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# INNOVATIVE CLUSTERS: THE CASE OF ROMANIA

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## Abstract

The objective of this paper is to argue the importance of innovative clusters for the regional development having as example Romania. Many empirical studies emphasize a positive relationship between the cluster-like organization and the development extent at local or national level. The current article comprises a synthesis of these studies. On these grounds the formal clusters from Romania are analyzed in terms of their capacity to catalyze the regional development. The main conclusion of the work is that the Romanian economy does not have the experience of cooperation within a micro-economic network. The innovative clusters are very young and they have not demonstrated their growth potential.

**Keywords:** innovative cluster, institutional cluster, regional development, economic growth

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## 1. INTRODUCTION

The cluster-like structure is a key element for the regional development within the economic policy. The economic literature is abundant in works referring to clusters and to their impact on the regional economic stability, the creation of value added, jobs and innovation. Feldman and Kogler (2010) define the geography of innovation as part of the new geographic economy which describes the "importance of proximity and the innovative activity location". According to these, innovation and knowledge dissemination are spatially centered, fact affecting the technological changes and economic growth. The idea is also supported by Morone and Taylor (2010), and in their view, the globalization emphasizes the importance of location, of interactive learning at local level and of local clusters within the innovation process. Bröcker et al. (2003) state that innovation, extension of jobs number and regional economic growth are attained inside the geographical centered networks called clusters. The evolutionist school is focused on clusters perceived as an innovative environment and learning network. The firm is defined as a set of core competences, by core competences being understood an integrated set of knowledge and technologies. It is based on organizational routines, substantiating the knowledge generated by learning and they are produced by repeated interaction between the agents and the environment. The dynamics of the economic systems is endogenous, determined by the "persistent emergence of innovation into products, processes and organizational forms" (Coriat and Weinstein, 1995). The knowledge is implied and the routines are specific and non-transferable. The clusters are the "milieu innovateur" allowing the local knowledge dissemination and

catalyzing the collective learning process, defined as a social cognitive process permitting the overtaking of each individual's limited ration by synergy and cooperation. The importance of this topic is emphasized by numerous documents and national and European programmes focused on the support of cluster formation and development. At the end of 1992, the European Commission set up the European Observatory of Small and Medium Enterprises, whose main task has been to provide information on all these enterprises to all the interested parties. In 2002, it published a report on the regional clusters from 17 European countries, and the report highlights their importance for the regional growth. In addition, the report is an overview of the economic cluster policy tools implemented in Europe. The guidelines to implement the concept of innovative cluster were drawn up in Romania in 2009 within a project called suggestively InovCluster, financed by the European Union.

The objective of this work is to argue the importance of innovative clusters for the regional development having as example Romania. Therefore, there has been studied the reference literature within the field, a synthesis of it being displayed into the second chapter. The case of innovative clusters in Romania is presented into the third chapter, sustained mainly by the official information delivered by "The Cluster Observatory" and the conclusions of the projects developed into our country on this topic. Based on the results of the empirical analyses referring to the relationship between clusters and regional development and to the Romanian clusters case, the main conclusion of this work is that the Romanian economy does not have the experience of the network cooperation at micro-economic level. The innovative clusters are very young and they have not proved yet their growth potential.

## 2. THEORETICAL REFERENCES

### 2.1 *The innovative cluster concept*

The term cluster does not have a commonly accepted definition into the professional literature. Porter is the one who set up the term (2000), and for him the cluster is "a group of cross-connected companies and associated institutions which are geographically close, belonging to a certain domain of activity, linked by common and complementary elements". The concept of innovative cluster refers to the role of cluster into the learning network, understood as the "structure built to increase the level of knowledge and the participants' innovative capacity and to give the organizations the possibility of entering into relationships with other organizations and to support the voluntary learning of their employees." (Bessant and Tsekouras, 2001 quoted in Passiante and Secundo, 2002). For this type of cluster OCDE (2001) uses the term of reduced form national innovation system which can be interpreted as a replica of the entire system at the industrial

cluster level or as an entity which keeps the core elements of the national system<sup>1</sup>. Bortagaray and Tiffin (2000) define the innovative cluster as “groups of firms, research centres and investors that work together within a narrow physical proximity in order to create new products, technologies and enterprises. They work into invisible relationship networks within a complex social framework where the collective industrial activity is based on learning and knowledge”. The two authors consider the innovative clusters a category of industrial clusters that can be divided into three subcategories, in accordance with the intensity of innovation, i.e.: innovative industrial clusters (centered on incremental innovations as the authors suggest, improvement of products, processes and routines), proto innovative clusters (focused on the latest knowledge as competitive means at mondial level, that supports a limited growth of the knowledge based firms but which lack all the elements to guarantee the medium-term development) and mature innovative clusters (developed inside the social community structure, which gather competitive international firms and path the rhythm and the direction of the world scientific and technological research). The model of the innovative cluster proposed by Bortagaray and Tiffin (2000) for the Latin America is presented in Table1:

TABLE 1 - INNOVATIVE CLUSTER

Elements	Contents	Description
Tangible	Knowledge based firms	The firms are those that store and generate knowledge, they assure an appropriate framework for the learning process, they induce trust and cooperation. The anchor firms are defined as “wide sources of technology, markets and expertise”. Beside them, there is a “swarm” of highly innovative small firms, spinoffs, startups and big corporations, the last ones being themselves innovation systems in miniature.
	Knowledge inputs	Universities, research-development laboratories, publications, expertise, other sources.
	Consulting services	Firms specialized in technology transfer, legal services (brands, patents), accounting firms, industrial design firms, industrial engineering firms, marketing firms, patronal associations.
	Specialized inputs	Specific or to be adapted materials, instruments, equipments.
	Markets	Sophisticated customers, the government-consumer, tenderers, transport and communication networks for the world customers.
	Cluster support	Existence of public and private organizations to manage the network, to promote it, to assure coordination (a kind of turntable plate of the cluster). The business incubators are also rated as support organizations.
	Financing	Capital, risk capital and knowledge based banks with highly local character.
Intangible	Culture	Favourable social climate: local cultural values, the contractors’ value system, the business and socio-cultural environment, the legal framework.
	Integration	Formal and informal links and interactions within individuals and organizations.
	Life quality	Quality of life for the persons who work into the community where the clusters operate, measured through the cost of houses, leisure facilities, quality schools and hospitals, urban services, and so on.

Source: Adaptation after Bortagaray and Tiffin (2000), p.13-19

<sup>1</sup> According to Edquist and Lundvall (1993), quoted in Lundvall, Vang and Chaminade (2009), “the national innovation system consists of institutions and economic structures affecting the rate and direction of the technological change within society”.

Table 1 will be used in chapter three of this scientific research in order to assess the innovative character of the formal clusters identified in Romania.

## **2.2. Clusters and the regional development**

As Hermans, Castiaux, Dejardin, and Lucas (2010) assert, the clusters have reached a “quasi-paradigmatic status” for the regional development. The proof consists in many initiatives of the governments from most of the world states, all over the continents, having as objective to support the set-up and development of clusters. The initiatives are based on a wide variety of empirical studies validating the hypothesis that clusters are catalysts for growth and innovation. Several of the most quoted or the latest works are briefly presented hereinafter to confirm this hypothesis and they are selected so that all the continents should be covered.

Saxenian (1996), by comparing Silicon Valley and Route 128 regions in USA, came to the conclusion that the industrial systems based on regional networks generate flexibility and innovation. In Porter's view, the connections between firms, the network relationships create synergies and, in time, lead to innovation, to the growth of competitiveness and to the economic growth. For Porter (1998) competitiveness means the capacity to make progress in time, to innovate, “to change and improve”. Delgado, Porter and Stern (2011), by studying the impact of the USA clusters upon economic performance, prove that the enterprises inside clusters have high rates of increasing the occupancy, wages and patents. In addition, the rate of increasing the regional occupancy is accentuated if within that region there are powerful clusters. Moreover, the clusters favour the creation of new industries inside them and lead to the development of the networks which they are cross-connected to. Arita, Fujita and Kameyama (2004) prove, through a questionnaire based survey performed on three big industrial clusters in Japan, there is a positive correlation between the intensity of the regional cooperation on one hand, and the rate of the firm growth and the research-development expenses on the other hand. In addition, the horizontal cooperation, with the universities and trans-industrial organizations, bears a positive effect on the rate of growth of the firms. Silvestre and Dalcol (2006), quoted in Botelho and Bastos (2010), in reviewing a cluster from Brazil, demonstrate that the geographical agglomeration has a positive impact on the innovation activity within several firms composing the cluster.

Sonobe and Otsuka (2011) published a series of empirical studies on industrial development based on clusters belonging to several developing and underdeveloped countries in Asia and Africa. Their objective was to identify a model of developing the clusters, useful for the industrial policy. They conclude that the agglomerations determine in a first phase the diminution of the firms' profitability, due to the lack of barriers at the entrance of the clusters and to the increase in quantity of low quality products. As an answer to the diminution of profitability, the firms begin to innovate and to increase the level of product quality. The two authors ascertain that the difference between success and bankruptcy stands in the capacity of firms to innovate. By introducing higher quality products, the cluster steps into a new

stage where the firms know an increase of return. At this stage the leading enterprises relocate, one of them in the centre of the cluster, others outside it, depending on the links with the suppliers and distributors and on the danger of copying and imitating. The study does not comprise express findings about the relationship between the clusters and the regional development, but the empirical evidences related to the increase of product quality and the increase of human resource quality suggest the fact that the impact upon the development is a positive one.

Kuchiki and Tsuji (2009) argue that industrial agglomerations in India, Brazil and Eastern Asia have contributed to the economic growth, diminution of poverty and income polarization. They advocate that innovation is an endogenous process and the turn from agglomeration (assimilated to production based cluster) to innovation (or knowledge based cluster) requires building networks of heterogeneous entities – universities, research institutes, local firms, branches of trans-national corporations, governmental entities. Their book comprises numerous empirical studies whose common conclusion is the existence of a positive relationship between clusters and innovation. For example, Tsuji and Miyahara (2009) demonstrate on a sample of 5000 enterprises from Japan (out of which 2000 organized into clusters) that innovation and progress of small and medium enterprises are positively influenced by the presence of clusters and regional research institutes.

Rutten and Boekema (2007) analyze the project “Knowledge Industry Clustering” (KIC), coordinated by the Dutch firm Océ within the manufacturing. The review is done in terms of knowledge based economy, concept synthesized by authors through the acronym LINKS – learning, innovation, networks, knowledge, space, seen in their interdependence. The KIC project has involved forty tenderers of Océ firm, organized into approximately twenty clusters, but the empirical study has taken into consideration only 14 tenderers and 10 clusters. The researchers’ conclusion was that, in this case, the industrial geographical build-up had determined the increase of innovation at local and regional levels within the respective industry.

Van den Berg, Braun and Winden (2001), reviewing the clusters from nine big European cities, conclude these networks contribute to the economic development of urban regions. Wennberg and Lindqvist (2008) have studied the cluster effect upon survival and performance of new firms, on a sample of 4397 firms in Sweden. Their conclusion was that clustering increases the number of jobs and wages. The work comprises a table displaying the similar prior empirical studies. The table shows that three out of five studies upon performance confirm the previous conclusion.

The OECD study (2007) referring to the policies supporting the competitiveness poles implemented by the EU countries emphasizes the fact that the clusters publicly supported have determined the growth of the rate of creating new jobs, the emergence of new enterprises and the innovation emphasize.

The works studied and briefly presented into this section prove that, beyond the semantic ambiguity, the cluster is frequently used into the empirical studies. In addition, regardless of the methodology of cluster delimiting and performance measurement, most of the empirical studies support through their conclusions the world authorities' decision to help to the creation and development of clusters.

### 3. THE CASE OF ROMANIA

Two factors make difficult the study of clusters from Romania: the limits of this very popular theory and the little quantitative and qualitative information concerning the enterprises from this country. With reference to limits, there should be mentioned the ambiguity of the geographical and industrial boundaries of a cluster and the difficulty to define and measure the cross-individual and cross-organizational links. To overpass these inconvenience, the work refers only to formal clusters as they were described by The Cluster Observatory, 2010.

The first work that tried to shape the clusters from Romania was coordinated in 1998 by the International Centre for Entrepreneurial Studies (CISA). Up to 2011 the author knows there have been prepared eight more empirical studies for cluster location, i.e. Ferrari (1999), Ionescu (1999), Majocchi (2000), VICLI Project (Virtual Clustering Identification and Dissemination of Strategic Territorial Planning Best Practices for Certain Countries of Danubian and Southern Europe, 1999 – 2001), WEID Project (West-East Industrial Districts, 2001 – 2004), INCLUD Project (Industrial Cluster Development, 2003-2004), Cluster Mapping Report (2010), Watermode Project (2011). There are three main elements that have determined the framing of the agglomerations in Romania: (1) tradition, for the North-East region clusters (confirming the results of other studies on the past dependence); (2) partnership with firms from Italy, for the region Timiș-Arad (3) externalities generated by the capital and national development centre status for Bucharest. All empirical studies about Romania ascertain the fact that the industrial agglomerations do not generally take the form of cluster as network of connex organizations. None of the studies confirms the functioning in Romania of mature innovative clusters in accordance with the definition given by Bortagaray and Tiffin (2000). Constantza (2011), the last of its kind, identifies the following clusters in Romania for which there are evidences of “cooperation and common usage of several innovative services”, respectively official agreements of cooperation (the case of the institutional agreements) (Table 2).

At mondial level there is running an international project intended to create a comprehensive database concerning a world map of clusters shortly called The Cluster Observatory. Within this project (2011) there have been identified the following additional institutional clusters in Romania:

- ECENA (Environmental Compliance and Enforce Network for Accession), in the Bucharest – Ilfov region, specialized in the environmental technology;

- ARACO, in the Bucharest – Ilfov region, specialized in the construction technology;
- Innova-Eszak Alfold, in the North-West region, specialized in education, health, environmental technologies;
- Hemeius Information Technology Park – H.I.T. Park, in the Centre region, focused on ICT;
- Transylvania cluster, in the North-West region, specialized in ICT;
- CLOE (Clusters Linked Over Europe), in the Western region, specialized in business, mostly telecommunications, automotive industry, software and support industries;
- Regional Cluster for the Information Technology and Communications in the Romanian West Region (2010), in the Western region, in ICT.

The Cluster Observatory also mentions a cluster within the Bucharest region focused on education, but its structure is doubtful.

TABLE 2 - CLUSTERS IN ROMANIA

Region	Identified clusters	Institutional clusters (formal)
Bucharest-Ilfov	Clothing, footwear and fashion Construction materials Food industry Publishing Houses	PACTMAR - Agro-Food Cluster Bucharest FEPAIUS - Fashion, Clothing
West	Automotives ICT	AUTOMOTINVEST – automotives ARIEȘ-TM – ICT AGROFOOD CRISANA BANAT
Center	Wood Wine Ceramics	PRO WOOD Green Energy Association ETREC – electronic Furniture cluster centered round MOBEX
North-West	Geo-thermal energy	Geo-thermal energy
North-East	Tourism Food industry	ASTRICO – textiles Association for Tourism Bucovina Agro-Food Cluster Iași
South-West	Automotives Tourism Agriculture	TURINN – sustainable and innovative tourism Pole of regional competition ICT and automotives, Craiova
South	Automotives Tourism Agriculture Electro-technical industry	Dacia-Renault – automobiles
South-East	Logistics Tourism Shipbuilding	Tourism South-East

Source: Constantza, 2011

Following the review of these clusters' structure, in accordance with the information available on these organizations' web-sites, there has been noticed the fact that most of them are related to the "triple helix" concept (enterprises, universities, authorities), but they are very young, many of them set up after the year 2009 (approximately 80% of them). Moreover, many of them comprise partnerships with consulting firms, indicating a "four clover" organization (Guth and Coșniță, 2010). In addition, there are clusters which require international alliances, such as Innova-Eszak Alfold, set up in 2009 at the Western country border.

By applying the innovative cluster features emphasized in table 2, the conclusion is that only Dacia-Renault has been comprising all the elements of the mature innovative industrial cluster, without being a pivot of the scientific research and world technology. Thus, Dacia-Renault is the center of ACAROM – ODETTE Romania (Association of Automobile Constructors from Romania), being the best structured and functional cluster, comprising small and big firms within the main production activity and within the support activities, consulting firms, research firms, financial organizations, universities. All the other clusters have lacked at least one main element for innovation: the financial organizations.

The brief history of clusters, their mission and officially declared objectives suggest the fact they are into a settlement process and a process of seeking for alliances and cooperation frames. Besides, the professional literature certifying the cooperation inside these Romanian organizations is not conclusive and, in the author's knowledge, there are no statistic studies upon their regional and/or national economic impact.

#### 4. CONCLUSIONS

The main objective of this paper was to identify the innovative clusters from Romania. Therefore, the work started by defining the cluster and innovative cluster concepts, went on with a synthesis of the reference studies upon the relationship between clusters and regional development and ended with the mentioning of the institutional clusters from Romania. Following the research, the main conclusions are:

- The innovative cluster is a system of tangible and intangible elements, focused on the learning process, having as its main organizations the companies, research-development units (including the universities), consulting firms, and financial organizations, and as its main input, knowledge.
- Most of the empirical studies all over the continents validate the hypothesis according to which the clusters catalyze the economic growth and innovation.
- The author believes that in our country there is a mature industrial innovative cluster: Dacia-Renault.
- Most of the institutional clusters from Romania are very young and they have not proved yet their growth potential and innovative character.

There are very little information in Romania referring to the formal and informal networks of cooperation within the industrial agglomerations and to their impact upon the local and regional development. The two subjects could be the theme of a research project allowing the foundation of the public policies supporting the cluster cooperation.

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