Impact of Clusters on Innovation, Knowledge and Competitiveness in the Romanian Economy

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ABSTRACT

The concept of clusters has become extremely popular in the recent years, as more and more practitioners and theorists refer to it.

From my point of view, clusters are the ideal structure for some companies to build their skills, knowledge and know-how together. To the same extent, this form of organization enables the creation of common structures / facilities, which allows the smaller firms or the ones that lack experience to learn from the ones with more experience and to benefit from their more advanced capabilities, and thus to grow together. Moreover, the participation, collaboration and cooperation of universities, institutes, research centers and other organizations/entities inside a cluster undoubtedly leads to the growth of the economic development of the region, from which the cluster is part of. In the case of Romania, the eight development regions could greatly benefit from the formation and implementation of clusters. With the shift to a knowledge-based economy and society, the difference, made by clusters and creative networks that promote innovation, is now clear. Thus, the purpose of this paper is to outline the benefits that can come from the development of clusters, and to highlight the impact of clusters on innovation, knowledge and competitiveness in the Romanian Economy.

INTRODUCTION

For many government programs around the world, the development of clusters has become a focal point.

Clusters are seen as an important factor in explaining the empirical phenomenon of geographical concentration of economic activities and innovation. There is more than one definition of clusters, depending on the purpose and the specific context of its use. There is a clear distinction between clusters, as a real economic phenomena - and cluster policies and initiatives that have a more normative function.

I considered that, the subject of clusters is of current and relevant matter, its importance being underlined by the fact that the concept needs to be well known in order to be well used and to better take advantage of the benefits it implies. In the same measure, the implementation of clusters implies certain advantages that could be beneficial in terms of improving the economic, technologic and scientific performance of regions and countries.

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The purpose of this study is to create a basis for information, knowledge and awareness of the cluster concept and its relevance and impact on innovation, creation of knowledge and obtainment and maintaining of competitive advantage.

1. BACKGROUND AND THEORETICAL FRAMEWORK

1.1 Background – The Romanian economy in the context of the knowledge-based economy

A series of internal and external factors act upon organizations, which are going through a continuous change. Due to this dynamism, companies are confronted with more and more complex and varied situations, and among others they must ensure that the organizational structure is flexible enough so that the company is easily adaptable to the conditions of the environment, in which it carries out its activity. Also, companies must find the best method through which they minimize the threats and maximize the opportunities; also it is necessary to highlight the strengths and weaknesses, so that in the end, they are as competitive as possible on the market.

In order to ensure that the Romanian economy becomes stronger and stronger and that it manages to overcome its main issues and catch up to the more advanced economies of the world, it is necessary that the main focal points in its development are innovation, knowledge and competitiveness.

Much more now, in the current economic context of the knowledge-based economy, when organizations are confronted with the situation in which they need to become increasingly more innovative and flexible, to own as much knowledge as possible, and to be more and more competitive, due to the fact that the economic environment is still changing and evolving, and at an increasingly growing rate.

The problem with which most organizations are confronted with in the present is that of needing to increase their degree of functionality and adaptability towards the conditions of the economic environment, which itself is currently undergoing through a profound change in terms of its functional mechanism.

In the knowledge-based economy, the success of companies is decisively dependable on their ability to value the most precious resource – organizational knowledge. In terms of the business environment, this is also changing, making it more difficult to obtain, transmit, protect and value knowledge. This is why the only way of sure valuing knowledge is through innovative clusters that ensure flexibility, adaptability and know-how transfer of the member organizations. From my point of view, it is essential to consider knowledge and innovation as the perfect tools for obtaining competitive advantage. Especially due to the numerous changes in product and process, innovation plays a critical role in business success. Innovative clusters are the means through which economical and regional development can be obtained.

It is therefore extremely important for modern organizations and enterprises to develop mechanisms for the logical and methodical ways to manage knowledge, to systematize the knowledge and information assets and to optimally combine existing knowledge to enhance the firm's performance. Also, companies must find new ways to develop and disseminate existing knowledge.

The dynamic of the economic environment is becoming predominantly dominated by competitiveness. Globalization and internationalization of markets and technologies are other factors that characterize the current context. Because of these issues, companies face circumstances that require from them a huge capacity for adaptability to change, and high flexibility. Therefore, to survive, companies must use more effective strategies to respond to the environmental changes.

1.2 Theoretical and conceptual approach on clusters, innovative clusters and regional econmic development

There are many definitions for clusters. From an economic perspective, most cluster definitions are intended to better explain the elements that improve competitiveness and ensure growth. The general definitions are intended to highlight a large variety of issues that describe and characterize clusters.

The term business cluster, also known as industrial cluster, competitive cluster, or Porterian cluster, was introduced and made famous by Michael Porter in his book: The Competitive Advantage of Nations, from 1990 (Porter, 1990).

A business cluster is a geographic concentration of interconnected companies, suppliers and related institutions, in a certain field.

More generally, clusters can be defined as a group of firms, related economic actors and institutions that are located close to each other and have reached a sufficient scale to develop expertise, services, resources, suppliers and specialized skills (report of the U.S. Council on Competitiveness, 2007).

Another definition would be that a cluster is a geographical concentration of interconnected companies, specialized suppliers or support type organizations of related businesses, in certain areas, which are in competition with each other and that are at the same time cooperating (Sternberg & Litzenberger, 2004).

A common element in most of the definitions of clusters is the appearance of concentration of one or more sections in a given region, and the focus on networking and cooperation between companies and institutions.

Clusters are defined by the relationships, not by the membership, also the spatial limits of this member quality are variable and do not necessarily correspond to political boundaries. Geography of clusters can be defined when people are willing to travel for employment and the distance the employees and owners of companies would consider reasonable for meeting and networking. Geography is therefore a stable concept, but is influenced by factors such as conditions of travel, cultural identity, and personal preferences. However, the new means of transportation and communication change the spatial dimensions of a group or cluster.

The importance of economic geography was brought into focus by Paul Krugman in 1991 through his work: Geography and Trade (Krugman, 1991).

Clusters increase productivity, and because of it, companies are better able to compete both at a national level and internationally (Porter, 2000).

With the existence of multinational corporations inside clusters, the latter are able to increase the number of external networks and become more competitive and powerful.

Local entrepreneurship in clusters inserted in global value chains will be a function of the way in which both clustered firms are integrated in the global value chain and multinational companies are embedded in the local area (Rocha, 2005).

As shown in a recent study from a book published in Romania, a flexible organization is the first feature of clusters - each company performing certain activities in line with the market demand and the cluster strategy. A second feature of a cluster lies in the emphasis on organizational learning, which is often stated as an objective of cluster formation and function.

According to Uwe Blien and Gunther Maier, in their work: "The Economics of Regional Clusters: Networks, Technology and Policy", from 2008, innovation dynamics and the structure and evolution of industrial clusters are two empirical issues that require a careful analysis of the local economic context, in general, and a identification of the types of organizations that operate in that environment, in particular. "Identifying the characteristics of the firms, their transactions, and their relations with other firms will then allow us to make realistic assessments of how the firms will most likely perceive the effects of unintended outward knowledge spillovers. On this basis we can then begin to make predictions regarding the types of local innovation behavior, and the modes of local innovation generation." (Blien & Maier, 2008)

The initiatives of innovative clusters have to be built "upon a thorough stocktaking of regional strengths and weaknesses, and to succeed they require a culture of mutual trust and openness among the respective local and regional players." (Bröcker & Dohse, 2003).

2. IMPACT OF CLUSTERS ON INNOVATION, KNOWLEDGE AND CHANGE IN THE ROMANIAN ECONOMY

Michael Porter argues that clusters have the potential to affect competition in three ways: by increasing the productivity of companies in the cluster, through innovations in the field, and by stimulating new businesses in the region.

Following a careful analysis, clusters are found to be the key to competitiveness and innovation and therefore economic growth and job creation. Evidence suggests that clusters are significantly linked to prosperity.

"At the same time, clusters are increasingly seen in modern economies as strong building blocks for accelerating industrial transformation and developing new competitive advantages in a region that will speed up the creation of new companies and jobs and drive economic growth". (Muffatto & Giacon, 2012)

More than 2,000 clusters were statistically identified in Europe, by the European Cluster Observatory. Measuring the impact of programs and initiatives that support clusters is a challenge (according to Françoise Le Bail, Deputy Director General, Enterprise and Industry Directorate General, European Commission, 2008).

However, it may take decades for a cluster to evolve and have measurable positive impacts on the regional economy. Moreover, not only is it important to develop and maintain links with these clusters but likewise between clusters and the outside world. There is no simple policy formula applicable to all clusters (Bröcker, Dohse & Soltwedel, 2003).

None the less, clusters are essential to the increase of the effectiveness of their countries innovation systems, and it the end in creating, diffusing and using knowledge.

According to the editors of the "Industrial Clusters and Inter-firm Networks": "Firms located close together can profit from the stock of knowledge that exists in the cluster and with relative ease cooperate in the development of innovations, communicate changes in desired specifications of inputs, point out new products, and signal market and technological changes, among others." (Karlsson, Johansson & Stough, 2005)

The clusters approach is oriented more towards customer satisfaction, flexibility and reactivity, can adopt - mainly thanks to the new electronic communication and information transfer - simple solutions to the problems of internal and external factors that determine the dynamic environment of companies. The concept of cluster appeared, more, as a solution for the shortcomings of the existing structures against the new requirements of the growing competition on the international market.

According to Alfred Marshall, there are some advantages of implementing clusters, and that mainly they are related to the availability of skilled employees, intermediate products, and feedback and communication of changes, decisions and ideas.

In the opinion of Doeringer and Terkla (1995), clusters are "geographic concentrations of industries that gain performance advantages through co-location" (Doeringer & Terkla, 1995). The term "co-location" was also discussed by Porter (1998), namely that it: "creates the potential for economic value", but "does not necessarily guarantee its implementation" (Porter, 1998).

Clusters can be seen as innovations systems of scale. The characteristics and interdependencies of the dynamic system are similar to those of natural systems of innovation. The cluster approach offers several advantages over the traditional sectorial perspective in the analysis of innovation and innovation networks. These advantages are not limited to the analysis of innovation processes, but extend to innovation policies. Cluster policy is to eliminate the imperfections of traditional mainframe systems of innovation (systemic imperfections), facilitating the effective functioning of these systems (OECD, 1999).

A cluster can be static or dynamic. A dynamic cluster is, in the opinion of the authors Sölvell, Orjan, Lindqvist, Göran, Ketels and Christian (2003), in their work "The Cluster Initiative Greenbook. The Competitiveness Institute " a cluster that has the following features:
- Local rivalry and international competition;
- Local specialized suppliers;
- Training and advanced training of human resources and adequate infrastructure;
- Highly developed social capital (strong ties characterized by trust);
- Many institutions working together to achieve innovative clusters.

Clusters of firms and industries represent increasingly important issues of business and industrial development. Learning ability and training as the main basis for performance in innovation, and innovation are the main drivers of industrial development and structural changes; and the resource-based approach must be fundamental to understanding the processes of innovation.

The Organization for Economic Co-Operation and Development-OECD stated in June 2011 through the paper „Innovative Clusters: Drivers of National Innovation Systems", edited by Pim Den Hertog, Svend Remoe, that policies that stimulate local/national innovation must be built on, but also contribute to the dynamics of innovative clusters. (OECD, 2001).

The cluster can be more easily perceived as any urban agglomeration, and most types of commercial units will tend to spontaneously group into categories. Shoe stores or clothing stores, for example, are rarely isolated from their competition.

According to Blien and Maier, many researchers agree that "spatial concentration of companies and their economic activities are important factors for regional economic growth. This spatial concentration generates agglomeration benefits such as reduced transport and production costs. Especially important are lower information costs, facilitating collaborative research and development between companies." (Blien & Maier, 2008).

What needs to be remembered is that competitive advantage and innovation are more likely to be created by a regional agglomeration of companies, research centers, institutes, universities, institutions and organizations, etc., rather than individual companies or entities; also a region's favorability towards development needs to be taken into account, this being a two-edge knife, meaning, clusters are more likely to appear in a more developed region, but cluster also lead to the development of the region in which they act.

The cluster is similar but not identical, to the network effect. Is similar, in that the preferences are independent of the market price and its relationship between participants is based on the perception of each other, rather than their market shares, which are the sum of all its participants.

Governments and companies often try to use the effect of clusters to promote a place as being a good place for a particular type of business to be.

According to Carayannis and Assimakopoulos (2008), in their book: „Innovation Networks and Knowledge Clusters: Findings and Insights from the US, EU and Japan", „American, European and Asian knowledge-based innovation networks and clusters function as catalysts and accelerators of new and sustainable technological venture formation and growth" (Carayannis & Assimakopoulos, 2008).

Science, technology and innovation are important drivers for the Europe 2020 growth strategy. This strategy "sets out a vision of Europe's social market economy for the 21st century and notably retained the 3% R&D intensity goal as one of the five headline targets to be achieved by the EU by 2020" (European Commission & Eurostat, 2013b).

Europe 2020 is a strategy for jobs and smart, sustainable and inclusive growth and it is based on five EU headline targets: 75% of the population aged 20-64 should be employed; 3% of the EU's GDP should be invested in R&D; greenhouse gas emissions should be reduced by 20% compared to 1990, the share of renewable energy sources in final energy

consumption should be increased to 20%, and energy efficiency should improve by 20%; the share of early school leavers should be under 10% and at least 40% of 30-34 years old should have completed a tertiary or equivalent education; and poverty should be reduced by lifting at least 20 million people out of the risk of poverty or social exclusion), according to Eurostat and European Commission (n.d.).

The cluster does not continue forever. To support the long-term performance of clusters, we need to manage the openness of clusters outside the business network while facilitating inter-organizational relations in the cluster. Relative influence is also dictated by market factors such as estimated income, power demand, tax, competition and policy.

The cooperation and interconnections in a cluster, in time able the development of new competition forms. In its turn, competition challenges companies and clusters to be more innovative, in order to keep up with the changes of the international economic environment.

One of the five headline targets of the Europe 2020 Strategy is to achieve an R&D intensity of 3 % in the EU (R&D expenditure as a percentage of GDP). The gross domestic expenditure on R&D (GERD) shows a picture of each individual country's interest in R&D and by all means the measure in which each individual country focuses on knowledge and innovation. The figure below shows the percentage of GDP on R&D.

In Romania, in 2010, more than 49 % of R&D expenditure was funded by the government sector, like in Cyprus, Poland, and Slovakia. Also, in Romania, large enterprises accounted for less than 50 % of BERD (the breakdown of business enterprise R&D expenditure). And the most noticeable aspect was that "in most countries, the proportion of innovative enterprises was generally higher in industry (excluding construction) than in services. The opposite was observed in Iceland, Luxembourg, Portugal, Lithuania, Hungary and Romania." (European Commission & Eurostat, 2013b)

The most important feature of an innovative cluster is represented by the existence of knowledge, know-how and expertise, which foster innovation and lead to a competitive advantage.

According to the Council of the European Union (2013), "Romania faces a number of challenges in economic competitiveness with productivity in industry and services remaining low. Major challenges are a weak business environment and low support for research and development (R&D)".

R&D contributes to a well-functioning economy by fostering knowledge and know-how which translate into new ideas for products, procedures and services. An innovative economy helps companies grow and maintain their competitive advantage in the market, resulting in economic growth and more jobs (European Commission & Eurostat, 2013a).

The imminent transformation into a knowledge-based economy can no longer be ignored, and innovative clusters can make the difference in terms of value, if we acknowledge the network economies and the very creative organizations and entities that cooperate and collaborate to create and introduce new ideas. The presence of such clusters causes a wave effect by having a direct impact on the regions where they establish and grow, the community of that region, and in the end the performance of the country in general, bringing it competitive advantage from an international stand-point.
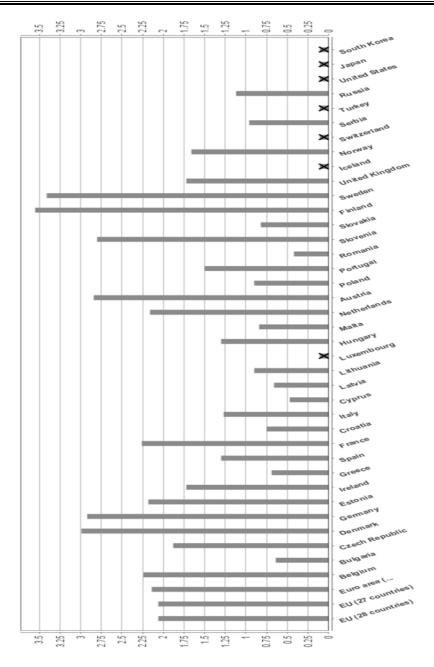
Figure 1. Gross domestic expenditure on R&D of European countries in 2012
Source: Eurostat (2014)

According to Gunther Hanreich's, Director General of Eurostat, opening speech of the Conference on "Knowledge economy - Challenges for Measurement"8-9 December 2005, organized by Eurostat, the Statistical Office of the European Communities, "The knowledge economy refers to the use of knowledge to produce economic benefits. It is thus of immediate importance to policy makers, researchers and citizens alike." Also, Gunther Hanreich said that "today's global economy as one in transition to a "knowledge economy" or an "information society." As part of this transformation process, the rules and practices that determined success in the industrial economy of the 20th century need rewriting where knowledge becomes the most critical economic resource."(European Commission, 2006)

This situation includes Romania, meaning that in order for the economy to grow and further develop, knowledge must become one of the most important assets. The Romanian economy needs to make the transformation towards a knowledge-based economy, as soon and as effectively as possible, since it has some catching up to do, in terms of performance and development, when compared to the more advanced economies.

In the National Strategy for Competitiveness 2014-2020 of Romania (Ministry of Economy Romania, 2013), a very important aspect is represented by the focus towards SMEs: "In compliance with the principles for applying the Common Strategic Framework 2014-2020, Romania shall need to perform a decisive transaction towards financial instruments destined to SMEs in order to support innovation, which insure the availability of starting capital, collaterals, loans, mezzanine type capital and initial capital for supporting the SMEs." Another important element that has become more obvious is the fact that economic/ industrial agglomerations, poles of competitiveness and clusters are now a valid means through which competitive advantage can be achieved.

"Given the fact that economic activity in Romania is concentrated in the capital area, a number of 42 two star-agglomerations and 143 three star-agglomerations are generated in Bucharest alone. Additionally, Ilfov county comprises other 10 two star-agglomerations and 3 three star-agglomerations, again due to the capital's proximity. All these 198 agglomerations must be treated distinctly from the rest of the results obtained at national level, taking into account their characteristic of being concentrated in the urban and peri-urban area of a single metropolis." (Cojanu & Pîslaru, 2011)

In these conditions, many studies have revealed that regional concentration and specialization lead to better knowledge transfer and accumulation, which in its turn leads to innovation, and to economic growth and development of the regions, and in turn of the country, in this case Romania.

One of the strategic objectives for re-defining industrial policies by orienting towards innovation and consolidation of the market operation mechanism is that of "consolidating business relation viability by multiplying cooperation inter and intra-industries between big companies and SMEs for the purpose of increasing commercial performances for economic clusters" (Ministry of Economy Romania, 2013). Also, another objective refers to the increase of cooperation relations and link between large companies and SMEs, to allow a performance growth and a development of economic clusters.

CONCLUSIONS

In conclusion, the transition of the Romanian economy to the knowledge-based economy is a complex and continuous process, which is based on building a knowledge culture and implies continuous learning from both the positive and negative practices of the economic actors, in the conditions of increasing competition, through fostering innovation. Implementing the idea of clusters would be a way through which the transfer of managerial know-how would be encouraged and through which small and medium enterprises would be better equipped to respond to environmental changes and compete with large companies, both internally and internationally. The formation and development of clusters in the Romanian economy would, without a doubt, influence the economic growth and competitiveness of the eight development regions, and at the same time have a huge impact on the overall economy in terms of innovation, knowledge and competitiveness, which in turn helps minimize the gap between Romania and other countries with advanced economies, and also facilitates the process of transformation into a knowledge-based economy.

However, attention needs to be paid to the conditions of the local environment, in this case – the Romanian economy, which need to allow a prosper transfer of know-how.

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