STUDIA UNIVERSITATIS MOLDAVIAE, 2019, nr.2(122)
Seria "Științe exacte și economice" ISSN 1857-2073 ISSN online 2345-1033 p.159-163

CZU: 332.1

CLUSTERS AS CATALYSTS OF THE ECONOMY COMPETITIVENESS

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In the introductory part of this paper we have presented the development clusters and cluster-related concepts in interdependence with technological developments and innovation worldwide. Most of the research is related to the use of the comparison method to identify the main types of clusters developed mainly in Romania and the use of synthesis method in order to identify the criteria for assessing the clusters, particularly innovative clusters. In the end, we have highlighted the importance of clusters in the economic development and in increasing the competitiveness of the national economy.

Keywords: *clusters, innovation, economic development, regional clusters, economy.*

CLUSTERELE – CATALIZATOR AL COMPETITIVITĂȚII ECONOMIEI

În cuprinsul acestei lucrări am arătat, în partea introductivă, evoluția noțiunilor legate de cluster și conceptele sinonime acestuia în interdependență cu evoluția tehnologică și inovația la nivel mondial. Cea mai mare parte a cercetării este legată de utilizarea metodei comparației în vederea identificării principalelor tipuri de clusetre dezvoltate în special în România și de utilizarea metodei sintezei în scopul identificării criteriilor de evaluare a clusterelor, în special a clusterelor inovative. În final, am evidențiat importanța clusterelor în dezvoltarea economică și în creșterea competitivității economiei naționale.

Cuvinte-cheie: *clustere, inovație, dezvoltare economică, cluster regional, economie.*

Introduction

Economic development and global competitiveness are the priorities of every country and any tool that can boost these is important.

In this context, clusters represent a catalyst for developing the innovation and competitiveness of the European economy. The major characteristic of innovative clusters development in the EU is the consolidation of efforts and resources at the national, regional and community levels, in order to ensure global, national and regional-local competitiveness [1].

In the long run, the concept of cluster has been known under several names: "pole of competitiveness", "industrial agglomeration", "economic enclave", etc. Alfred Marshall was the one who founded the concept of business cluster in the 19th century in his "Principles of Economics". Since the '90s, Professor Michael Porter has been popularizing the term "cluster". Michael Porter, who is considered today "Spiritus Rector" of the economic policy based on cluster development and the one that gave the following definition: "***clusters*** are geographic concentrations of interconnected businesses and institutions in a particular field. They represent an effective form of cooperation between companies, universities, research institutes, customers, competitors and suppliers in a specific geographical area and their development policy differs from country to country, depending on the political, economic and social conditions. In general, clusters comprise a group of associated industries and other entities which are important from the competition's point of view [2].

Technological developments of the last two decades have imposed the use of a concept which is better suited to innovative clusters. Applicant's Guide POC 2014-2020, Action 1.1.1 "Big research infrastructures", defines the innovation cluster as follows: Innovation clusters represent structures or groups organized by independent parties (such as the newly established innovative enterprises, small and medium sized businesses and big companies as well as research organizations and for the dissemination of knowledge, non-profit organizations, other associated economic operators and public authorities and institutions that can provide specialized support in research, technological development and innovation, or in testing the innovative product in conditions that more closely resemble real ones) designed to stimulate innovative activity by promoting the joint use of equipment and exchange of knowledge and expert knowledge, and through contributions to the effective transfer of knowledge, networking, dissemination of information and cooperation between enterprises and other organizations within the cluster.

When a cluster is based on important technological development, its members benefit from diminished research-development efforts and a faster diffusion of the research results among the members of that cluster [3, p.67-73]. Although the economic practice has validated the model also known in specialized literature as the *triple helix* which groups together, within a cluster, entrepreneurs, representatives of universities and research institutes and of local and regional public authorities, in Romania it needed to be adapted to a "*four-leaf clover*" model, the fourth element being consultancy firms specialized in the field of technology transfer and innovation, technological transfer centres, etc. Often clusters extend downwards to various distribution channels and customers and sideways to the producers of complementary products and related industries through qualification, technology or common inputs. The recent EU policy with regard to the development of clusters is to follow the quintuple model, where banks represent the fifth element [4].

The interconnections identified by Porter in a cluster have two forms:

- the horizontal connections are related to the direct processes concerning the provision of the goods and complementary services needed for their production
- the vertical connections are related to the processes of supplying the raw materials and selling the final product within the geographical area the group of companies belongs to.

These connections and the intensity of cooperation lead to a cluster differentiation based on the specialization in a particular stage of the chain of values, on geographical location, according to certain clients' requests or to market segments. They can be networks of SMEs developed around large enterprises or even around some universities and from the point of view of the field of development, most clustered operate in the fields of IT field, healthcare, manufacturing, technology, equipment communications, biopharmaceutical and automotive [5].

The development of clusters in Romania

In this paper I will begin the presentation of Romania's clusters by producing studies that have analysed the clusters or other forms of cooperation related to the notion of cluster. The most important are: *Study regarding the competitive economic cluster agglomerations in Romania* co-ordinated by the International Centre for Entrepreneurial Studies (CISA), University of Bucharest, in the year 1998 and which has identified the existence of three "early" forms of clusters in the field of software production, the shipping industry and the wood industry. In 1999, *Valentin Ionescu* applies a different method and identifies two "proto-clusters" within the pottery industry (Alba) and the software industry (Bucharest) (Ionescu). He draws attention upon the idea of "emergent clusters" [6]. The project VICLI (Virtual Clustering Identification and Dissemination of Strategic Territorial Planning Best Practices for Certain Countries of Danubian and Southern Europe), developed within the European programme INTERREG II C – CADSES (Central Adriatic Danubian South Eastern European Space) tried to identify and support the development of clusters, through a regional exchange of knowhow [7]; the project INCLUDE (Industrial Cluster Development) funded by the Interreg III B CADSES programme, European Initiative for the European Found of Regional Development between the years 2000 and 2006 analysed the potential existing clusters in partner countries from Central and Eastern Europe using expertise and know-how from Italy and Austria. Several potential clusters have been identified in the field of textiles (in the North-Eastern Region, and in particular in Bacău County and West region, particularly in Timiș county), in the field of software (Timis, Cluj and Bucharest), wood processing, steel components and metal products (Centru 6 Region), the chemical industry (Brasov County); *Analysis of the current situation regarding the existing and potential poles of competitiveness from Romania*, the Sectorial Operational Programme "The Development of Economic Competitiveness", "Investments for your future" revealed that in Romania, the clusters, taken as industrial agglomerations had been formed by either tradition like the cluster of suppliers of components for the automotive industry (Dacia-Renault) or «Textil NE», or by the localization of multinational firms, as is the case of Automotive West and their subsequent development was the result of the intervention of some catalyst institutions such as the Ministry of Economy, Commerce and Business Environment, the Directorate of Industrial Policy or Regional Development Agencies [7]; ClusteriX 2.0 is an Interreg Europe project which allowed the implementation of appropriate tools in order to improve the work of clusters and their inter and intra-regional cooperation.

The findings of these studies have spurred the implementation of *measures regarding the work of clusters*, through the implementation of research and innovation policies or policy for the development of the business environment and they are implemented through different government programmes and by various institutions.

Thus, according to the information provided by the Agency for Regional Development Centre, and depending on the objectives and reasons which have led to their adoption, the *policies regarding clusters* can be divided into three categories: facilitation policies aimed at creating a microeconomic environment conducive to innovation and development in microeconomic levels in order to foster the dynamics of clusters; *general framework policies* include tools to improve the business environment, SMEs and national economies as well as references to clusters; *policies focused on the creation and mobilization of a specific category of clusters* in order to strengthen a particular economic sector.

The attention that is paid to these policies is obvious if we consider the fact that the European Cluster Observatory has been set up within the European Union in order to provide quantitative and qualitative statistical data, comparative analyses on the clusters in Europe [8] and to initiate and implement policies and strategies regarding development.

Types of clusters in Romania

The best and the most common clusters are the *innovative ones* with an impact on the level of competitiveness, considered the engine of economic development and innovation and a framework conducive to business development and collaboration between companies, research institutions, universities, suppliers, customers and competitors. Another category of clusters is that of *regional clusters* that have a significant impact on the economic development of a particular region. As shown in the following figure the number and diversity of sectors where clusters are starting to form are related to the level of development of the regions, e.g. Central region or Bucharest-Ilfov region are more developed and with a significant number of clusters compared with the South-East region, Southwest or the Southern Region.

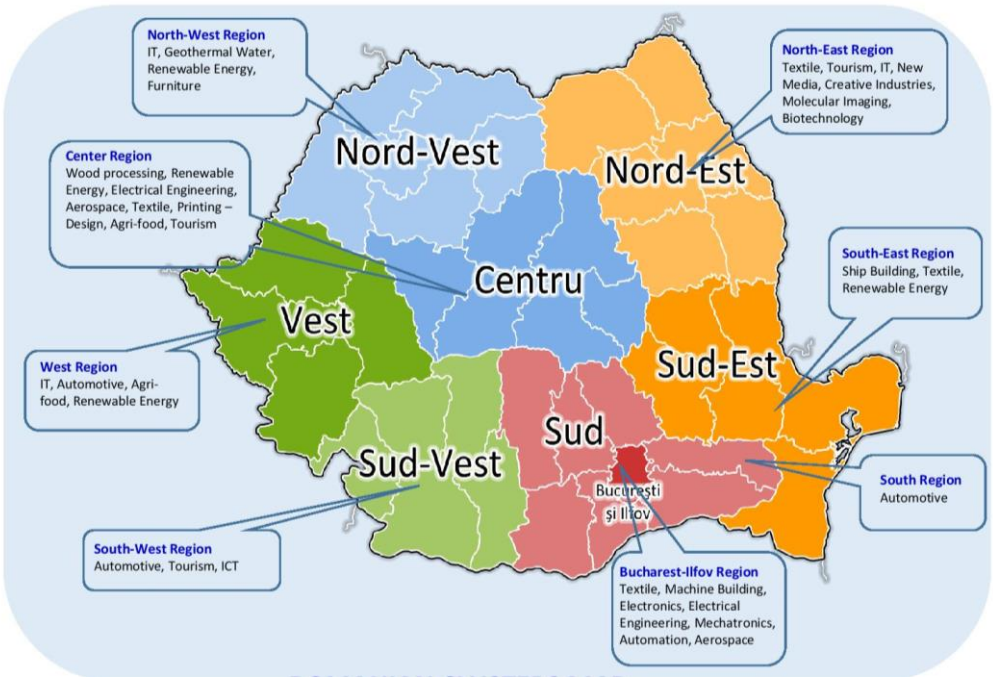

Fig.1. Romanian Cluster Map.

The definition of best practices and successful business and the high degree of excellence of a cluster are embedded in what is known as a pole of competitiveness or pole of excellence [9]. Thus, considering the type of competitive advantage [10], there are several types of business- clusters based on different kinds of knowledge*: high-tech clusters* make use of an advanced technology, well adapted to the knowledge-based economy and are also in partnership with universities and well-known research centres; *the clusters for knowledge services* have emerged in as usual in the developing countries and serve a growing demand for standardized knowledge services (technical support, analytical system services etc.); *historical clusters* based on know-how that relies on more traditional economic activities that are specific to the industry.

Connections and cooperation within clusters is very important and its effects are determinants for investment flows. Thus, according to data provided by the National Romanian Institute of Statistics, it is shown that for large enterprises in the industrial field and the services sector the share of companies involved in a cooperation of any kind within the cluster is very important in the period between 2014 and 2016, with a share of 23.3%, while the cooperation with the suppliers of equipment, materials, components or software is more than 16%.

Taking in to account the structure and the cooperation within clusters, one can identify four types of clusters [11]: network clusters (industrial district), knot and link clusters (hub and spoke), satellite clusters and institutional clusters.

The network type cluster (industrial district) consists of small businesses in the same field or related fields able to adapt quickly to market changes and to the use of new technologies with access to the local market, to the local infrastructure and an organizational culture based on trust and cooperation, as well as to associated local infrastructure services; *knot and link clusters* are based on large companies - anchors whose suppliers are concentrated around them and which usually are small local businesses within the region, and cooperation is based more on the supply connections and less on the exchange of information for innovation, most clusters of this type operating in the automotive industry; unlike knot clusters, *satellite clusters* have ties outside and within the cluster and trade and cooperation are minimized; *the institutional cluster* has major implications in the stability of the region and in its future development while its activity revolves around public entities or non-profit organizations, for example, research and development laboratories, institutions or universities.

Table

The weight of enterprises involved in co-operation, by size class, activity and type of partners, during 2014-2016, in %

Type of partner	Enterprises				Activitiy	
	Total	Small	Medium	Large	Industry	Services
Any types of cooperation	17.9	18.6	13.8	23.3	21.8	13.8
Other enterprises within your enterprise group	3.0	2.2	2.5	12.1	4.0	2.0
Suppliers of equipment, materials or software	9.3	7.9	11.5	16.6	8.6	10.1
Clients or customers from the private sector	2.4	2.0	2.2	6.3	1.5	3.2
Clients or customers from the public sector	7.7	7.8	5.6	13.0	9.7	5.7
Competitors or other enterprises in your sector	2.6	2.0	2.6	8.5	1.8	3.5
Consultants and commercial labs	4.6	4.7	3.3	7.6	6.6	2.5
Universities or other higher education institutions	9.1	10.7	4.0	8.1	11.3	6.8
Government, public research institutes	4.9	5.4	2.2	8.1	5.0	4.7
Private research institutes	3.7	3.9	2.8	4.9	3.7	3.8

Source: National Institute of Statistics of Romania.

Obviously, these classifications do not place any limits and innovations in all areas, especially technology and management, have a direct influence on the clusters' evaluation and structure. Accreditation of clusters is voluntary and is based on assessment of five qualitative and quantitative indicators [12]: cooperation within the cluster, cluster members, economic performance of the SMEs in the cluster, R & D performance, strategic and operational plan. Moreover, the Ministry of Economy, Trade and Business Environment through The Guide for Implementation in Romania of the concept of innovative cluster has defined several evaluation criteria starting from the contribution and effects of cluster development, as follows: *the contribution to the objectives of the programme* defined by the degree of integration of the cluster in the geographical area covered, the competitive advantages of the cluster and opportunities for economic growth, the relevance of the project for the development of international cooperation; *the contribution to the development of the scientific field/sector* is characterised by boosting innovation activities within the cluster and by obtaining direct results applicable on the market, the relevance of the economic sector where the project National Strategy for Competitiveness and other sectorial strategies and/or regional strategies for innovation belong

to; the interaction between research, education and industry within the cluster; *the contribution of the project to increase the economic competitiveness of a cluster* in the targeted field is determined by: the number of new jobs created or maintained within the cluster, promoting sustainable development and equal opportunities; *the contribution of the cluster to carry out the proposed activities based on investments* and after the termination of funding grants and the existence of an experienced team in units/ supported CD laboratories.

Conclusion

Clusters affect productivity, innovation, entrepreneurship, businesses and industries, the performance of the regional economy, their impact is quantifiable. Although Romanian inventors and innovators in various fields dealing systematically top ranking on the nation's annual salons of inventing. In conclusion, the institutional factors involved in the performance of a cluster, government and state institutions, universities, specialized research centers and companies can influence the business environment and implementation and coordination of cluster initiatives and networks have become an important tool in the hands of authorities to support and promote the development of economic growth as in the technology advanced, both in traditional sectors of the economy.

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The work was done within the project CNFIS 0407/2017.

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Prezentat la 27.12.2018