SMEs most often participate in clusters, in which the vertical dimension is very well developed.
4. Clusters are particularly important for SMEs, because they encourage their activities on the development of completely new technologies and products. Clusters specifically assist SMEs.
5. SMEs prevent the negative consequences of work and operation of clusters by:
 - preventing lowering the level of competition resulting from the formation of cartels;
 - preventing the increase in the prices of houses, rents, land, wages;
 - preventing the development of groupthink, which can lead to

hardening of positions and failure to adapt to new technologies and ideas.

6. The profits of the companies involved in the cluster are higher, but their costs for research and development are also high. Clusters increase the level of distribution of new technologies in the country in general and positively affect economic growth, because research activities and development are profitable not only for companies but also for society in general.

It can be concluded that participation in the cluster increases the profits of the companies, and in turn, clusters generate social benefits that increase economic growth. Markets for small independent companies, especially the new ones are often geographically confined, and this makes innovation in small companies "local phenomenon" (Thwaites 1981).

4. Present State of Cluster Development in Ukraine

The Ukrainian economy has many promising opportunities to pursue (Pawlak 2015). In Ukraine, no specific legislation was adopted for clustering. Instead, local practices in the spheres of ICT and business services (in Lviv area), lifting equipment, construction, organic farming and eco-tourism sectors, as well as a project of German technical assistance have been developed (Konrad-Adenauer-Stiftung (2015). But even though it has a backlog of work to do that has been mounting up for the past 25 years; a well-educated labour force and established independent industries constitute a solid foundation for future development (Pawlak 2015).

Clust-UA is an example of Ukrainian cluster development agency, non-governmental and non-profit organization which purpose is to help Ukraine become an important part of the global economy, by creating and improving the efficiency of Ukrainian clusters (UACD 2016). Clust-UA is implementing in Ukrainian economy cluster policies and innovations that support collaboration at local, regional, national and international levels; provide interaction between the participants on the stage of initiation cluster creation and their further development. Clust-UA is the first and only organization in Ukraine whether become a member of the international association of innovation and cluster TCI Network (TCI 2016),

which numbering 900 participants from 42 countries.

According to "Economy. Results and proposals of the workstream" Survey, the main sectors to consider for the creation of clusters in Ukraine include (Pawlak 2015):

1. Energy and ecology.
2. ICT, software and programming.
3. Agriculture.
4. Textile and chemicals.
5. Steel/heavy industry.

Therefore, since Ukraine has a highly skilled and educated workforce it could serve other European countries as an outsourcing hub for the ICT and innovation sectors (Pawlak 2015). The ultimate success of implementing a cluster-based economy depends on an ability to develop high quality management (Pawlak 2015).

5. Perspectives of Ukrainian Clusters Development on the Basis of DCFTA Applying

Today, Ukrainian SMEs often find their way to success through international clusters which composed of many firms based around the world working together as a single company (EU Cooperation news 2015). Ukrainian SME has significant impact to its activity from 1 January 2016 when the EU and Ukraine started applying the Deep and Comprehensive Free Trade Area (DCFTA) which forms part of the Association Agreement signed in June 2014. Assistance from the EU will be made available to help Ukrainian SMEs seize these new opportunities, to grow, and thereby create jobs (TFR 2016).

Commissioner Malmström's remarks expressed confidence in the prospects for Ukraine (European Commission 2015): "Assistance from the EU will be made available to help Ukrainian SMEs seize these new opportunities, to grow, and thereby create jobs. Gradually, the DCFTA will contribute to a prosperous Ukraine and to stronger economic integration with the EU." The EU continues to stand by Ukraine by providing assistance and making available advice and expertise, notably to help SMEs to grow and to take advantage of the opportunities granted by the DCFTA, in particular regarding the progressive alignment with EU rules (European Commission 2015). The European

Commission – jointly with the European Investment Bank (EIB) and the European Bank for Reconstruction and Development (EBRD) – has put in place the DCFTA Facility for SMEs. The Facility will complement the EU programmes in Ukraine that help small businesses to grow – such as EU SURE and the SME Flagship. The funding will (European Commission 2015):

1. Help SMEs to seize new trade opportunities with the EU and within the region which have been opened up thanks to the DCFTA.
2. Improve access to finance for SMEs, enabling them to make the necessary investments to increase their competitiveness.
3. Allow SMEs to integrate into global value chains by becoming business partners of foreign direct investors.
4. Enable SMEs to comply with new food safety, technical and quality standards, as well as with environmental protection measures, thereby benefiting Ukrainian customers and boosting exports to the EU and beyond.

6. Conclusion

The EU strategy shall support also the inter-cluster cooperation again in order to provide access to third markets, as well as the creation of hybrid clusters that are not strictly oriented in only one sector of the economy. The European strategy for growth is based on the reindustrialisation and promotion of 10 emerging industries, including industries related to environmental protection, logistics (intermodal transport), mobility technologies, packaging, Bio-pharmaceutics, marine economy, creative industries, industries of experiences, they are all inextricably linked with the development of modern ICT. Problems in Bulgarian clusters development are related to the lack of a realistic assessment of the state of clusters as an organization, content, effectiveness, to define the need for appropriate funding or support for the operational programs and especially of the "Competitiveness" program. Start of applying the Deep and Comprehensive Free Trade Area between EU and Ukraine made available to help Ukrainian SMEs seize these new opportunities, to grow, create jobs and participate in different forms

of cooperation with EU businesses includes inter-cluster cooperation.

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