CLUSTERS PERFORMANCE IN THE ROMANIAN AUTOMOTIVE INDUSTRY

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ABSTRACT
Nowadays, we are facing a highlighted interest in developing clusters in the automotive sector with the purpose of successfully using the intellectual capital elements in order to be more efficient and to face the pressure generated by innovation and high costs. Therefore, based on a literature review, this paper starts with general considerations regarding the role and the importance of clusters to the economy as a whole, followed by an analysis at the level of the automotive industry. The main goal of the article is to identify models for measurement of clusters performance in the automotive industry in order to illustrate the efficiency of using the intellectual capital in the Romanian automotive industry. The results presented are part of a more elaborated PhD research, conducted by the authors.

KEYWORDS: *Automotive industry, clusters, intellectual capital, performance, Romania.*

JEL CLASSIFICATION: *L10, L62, O34.*

1. INTRODUCTION

A testimony to the efficiency of intellectual capital elements in the automotive industry is represented by the development of clusters, which have become a focal element of many government programs (Solvell, Lindqvist and Ketels, 2003). Considered as examples of good practice with regard to the use of intellectual capital, automotive clusters lead to the increase of productivity and of competitiveness of national and international companies operating in the automotive market. The competitiveness of organizations in a particular area constitutes an important determinant of the level of welfare specific to the region, reason for which, nowadays, we see an intensified interest for the development of such networks for the actors in the automotive sector with the purpose of successfully responding to pressure that is due to innovation and high costs.

Starting from the general considerations regarding the role and importance of clusters to the economy as a whole, it is considered necessary to point out what is happening at the level of the automotive industry. Thus, in order to keep its position of leader on the automotive market, Europe needs a strong auto industry, competitive and innovative, based on clusters and networks of clusters. The increasing development of new equipment producers alongside traditional vehicle manufacturers, represents starting points for the development of sub-ensemble and component manufacturers belonging to the region. In this context, the improvement of the innovative capacity becomes the key factor of sustainable development of a sector which has a strong impact over economic growth.

Compared to other industrial sectors, the automotive sector is characterised by a high level concerning cluster creation. The geographic concentrations at the level of the European Union are well aligned with the modern approach regarding *open innovation* which is based upon the

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relationships and strong interactions between dynamic entrepreneurship (private sector), academic research (universities) and the regulatory centre as a support for all the activities conducted (public administration). The clusters from the European automotive industry now prove that they represent a true recipe for success for participants with regard to the enhancement of regional competitiveness. Towards the end of 2009, within the project SEE/A/594/1.2/X Autoclusters WP 3.3 financed by the European Union destined for the South East Europe Transnational Cooperation Programme, a global study was realised on the subject of good practice in terms of clusters and SWOT analyses on regions with the purpose of sharing relevant information between member states with regard to the benefits provided by the auto industry networks in order to increase regional competitiveness (Autoclusters Project Wp 3.3, 2009).

2. LITERATURE REVIEW

Noticing the definitions given to the concept of clusters over the years, we can appreciate the fact that, up until now, there is no unitary definition. Specialists from various fields (for instance architecture, urbanism, regional sciences, economics, political sciences etc.) have been preoccupied with the definition of clusters, but even more so with the identification of factors of influence that have led to the apparition of such conglomerates, with the positive and negative effects induced by the development of clusters in a certain region.

The most widespread definition in specialty literature, but necessarily the most agreed-upon or unanimously accepted one, has been given by Michael Porter, considered today "*Spiritus Rector*" of economic policies based on cluster development. In 1998, Porter was declaring that they are "*geographic concentrations of interconnected companies and institutions in a particular field. Clusters encompass an array of linked industries and other entities important to competition. They include, for example, suppliers of specialized inputs such as components, machinery, and services, and providers of specialized infrastructure. Clusters also often extend downstream to channels and customers and laterally to manufacturers of complementary products and to companies in industries related by skills, technologies, or common inputs. Finally, many clusters include governmental and other institutions—such as universities, standards-setting agencies, think tanks, vocational training providers, and trade associations—that provide specialized training, education, information, research, and technical support.*" (CLUSTERO., 2013).

At the same time, Porter (1998) sees in a cluster a "*diamond of competitive advantage*" which has as main elements:

- Factors of production (well qualified workforce, highly specialized);
- Interdependent and support sectors (the existence of supplier networks);
- The demand (the existence of demand determines companies to invest in innovation);
- The strategy (development strategy through innovation);
- The structure (based on partnership);
- Competitors (in order to stay competitive, companies need to invest continuously and to adapt themselves to the conditions of the marketplace).

Even from the beginning of the '90s, the political environment has supported the role of clusters in the development of innovation platforms. Later on, even the impact created by clusters has been highlighted, consisting in reducing barriers, in the transformation of new ideas in businesses, beginning from the advantages of globalisation (European Cluster Memorandum, 2007).

At the level of the Union, the European Commission, with the occasion of the COM (2008) 652/2008 Communication, defines the cluster as being „*a group of firms, related economic actors, and institutions that are located near each other and have reached a sufficient scale to develop specialised expertise, services, resources, suppliers and skills*" (CLUSTERO., 2013). Fighting for the role of the cluster as an engine of economic growth, the European Union encourages member states to integrate cluster policies in the Competitiveness pylon of National Reform Programs and in the Operational programs corresponding to this pylon. In this respect, for the creation and

development of clusters in Romania, for example, 20 million EUR were allocated in the period 2007-2013, within the Operational Program for Increasing Economic Competitiveness, administered by the managerial authority within the Ministry of Economy, Commerce and Business Environment (Centre of Information for Structural Instruments, 2012). But, apart from belonging to a cluster, companies have the possibility of being part of a competitiveness pole as well. We must mention the fact that in Romania, the two terms: *cluster* and *competitiveness pole* are employed in a distinct way. As such, the competitiveness pole includes the cluster on one hand, as well as a series of other characteristic and additional benefits for companies, generated by the common assumption of a development strategy, through the possibility of using innovative results of the research activity, as shown in figure 1:

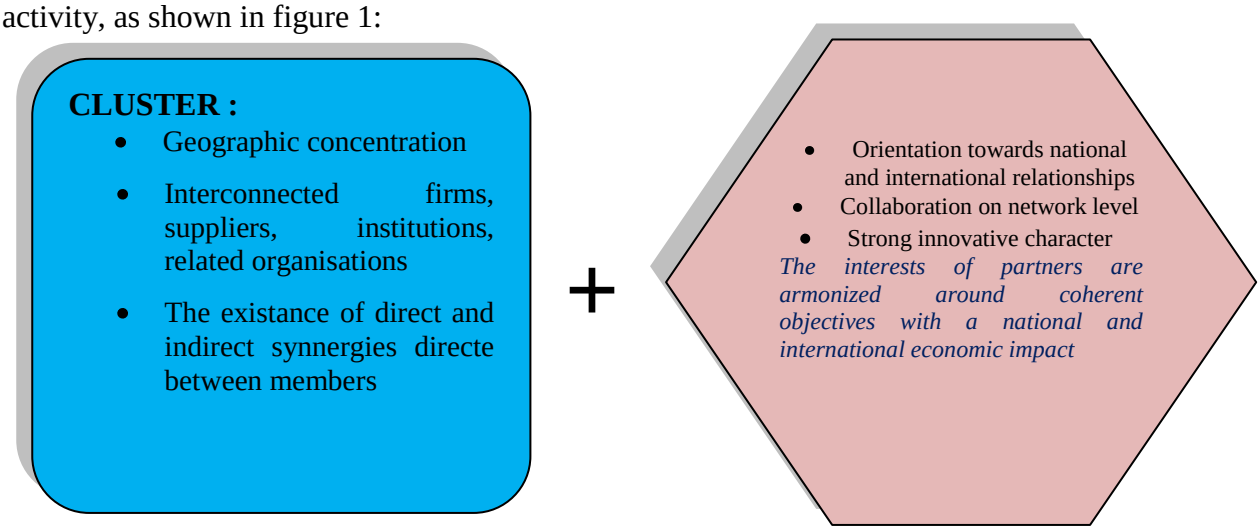

Figure 1. Competitiveness pole

Source: Adapted from the Centre of Information for Structural Instruments (2012)

Starting from the example of European Union good practices in terms of clusters and competitiveness poles, economic operators at the level of Romanian industry have at the moment the chance to strategically develop themselves, increasing their competitiveness not only on the internal market, but on the external one as well. According to Ketels (2004) relationships established between companies belonging to a cluster allow each participant in turn to be more productive and more innovative than they would have been had they remained in isolation. Economic theory explains at length the benefits generated by clusters. As such, at a sectorial level, geographic conglomerates of companies come to create various economic effects as:

- *Effects on the workforce*: the improvement of the level of qualification and specialisation of employed staff;
- *Effects regarding the specialisation of suppliers*: within the supplier chain, they have the tendency of specializing on each niche, with the purpose of increasing the quality of products and of facing up to the competition;
- *Effects on the technological transfer*: participants to the cluster share information and knowledge; information from the technical sphere represents intangible benefits having an impact on efficiency, quality and competitiveness;
- *Effects over the innovation activity*: affiliation to a cluster allows companies to pick up one from the other new ideas, innovations in terms of technologies, products and/or services, contributing thus to the spreading of good practices in the sector;
- *Effects on SMEs*: opportunities of SMEs are maximised through the removal of barriers such as: the lack of financing, the access to new technologies, the limitation of R&D, the lack of relevant information;

- *Effects over big companies*: their operation within clusters has granted them a horizontal development, through the conclusion of close partnerships with other companies and particularly with the academic environment and research institutes;
- *Effects regarding change management*: clusters allow participating firms to adapt themselves quickly to the changes on the market, so that they would continuously refine their capacity for development of new products and services, increasingly more competitive;
- *Effects over foreign investment*: the existence of clusters in a certain region may constitute a powerful and attractive pitch for investors, them being encouraged to implicate themselves in regional economy.

As presented above, it can be concluded that the affiliation to clusters determines a series of advantages and benefits to its participants, regardless of the economic sectors in which they operate. Through the effects generated by clusters, economic efficiency is positively influenced for the members of the clusters. Moreover, the Centre of Information for Structural Instruments (2012) gives a definition to the cluster from which we deduce the idea that those elements of intellectual capital such as: *cooperation (relationships), innovation* and *transfer of know-how*, constitute premises of sustainable development attainable to companies through their participation to a cluster. Viewed from the perspective of intellectual capital, the cluster represents a ground for regional development for companies which can be attained through the stimulation of knowledge creation processes. During one of his researches, Neş tian (2012) defines intellectual capital as being „*the sum of everything people know in an organisation, granting to the latter competitive advantages in the marketplace*", showing at the same time the impact of knowledge creation on the development of clusters, and on company competitiveness respectively.

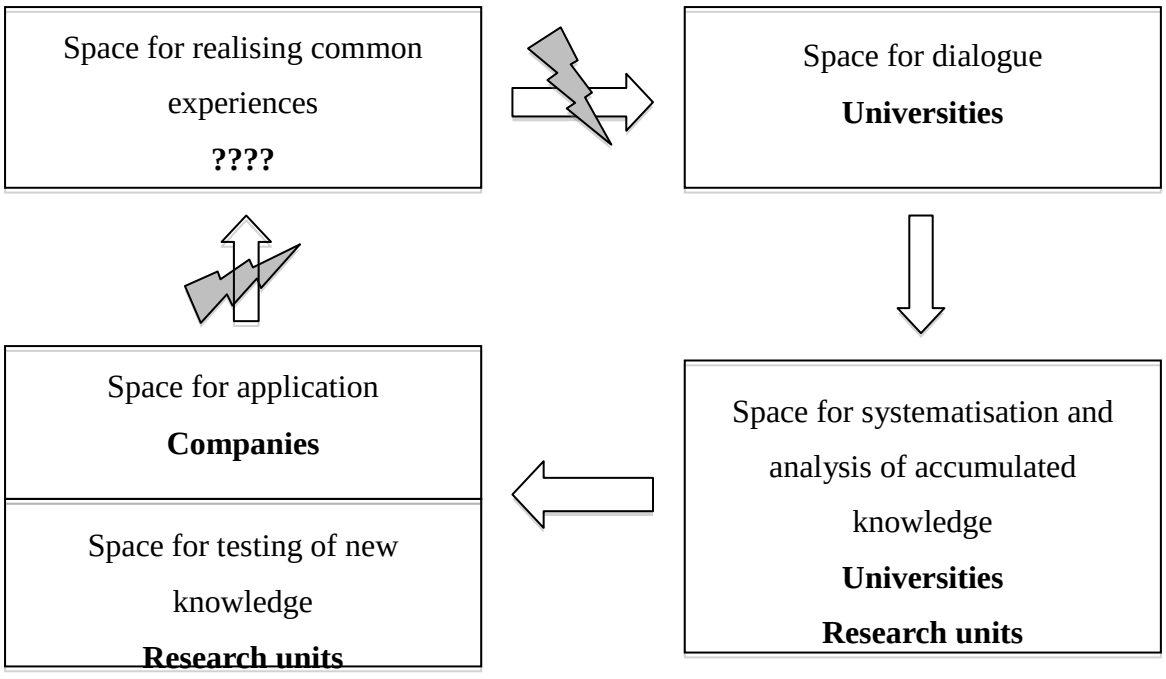

Figure 2. Knowledge flux at cluster level
Source: Neş tian (2012)

Starting from the model of Nonaka et al. (2000) of knowledge-creation, Neş tian notices how the cluster – as an instrument of knowledge creation – confers four types of spaces with different roles, as follows:

- Spaces for realising common experiences;

- Spaces for dialogue for the participants to the cluster in the view of conceptualising accumulated knowledge;
- Spaces for analysis of accumulated knowledge;
- Spaces for application, testing and value generation of new knowledge.

Therefore, in the following figure the participation of organisations is reflected, from the level of the cluster to the production and transfer of knowledge.
From figure 2 we can appreciate the fact that the space for realising common experiences, also considered the key-point in the creation of knowledge, is the least represented. From there, organisations take knowledge following the unfolding of common activities in the view of using them subsequently in the other spaces that have been indicated. In order to heighten firm competitiveness, Neş tian (2012) believes that those can become stimulated not only in dialogue spaces, but also within spaces for systematisation and analysis of accumulated knowledge and within spaces for testing of new knowledge respectively. Thus, in order to become dialogue spaces, companies need to implicate themselves in analyses actions of their own situation, receiving help from specialized companies – as participants to the cluster – through university professors, researchers or consultants. In order to be assimilated to spaces for testing new knowledge, a tight collaboration is necessary between companies and universities and research institutes, with the purpose of developing their own research-development-innovation. As a conclusion drawn from the results of the analysis effectuated by Neş tian, we can appreciate that the development of competitive clusters at the level of any industry is in close relation to knowledge development within the respective cluster, meaning to the intellectual capital. In other words, intellectual capital can be looked upon as a catalyst for cluster development.

3. PERFORMANCE OF CLUSTERS IN THE AUTOMOTIVE INDUSTRY

As observed in the previous section, clusters become day by day a catalyst of the efficiency of the employment of intellectual capital in the automotive industry. The globalisation of the market and the development of clusters offer companies belonging to the automotive industry the possibility of making important savings at the level of the value chain: supply of raw materials, components, technological equipment, low-cost production, access on other markets etc. This fact positively influences efficiency of companies that participate to an auto-cluster and which have, in this way, access to specialised and advanced production factors. The model of intellectual capital applied to company level can be transposed and replicated at a regional level with the purpose of reflecting competitive and development potential of the region. The reason for knowledge and intellectual capital accumulation at the level of the auto industry consists in the intention to influence the strategies of the companies concerned in order to create competences for an efficient cooperation in view of enhancing welfare for the entire community.
With respect to the role of clusters as a catalyst for the efficiency of the use of elements of intellectual capital, Solvell, Lindqvist and Ketels (2003) talk about *The Cluster Initiative Performance Model (CIPM).*
As we can see from figure 3, the performance model is founded upon four structural elements, out of which three have the role of drivers: the national economic, politic and economic frameworks; objectives and processes through which the clusters develop themselves. All these elements are capable of influencing at the same time the performance of clusters and of the participants to the cluster. The functioning following this model of performance has allowed clusters which have gained experience to produce significant benefits and advantages at the level of the industry.
Tanţ ău (2011) reminds about another model of cluster performance – *The model for innovation performance* - in the paper entitled "*A guide of good practices for clusters and networks of companies*". The author believes that this model is explained by the use of the intensification and

diversification of competition and with the help of cooperation relationships of the participants with clients and suppliers.

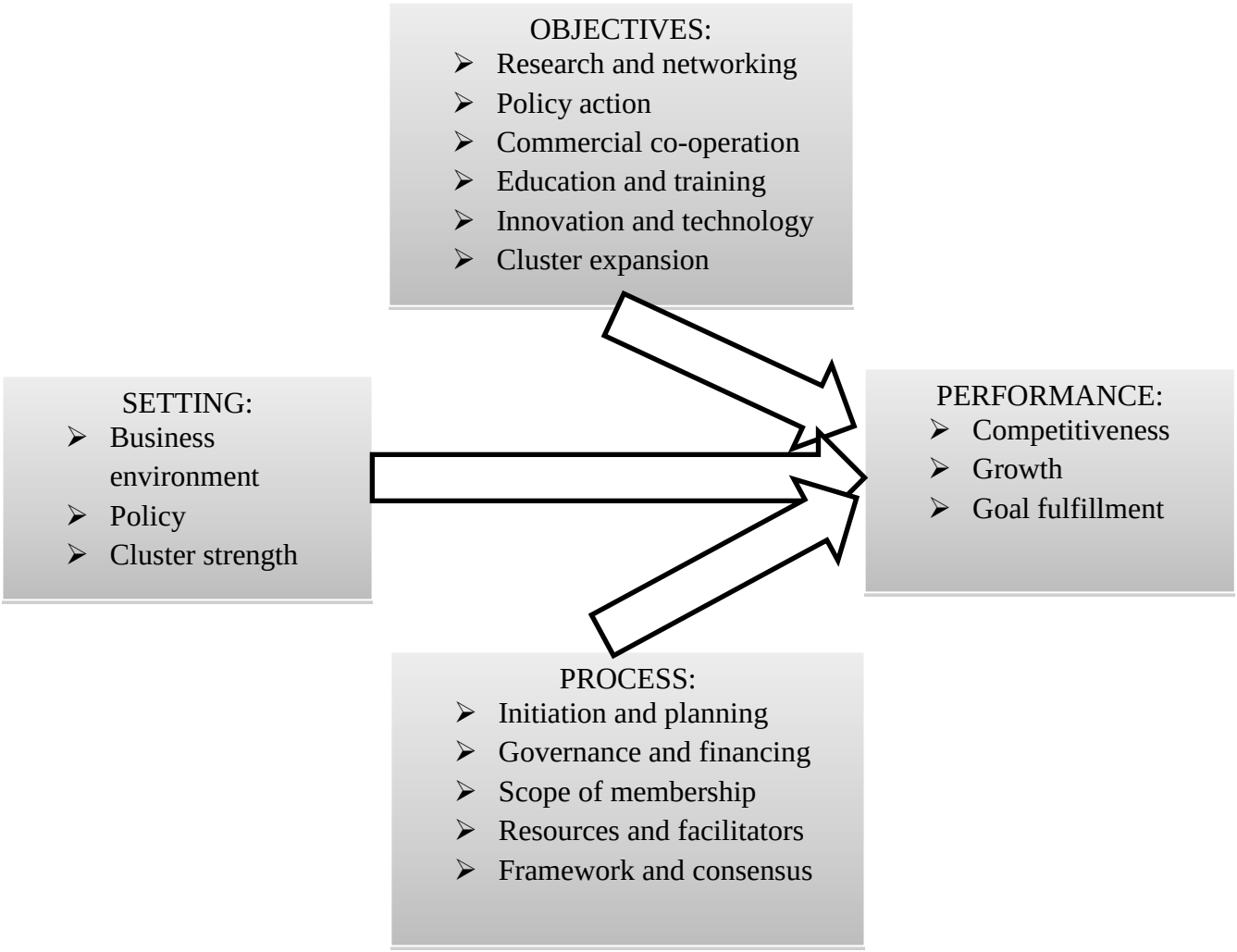

Figure 3. The Cluster Initiative Performance Model (CIPM)
Source: adaptation of the author from Solvell, Lindqvist and Ketels (2003)

Concerning innovation performance, Bengtsson and Solvell (cited by Tanţ ău, 2011) have shown that, at the level of the climate of the competition, symmetries between competitors positively influence the development of products and of processes. With respect to the stiffness of competition, this is heightened proportionally to the increase in information diffusion speed, competitors disputing not only market shares, but they are also fighting for attracting qualified and specialised human resources (Tanţ ău, 2011).
When the competitive advantage is a short-lasting one, companies are in a strong competition, being pressured towards manufacturing new products and improving efficiency (Aveni, 1994). However, in conditions of stiff competition, companies obtain improved productivity (Nickell, 1996) and have an increased appetite for innovation, contrary to organisations that occupy monopoly positions (Feldmann and Andretsch, 1999).

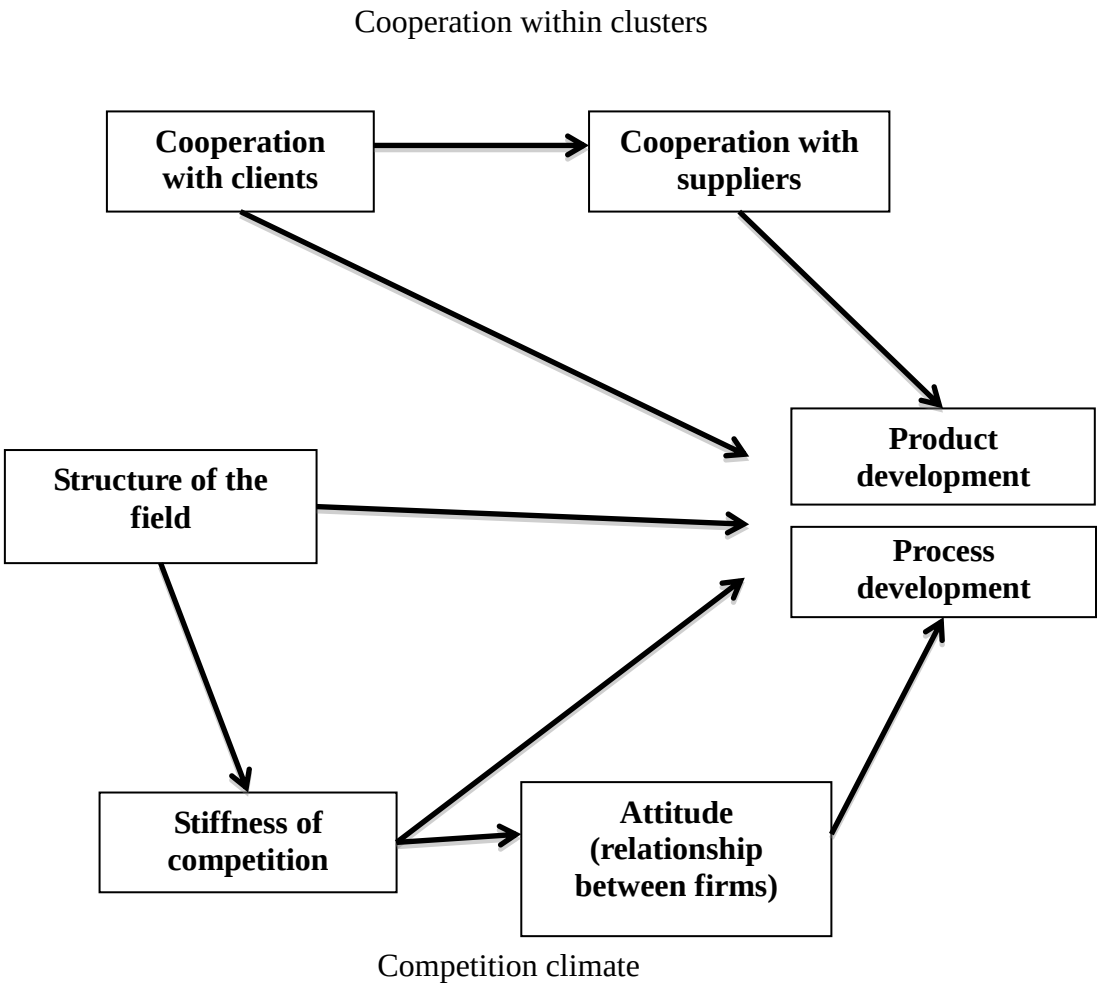

Figure 4. Diagram of analysis for innovation performance
Source: adaptation of the author from Bengtsson and Solvell, 2004 (from Tanţ ău, 2011)

In the framework of the innovative performance model at the level of clusters, an important aspect is represented by the cooperation between participants. The quality of the cluster is strongly dependent upon the quality of the relationship between member companies. As a positive result of the affiliation to a cluster, organisations intensify cooperation by sharing some resources or through the exchange of competences (Lundgren, 1991; Bengtsson and Kock, 2000). On the subject of the relationships between participants to the cluster and clients and suppliers, Hakansson (1987) and Hippel (1988) believe that the tighter the relationships are, the higher the innovation performance at the level of the cluster would be. The model of the cluster performance highlights the advantages of cooperation as compared to actions carried out on one's own account. This model can be quantified via the value-increase potential, with the help of the VAIC model developed by Pulic in 1998, as presented by Nedelcu, Banacu, Frasineanu (2014). Nonetheless, older theories that quantified efficiency on the basis of profit and return indicators were easier to capitalize, but newer models are more complex, taking into account more value-generating indicators, such as: added value, increase of turnover, duration of the increase, profit margin, investment rate, volume of the investment etc. The affiliation to the cluster facilitates the access of participants to sources of intellectual capital which help companies increase value and efficiency. In this way, we have proceeded to the elaboration of a simplified model which would illustrate the efficiency of the use of intellectual capital at the cluster level with the purpose of increasing performance, model which can be observed in figure 5.

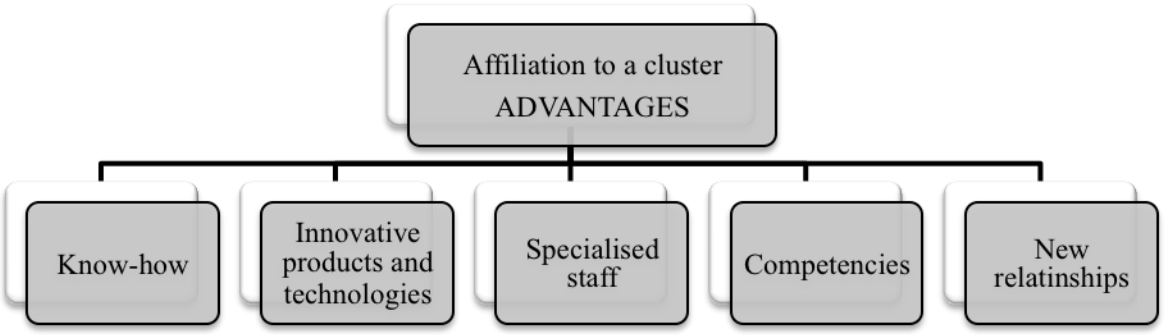

Figure 5. Simplified model of the efficiency of the use of intellectual capital at the cluster level
Source: projection of the author

From the proposed model, we can observe two new pylons of value increase, namely: know-how and new strategic relationships. We align ourselves in this way to the opinion of Visser (1999) who considers that knowledge, information, know-how and strategic relationships constitute an advantage of networks, showing a significant contribution to the foundation of business decisions. At the same time, belonging to a cluster facilitates specialisation and helps participants in making more suitable business decisions. As it has already been mentioned by Eisingerich, Bell and Tracey (2010, p.240), economic performance represents an objective of each cluster, and results of innovation constitute future performance indicators. In the opinion of Folta, Copper and Baik (2006, p.218), the quantification of cluster performance can be realised on the basis of three success factors, namely:

- *Cluster competitiveness;*
- *Enhancement/ expansion of the network;*
- *Rate of attainment of set objectives*.

A superior stage of the performance evaluation of the cluster brings to foreground the innovation results expressed through a series of new indicators of performance, such as:

- *Number of patents;*
- *Number of new listed companies;*
- *Number of companies affiliated to the cluster which occupy relevant positions in global charts;*
- *Number of competitions/trainings per employee;*
- *Number of specialized research centres;*
- *Rate of increase of number of start-ups.*

Within clusters, formation lectures and specialisation trainings occupy an important place among organisational concerns, so that the employed human resource at the network level disposes of superior qualifications and competences. Thus, investments in human resources constitute the premise for the stability of the workforce, but also for the increase in productivity. Alongside the specialised human resource, as a measure of cluster performance a series of other factors intervene, such as: knowledge, innovative business ideas and superior technologies (Saez, Lopez, Castro and Gonzales, 2010, p.694).

4. CONCLUSIONS

The interpretation of the performance model proposed within the current section of the paper has led us to the formulation of several personal considerations concerning the role of clusters to the sustainable development of participating companies. We appreciate with this occasion that clusters offer companies the advantage of improving their productivity and efficiency respectively, of increasing their resources (tangible and intangible as well), refining their competences and know-how through the means of collaboration relationships between various participants.

In the context of a stiff competition on the European automotive market, the innovation effort supposes new dimensions and expectations, so that organisations need to pass this test together in the view of creating the necessary conditions for a sustainable development. At the same time, the creation of an organisational culture in which the accent would be put on the intellectual capital constitutes the grounds for improving cluster competitiveness.

Future role of clustering is a one-way street towards efficiency. Developing new networks and strengthen the existing automotive clusters will improve the competitiveness of the European automotive industry.

There is a high demand of innovation within the automotive industry that is why a huge pressure is enabled from the large sectorial enterprises against the general suppliers. This business attitude will certainly translate into a high innovation and cost pressure mainly on sectorial mid-size enterprises.

Clusters represents the cornerstone framework for suppliers to respond to high cost and innovation pressure from the industry or from the peers in terms of facilitating enterprise access to resources such as technology, information on market requirements, qualification, business support services and finance.

Cross-border clustering of the European automotive industry and also the creation of strategic partnership between the existing clusters will take the European automotive sector to the next level of development.

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