THE COMPLEX RELATION BETWEEN CLUSTERS AND INNOVATION IN EUROPEAN UNION

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Abstract

In this paper we proposed to analyze the dynamics of innovation in the European Union countries in order to observe its implications in clusters. Due to the multiple links between cluster members, the innovation transfer is achieved much easier, contributing to the rapid spread of innovative ideas, technologies, labor and know-how. The opportunity for innovation is easier noticeable due to the diversity of the cluster members that operate in a competitive environment, the permanent contact that is created with other companies and institutions allowing just overcome competitive pressure by innovation. Therefore, we analyzed the links between innovation and clusters in the countries of Eastern Europe and those in Western Europe. For this we made a comparison between the most innovative countries and the less innovative ones, identifying the benefits of clusters as a means of enhancing the innovation capacity of each state.

Key words: *cluster; geographic concentration, innovation; knowledge; synergy.*

JEL Classification: O30, O52, O57

I. INTRODUCTION

The clustering process has experienced unprecedented dynamics in recent years, as it has the potential for creating added value above all collaborative organizations spaced-apart from each other.

The important role of organizing the business activities in crowded structures, as innovative forms of spatial organization, in order to ensure a more efficient and effective business by using the synergy between organizations, stirs the interest of researchers in management. The research aims the discovery and identification of the characteristics and innovation content of spatial organization of business clusters, in the developed countries of Europe and European Union, to inspire similar efforts in the Eastern Europe.

II. LITERATURE REVIEW

In the early nineteenth century, in an economy based on industry and agriculture, the emphasis was on resources and Alfred Marshall, based on analyzes of industrial agglomerations in England, found that there are clusters of businesses in a particular sector that creates positive economic effects called externalities. Based on the ideas launched by him in his Principles of economy, it can be seen that the existence of clusters is justified by the benefits of co-location and agglomeration of firms. (Marshall, A., 1925).

Later, in the late 60s, was highlighted the role of cities in regional economic development, Jane Jacobs being the one who brought up "growth poles" (Jacobs, J., 1969), emphasizing in his work the idea of creating and development of new products as a source of economic development.

Going in another part of Europe, specifically in Italy, G.Becattini introduced the concept of "industrial district" (Becattini,G., 1979) for the regional policy and territorial development in the article "From industrial sectors in industrial districts". Becattini was the one that changed the industrial policy approach in his analysis of the importance of location-based economic development.

In 1990 is highlighted the role of learning through dissemination of knowledge and the importance of networks of firms interact and share information. the cluster concept was popularized by M.Porter. He relying on "diamond model" (Porter,M.E., 1990) consider grouping economic activities in clusters as the result of the competitive advantage of firms to identify new ways to compete in certain sectors and cooperate in others. Porter defined clusters as "geographic concentrations of interconnected companies and institutions under which develops in a particular sector. The clusters contain a group of related industries and other entities important in

terms of competition. These include, for example, suppliers of specialized inputs such as components, machinery and services, and providers of specialized infrastructure. Often, clusters extend downstream to various distribution channels and customers and laterally to manufacturers of complementary products and related industries through skills, technologies or common inputs. some clusters include governmental and other institutions - such as universities, standards agencies, think tanks, vocational training providers and employers - that provides specialized training, education, information, research and technical support. "(Porter, M.E. ,1998).

As results from the arguments of Porter clusters have a big impact on competition in terms of productivity, innovation and the emergence of new business. (Luț,D. M., 2012).

III.   RELATION BETWEEN INNOVATION AND CLUSTERS

The experience identified in developed countries confirmed that clustering processes provide the basis for dialogue between representatives of the business sector and state institutions, education and information, thereby increasing the effectiveness of multilateral relations innovation processes between private and public sector. In cases where the regional innovation potential is weak or the cluster is in an embryonic form, staff's capability and performance are very important (Iordache et al, 2010)

Even though there are discrepancies between member states of the European Union in terms of innovation performance, this has improved in recent years. . For a long time, and unfortunately, still, innovation has been regarded as a linear process: invention - prototype - testing - serial production – marketing (Analysis of existing situation on current and potential competitiveness poles in Romania, 2011). Research done in the literature indicates that the geographical proximity of economic activities allows a high level of innovation and clusters have the potential to provide a network of skills that enable the implementation of ideas in the form of innovations.

Given the fact that global competition has evolved from competition between enterprises to competition between regions, the economic success of a country or region is based on the offer specialization and focus development efforts on key areas where they have competitive advantages, resources and skills.

Based on a specific set of indicators, Innovation Union Scoreboard (2014) places European Union countries in four different innovative performance groups, namely:

- Innovation Leaders: Sweden, Denmark, Germany and Finland, and these scores well above the European Union average;
- Innovation followers: Cyprus, Estonia, Slovenia, France, Austria, Ireland, UK, Belgium, Netherlands, Luxembourg with scores close to the European Union average;
- Moderate innovators: Poland, Lithuania, Croatia, Malta, Slovakia, Hungary, Greece, Portugal, Spain, Czech Republic, Italy with scores below the European Union average;
- Modest innovators: Bulgaria, Latvia and Romania significantly below the European Union average.

In this paper we have identified and selected the most innovative and less innovative European Union countries, a sample of extremes for this geographical area in terms of innovation to identify existing gaps and possible ways of softening them.
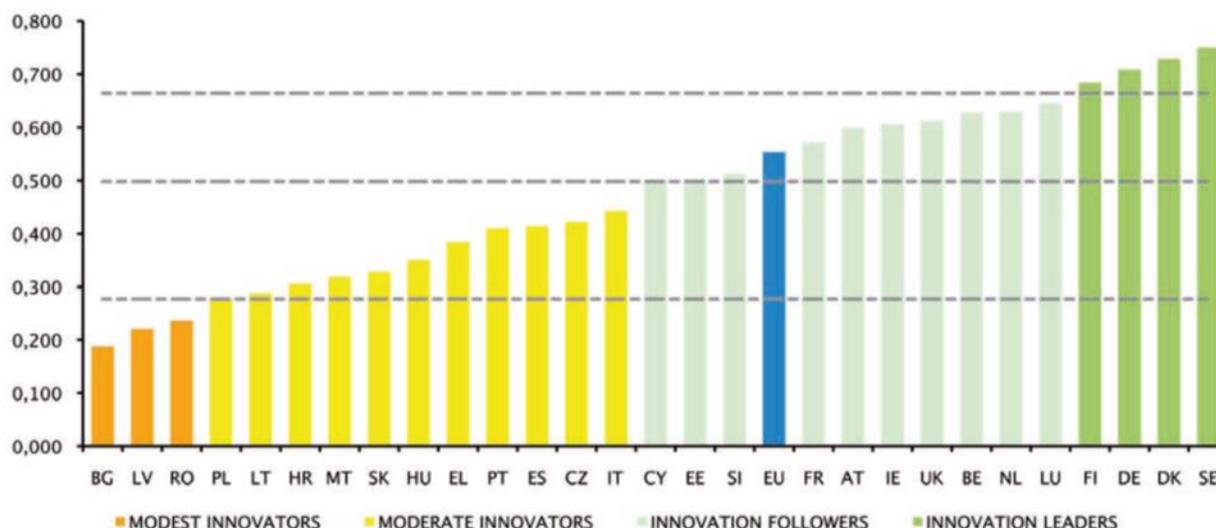

**Figure 1 - EU Member States' innovation performance (Innovation Union
Scoreboard 2014)**

As we can see in the Figure 1, the most innovative countries are: Sweden, Denmark, Germany and Finland (the Innovation Leaders) and the less innovative ones are: Bulgaria, Latvia and Romania(the Modest Innovatores). Speaking in terms of east and west, one can observe how the innovation level of East European regions are far below Western Europe and in the European media. West Nordic countries have been marked by a high index of innovation.

Although in the recent years the European Union has improved its innovation performance through numerous policies and programs in this regard, are preserved significant differences between Member States, differences that decrease the European average.

Table 1. Places occupied (from 1 to 28) by countries in the different innovation dimensions across and within performance groups(Innovation Union Scoreboard 2014)

Performance indicator / Country	Human resources	Open, excellent and effective research systems	Finance and support	Firm investments	Linkages & entrepreneurship	Intellectual assets	Innovators	Economic effects
Romania	23	27	26	27	28	28	24	20
Latvia	19	28	18	28	25	23	27	26
Bulgaria	24	25	28	26	27	22	28	27
Sweden	1	3	3	1	4	4	3	7
Finland	2	9	2	3	9	5	7	5
Denmark	10	1	4	6	1	1	5	4
Germany	11	12	8	2	7	3	1	2

Regarding to Table 1, Bulgaria is one of the countries showing a modest innovation with a performance well below the EU average, occupying last place. Relative strengths are found in human resources (which leaves behind four other countries), intellectual assets (which leaves behind six countries) and weak points are Finance and support and Innovators (which occupies the last place), Linkages & entrepreneurship and economic effects. Good place occupied in human resources is due only indicator located above the EU average, namely Youth with a level of secondary education and lowest scores is registered for venture capital and non-EU doctoral students.

Latvia strengths are human resources (leaving behind not only the two countries in the same category and the other six of the moderate innovators and one (Luxembourg) which is part of the innovation followers), finance and support which ranked 18, just 8 positions against average and 11 to the nearest innovation leader. Weaknesses are in open, excellent and effective research systems, firm investments and innovators. The performance is above average in human resources, namely in the population with university education.

Romania is found on the upper position of the group to which it belongs, namely modest innovators, with strengths in human resources, innovators and economic effects, for the latter indicator being located at a distance of 5places by Latvia and 6 places by Bulgaria . Weaknesses are linkages & entrepreneurship, which occupies the last position, intellectual assets and open, excellent and effective research systems where occupies the last place.

Sweden is one of the leaders in innovation, with a significant performance above average. This maintains the position of the top of the list, with the best system performance innovation in the EU, followed by Denmark, Finland and Germany, the countries with the highest investment in innovation.

Even if many oscillations can be observed upward and downward within each group of innovative performance, numerous studies have been developed by Feldman in 1994, Audretsch and Feldman in 1996 to demonstrate that firms within clusters are more innovative than those that are geographically distanced from each other, the reason being the rapid transfer of knowledge. " Firms' current technological efforts strongly depend and build upon previos scientific advances and technical achievements. Innovation is a highly cumulative activity. This implies that firms located in region which have accumulated high levels of innovative success and possess a relevant stock of knowledge will be relatively advantaged in the next round of innovations compared to other firms."(Beaudry, C. and Breschi,S. ,2000). Clusters have the potential to provide a network of skills that enable the implementation of ideas in the form of innovations.

Clustering of the technology industry is beneficial to the industry itself and moreover is also beneficial to the development of innovative practices in the industry(...)Innovation is an important factor crucial to the establishment of industrial clusters (Hsieh-Sheng Chen, 2011).

For the same countries where we analyzed the innovation place occupied in the total of European Union Members, we analyzed the number of employees in clusters and the number of enterprises involved in clusters. Figure 2 and 3 are elaborated using the information offered by the European Cluster Observatory.
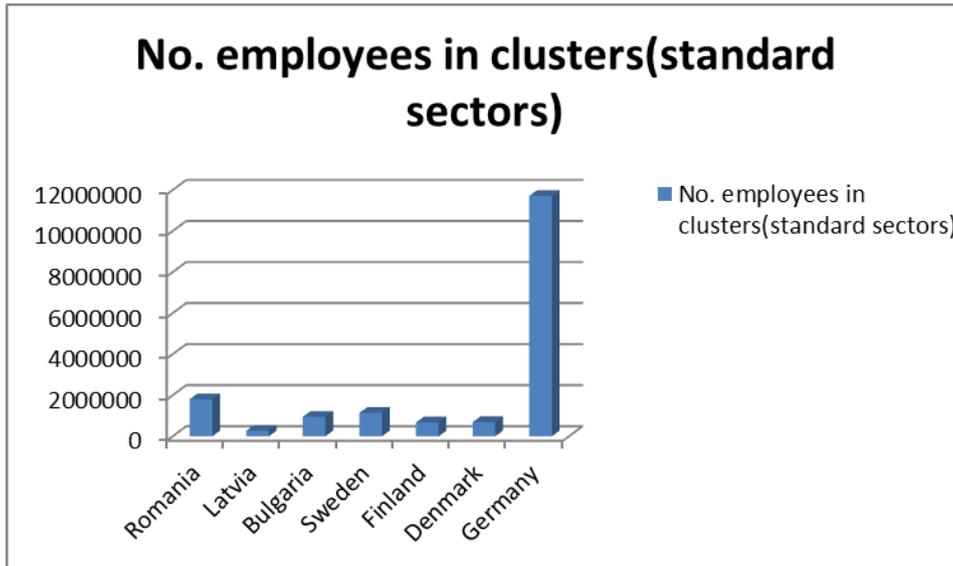
**Figure 2. Number of employees / cluster in the standard sector according to Cluster Observatory
(http://www.clusterobservatory.eu/index.html#!view=regionalmapping;i=V16140;y=2011;r=NC10-
BG,NC10-DK,NC10-FI,NC10-DE,NC10-LV,NC10-RO,NC10-SE;rsl=0;rp=NC10;s=CC20-
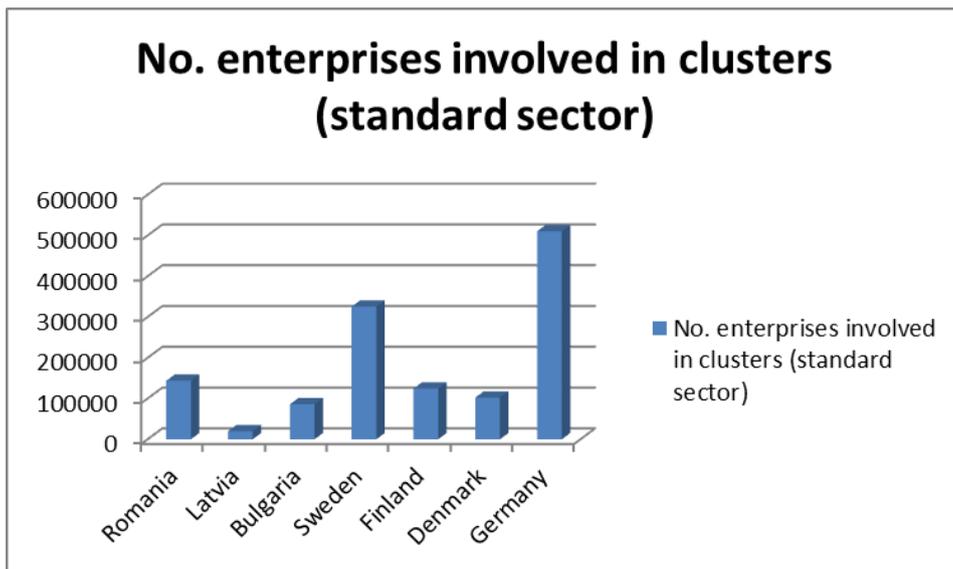STND;sp=CC20-STND;p=map;ll=58.615695,-1.409766;z=4)**

**Figure 3. Number of enterprises/ cluster according to Cluster Observatory
(http://www.clusterobservatory.eu/index.html#!view=regionalmapping;i=V11110;y=2011;r=NC10-
BG,NC10-DK,NC10-FI,NC10-DE,NC10-LV,NC10-RO,NC10-SE;rsl=0;rp=NC10;s=CC20-
STND;sp=CC20-STND;p=map;ll=58.615695,-1.409766;z=4)**

As we can see Germany is occupying the first place in both graphics, and Romania is trying to follow it, being the second or the third one.

IV. CONCLUSION

According to Porter (Porter,M.E., 1990) to understand the value creation in an economy, it is important to understand the elements that affect innovation at the company level. Although one can not speak of a stable business environment, creating a cluster allows creating a stable context in which companies can increase their value and degree of innovation.

An overview of the most innovative European Union Member States shows that countries in the top ranking predict much strength of national innovation systems. A significant role plays the activity of enterprises and cooperation between the private and the public sector. They also have high costs in research and innovation.

Greater efforts are needed to stimulate innovation because businesses are a key factor in terms of success in innovation and they should be encouraged to generate excellence.

Reforms that are being implemented should pay off in the long run, there has been progress in various fields, and the results are beginning to be visible.

Records indicate that the present European Union has a solid base of clustering, but there are still gaps that need to be removed. In reality clusters should not be just initiated, they should be developed.

V. ACKNOWLEDGMENT

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