

International Economy

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**ICT CLUSTERS DIAGNOSIS
IN POLAND**

Abstract

Innovations in the scope of information-communication technologies allow for a faster development of regional centres. One of the ways for supporting this kind of development are clusters. The significance of ICT technology is highlighted in strategic documents at the European Union level as well as at the national economic level. ICT technology development is considered to be a means for faster resolution of the economic crisis effects.

The aim of this article is identification of ICT clusters in Poland, which are a form of cooperation in the scope of ICT technology development and which stimulate the regional economic growth in the scope of information society. The article will also allow for estimating the development of these clusters and presenting their structure. The gathered material will enable further research in the following years.

Key words:

ICT clusters, innovation, e-commerce, information society.

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Introduction

The present condition of economy focuses on the solutions based on innovations in the scope of services, products and processes which may lead to a faster development and growth at the national, regional and local level. As innovations one has to recognise an idea, practice, or an object which is seen by people or other units as a new element of the system (Rogers, 2003). Innovations in economy enable higher profits and a higher level of investment reimbursement. Innovative economy is supposed to allow for better adjustment to market needs and constantly changing global and local conditions. Innovations in various spheres may appear in local communities through the involvement of local actors in creative processes, due to which the usage of non-material resources of a particular territory is possible. An important element of innovation processes is human capital which higher level enables easier absorption of innovations and their development.

In the days of information society more and more frequently used tools are computers which serve to create computer systems and information systems. Due to these solutions one can more easily manage data and information which as well become the elements for creating new knowledge and wisdom. The development of services, connected with information society, allows for making new products and creating innovations which may hit the global market or local communities. From the perspective of local community and creating information society, it has to be acknowledged that the opportunities of introducing innovations most frequently concern innovations in the scope of services. This becomes the basis for meeting society needs, for instance, in the scope of e-administration and implementations in this scope. It is the information service field that may undergo the fastest development. This results from the fact that economic development has determined the development of communication and information services, thus shaping the economic progress (Niedzielski, 2011).

Information, as an element of information revolution, is a good which may be easily spread by the means of information tools. Due to the development of information and communication technology sector (ICT), it is possible to introduce new solutions for e-service sector and developing information industry in the global economy.

Information-communication technologies

The development of the economy based on knowledge led to greater significance of information-communication technologies. ICT role results from the influence of this sector on the development and transformations which take place in various social and economic life spheres. Due to ICT technology a global society, which has a feature of an open and unhindered communication possibility, is created. (Castells, 2001)

The usage of ICT is connected with everyday life and one of the most important elements of the development is using technology in economy. It enables establishing and maintaining new business relations. Due to ICT technology, trade portals which enable the exchange of information and experience in the scope of science, research and development, and business, are created. An instance of such a platform may be the set-up base which allows for making relations between academic workers in Poland. The platform is called *iprosesor.pl*.

The necessity of using ICT technology is also emphasised in the scope of public administration. More and more often there are successful attempts to implement e-offices, due to which the relations between officials and customers will be more effective and the exchange of information could be handled via electronic communication. The solution in the scope of ICT used by public administration are spatial information systems, which by the usage of data, which has a spatial reference, present the phenomena taking place in communes, regions or in the country. This type of portals more and more frequently allow for an interactive usage of data and information. This results from the records of The Spatial Information Infrastructure Act¹, which converts the records of the Directive establishing an infrastructure for spatial information in the European Community (INSPIRE)² for the needs of Polish law. This kind of enterprises allow for obtaining information easily and clearly. Records of the above mentioned rights are implemented permanently in various spheres of public administration activities.

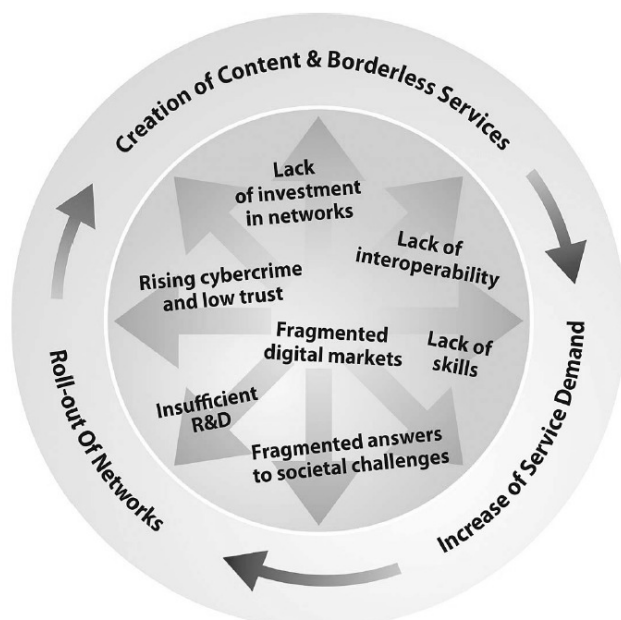
ICT technologies become a tool used by the public administration, scientific-research units and enterprises; moreover, they are also a catalyst of processes which take place in these institutions. These tools may be used in order to initiate, stimulate and create changes in all units using ICT technologies. (Thaens, 2006)

¹ The Spatial Information Infrastructure Act of 4 March 2010, JL. 2010 No 76 pos. 489, with subsequent amendments.

² Directive 2007/2/EC of the European Parliament and of the Council of 14 March 2007 establishing an Infrastructure for Spatial Information in the European Community (INSPIRE), OJ L 108, 25.4.2007, with subsequent amendments.

Figure 1

Functioning of the digital economy



Source: Europe's Digital Agenda, p. 5

In the documents concerning information society, the European Union indicates the priorities of the development of this economic domain. Nowadays, in the times of national economic crisis, the role of information-communication technologies which have a social-economic potential through their usefulness for work, fun, communication and freedom of speech, is stressed. (European Commission, 2010)

The document emphasises the significance of information society development, however, it also indicates the weak points of digital economy development which is threatened by many dangers. This results from a weak digital market adjustment to requirements imposed by the global economy. A significant weakness of the European economy, including Polish economy, seems to be insufficient expenditures on research and development. Problems indicated in the Europe's Digital Agenda must be resolved in the forthcoming years so that economies of the EU countries could compete with other countries on the global market.

That is investment in research and development and cooperation between enterprises, which provide ICT services that should become a strong point in information society development in Europe and Poland. A solution for this type of activities are ICT clusters, which due to functioning in local and regional environment will become also a tool increasing the level of abilities in the scope of using ICT technology. They will also allow for raising social awareness in local communities. Cluster function is to popularise the need of possessing the ability and competence in the scope of using digital technologies.

The documents accepted by Polish government also call for ICT technology development. They assume that Polish society will be consciously using the information potential as an economic, social and cultural value and an additional support in this area will be obtainable through a modern and friendly public administration. (MSWiA, 2008)

An extremely important factor, in the scope of ICT clusters in Poland, is indicating the priorities connected with:

- increasing the involvement of public and private sector in research and implementation of innovative solutions in the domain of information and communication technology and ecology;
- increasing competitiveness and innovation of Polish enterprises though stimulating the usage of new technologies, especially information technology.

The approach presented in strategic documents allows for having very positive future perspectives in the scope of new ICT technology market development and their usage by economic entities, local community and public administration. These technologies will become an indicator for the development of societies and countries using them. In the times of economic crisis they will constitute an incentive for faster dealing with negative consequences of a slump in the economy.

The development of information communication technologies may be measured by means of many indicators. They have a significant meaning in case of using ICT by enterprises. An element that allows for information society development is also using computers and the Internet by households. In the recent years, the usage of computers with an Internet access in households has grown year by year. In 2007 the index was 36,6% of households in Poland and in 2010 it was already 59,6%. In the latter case, the index value was 10,4 percentage point lower than the average in 27 European countries. The situation looks similarly in the scope of e-service usage. According to Eurostat data, in 2010 in Poland, 25% of Poles used e-services, whereas the average for 27 EU countries was 36% then.

It has to be emphasised that the lowest values of the index in 2010 were recorded in the following voivodeships: lubelskie, świętokrzyskie, łódzkie and

podlaskie. In case of lubuskie voivodeship the index was 50,6% and in the other 3 voivodeships it slightly exceeded 52%. The highest percentage of households with computers that have the Internet access was recorded in śląskie, pomorskie and mazowieckie voivodeships. In all cases the percentage of households with the Internet access exceeded 64%. The differences in the index value in extreme cases reached over 14 percent point.

Apart from local communities using computers and the Internet, an important element of ICT and regions development is using new information tools in enterprises activities. One of the elements that enable estimating this factor is the index of using automatic information exchange with external actors and within an enterprise. The exchange of data happens automatically with the usage of ICT devices. In case of Polish enterprises, in 2011, these tools were used in 66% of enterprises during the exchange of data with external actors. The same technologies inside the enterprises were applied only by 34,5% of companies.

The diversity of automation process in sending documents via electronic communication to external actors shows that in the smallest degree it was used by enterprises from świętokrzyskie and podkarpackie voivodeships. In those cases, the index did not exceed 40% of enterprises. The highest index was noticed in łódzkie, lubuskie, and kujawsko-pomorskie voivodeships, where the index exceeded 80% of enterprises. In case of information exchange within the enterprises, it has to be stated that the situation is completely different because in łódzkie voivodeship only 22% of enterprises use automatic data exchange. The leader in this scope is mazowieckie voivodeship, where 41,4% of enterprises use this type of information exchange.

The indexes show that ICT technologies are present in enterprises functioning in particular voivodeships, however, the awareness of their usage ranks at different levels. Thus, it is a chance for companies dealing with ICT and clusters, which are going to attract other enterprises, and due to their cooperation they will have a possibility to spread knowledge concerning the usage of information communication technologies in business.

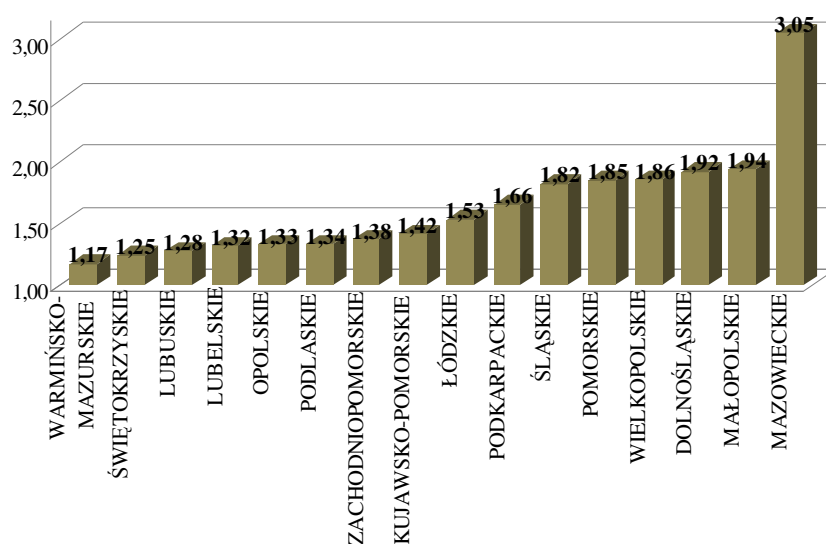
ICT clusters as an innovative development element

In theory, clusters are a specific form of production management. Porter shows that clusters have a background in geographical space, constitute a set of mutually related enterprises and institutions functioning in an estimated market area. The connections between these entities are formal or informal. Entities functioning within a cluster cooperate and compete on the market for customers and the market. Cooperation in a cluster brings outer profits for individual partici-

pants of a cluster and the whole organisation, which is a cluster. (Porter, 1998) The proximity of the enterprises and institutions, and the repeatable contacts between them, deepen the cooperation and confidence which in consequence increases the ability of absorption, production and diffusion of the innovation. (Nowakowska, Przygodzki, Sokołowicz, 2009) On account of the ICT trade, clusters will not have to undergo the territorial concentration, however, the theory of production management of clusters forces on the entities a proper location in space in order to take part in activities for the sake of the cluster.

Figure 2

Percent of the companies in the ICT industry in voivodeship in year 2011



Source: own work with use of data of Central Statistical Office.

On the basis of the research done in 2012, it has to be acknowledged that in Poland there are 223 clusters and cluster initiatives. The cluster initiatives have a chance to be transformed into a more specific form of production management that is a cluster. The statistical data has been taken from The Polish Agency for Enterprise Development (PARP) publishing series and Polish Innovation Portal. The biggest number of this type of enterprises in the scope of produc-

tion management has been recorded in mazowieckie and wielkopolskie voivodeship, where 26 and 22 clusters or cluster initiatives were identified accordingly. The smallest number of this form of production management was marked for lubuskie, dolnośląskie, and kujawsko-pomorskie voivodeships. There were 5 clusters in lubuskie and 9 clusters for each of the other two regions identified within their boundaries.

Figure 3

Localization of ICT clusters in Poland



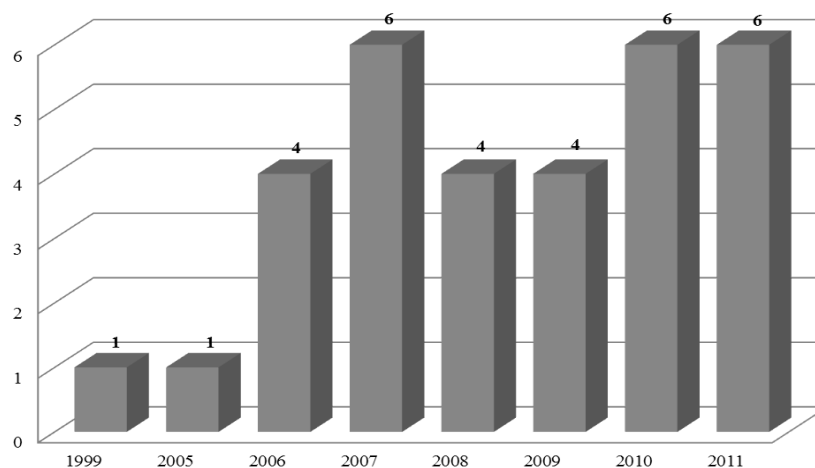
Source: own work.

Taking into account clusters/cluster initiatives which were connected with ICT business, it has to be assumed that 14,3% of all the enterprises were related to ICT sector. Among 32 ICT clusters the highest number was located in mazowieckie and małopolskie voivodeships, where 6 and 5 clusters of this trade were identified accordingly. No ICT clusters were found in łódzkie and świętokrzyskie voivodeships. This fact is particularly astonishing in case of łódzkie voivodeship, which is very often said to be a computer supply base for Warsaw and is ranked among the voivodeships with an average percentage of enterprises connected with ICT business. In case of mazowieckie and małopolskie voivodeships, we can talk about the adjustment of the connections, in the form of clusters, to market requirements. These are the voivodeships where the biggest centre of ICT clusters has been registered. In spite of the poorly developed ICT business in warmińsko-mazurskie voivodeship, a growing trend for cluster connections is noticeable in this region.

The majority of ICT cluster seats is located in the capital cities of the regions. Nine of them are located outside the main city in the region. The situation concerns lubuskie, małopolskie, podlaskie, pomorskie, śląskie, warmińsko-mazurskie, and wielkopolskie voivodeships. In these regions clusters have located their seats outside the regional centre, more precisely in: Gdynia, Nowa Sól, Elk, Kalisz, Nowy Sącz, Bytom, and Bielsko-Biała.

Figure 4

Number of established clusters in the years

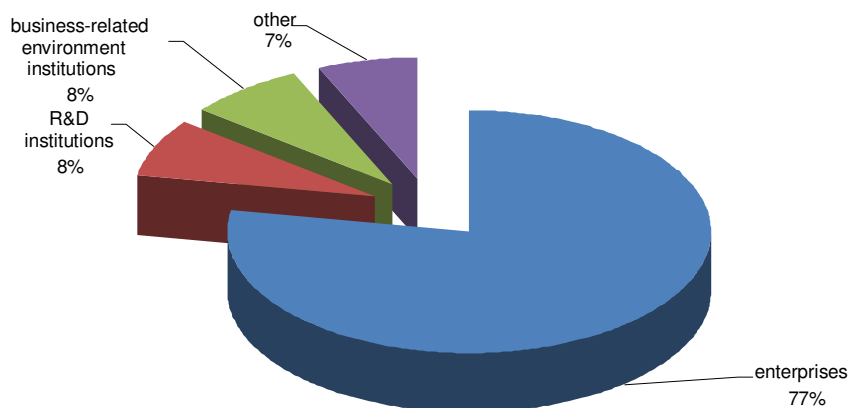


Source: own work.

ICT clusters do not have a long tradition, in Polish regional space the first ICT cluster was formed on the initiative of the founders in 1999. Until 2005 there were no new initiatives in this scope. The most numerous group of clusters of this specialisation was formed in 2007 and in the last two years of the analysis, that is 2010 and 2011, when six clusters identified in the research were formed. The recent economic changes and the crisis may be an element encouraging to cooperation and establishing any kind of cooperation including clusters which may become an element that facilitates functioning on the market. This results from the fact that, apart from enterprises, clusters include also R&D institutions, business-related environment institutions. Clusters may also include local governments which, by their activities, support entrepreneurs, foundations and other entities which allow for implementing the guiding principle of particular clusters.

Figure 5

Entities forming the ICT cluster



Source: own work with use of data from PARP publication.

Clusters and cluster initiatives identified for the research need included 78% of enterprises. The support for entrepreneurs was possible due to the activities and cooperation with R&D institutions which constituted 8% of the entities which associated clusters. Business-related environment institutions, such as technology transfer centres, business incubators, technological incubators, industrial parks, scientific-technological parks, business support centres, innovation centres, constituted 8% of entities included in clusters. The last group of par-

ticipants were local governments, foundations, primary schools and private individuals which were identified as a group of different participants of a cluster. From the perspective of cluster initiative development in local environments, an important element is the support obtained from local authorities and individual entities which emphasize the identity of activities undertaken within a cluster. Participation of the local or regional authorities in a cluster, positively influences perceiving all kinds of enterprises. It also proves the openness for cooperation and emphasises the significance of relation-building with business and business-related environment institutions, thus, constituting an important factor in strengthening the competitiveness of a particular territorial unit.

An important element of the analysis was estimating the leading industry in clusters. Part of the analysed units indicated as leading only one industry, in case of six clusters of leading industry several specialisations appeared. Due to the specificity of the studied clusters, the leading industry was ICT. Such a specificity was indicated in 43,8% of the examined units. 34,4% of clusters designated widely understood IT as a leading industry. 28,1% of the examined units indicated communication technologies as cluster specialisation. Among the analysed local production systems, an element appearing as a specialisation, was education and e-enterprise, including e-service. This kind of specialisation was recorded in 6,3% of clusters. In individual clusters, there were also recommendations concerning specialisation in the scope of games, computer devices and marketing.

Conclusion

ICT technological development, popularising Internet services and enterprises show that in XXI century there is no possibility to function in economy without the usage of a computer and information. An element of development in this scope is bottom-up initiatives that may acquire the form of cooperation as clusters. It is the type of cooperation that may become the basic source of development in the scope of ICT in local communities. Obvious is the fact that local community development will influence the development of regions connected with the cluster activity area. Particularly important will be innovations implemented in enterprises and their environment.

The carried out research allowed for identification of ICT clusters in the scope of Polish regions. Due to the research it is possible to estimate key industries and entities contributing to this type of clusters. An important element of the evaluation was stating the fact that innovative industry branches, such as ICT technology, are not organised in the form of clusters in all the regions in Poland. It is also very interesting that in some regions, there are located several clusters of the same specialisation, which may lead to mutual competition not only within the cluster enterprises, but also between the clusters. An important element re-

sulting from the analysis is the fact that in most cases ICT clusters are new organisations, which lead to a conclusion that it is their early stage of development. From this point of view, it should be borne in mind that the phenomenon of ICT clusters will evolve among regions and the undertaken research will allow for a wider assessment of the phenomenon in the future. Further research will also allow for an assessment of the effectiveness of ICT cluster functioning in regions.

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