A Theoretical Approach to the Concept of the Cluster

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ABSTRACT

The main objective of this research is to provide a general overview of the concept of the cluster, through the review of theoretical-empirical studies and some proposed models as well as its importance as a strategy for regional development and its operation

Keywords : cluster, regional development, functioning.

1. INTRODUCTION

There is no single formal definition about the concept of the industrial cluster. Some authors such as Porter (2003), Rosenfeld (1996), Altemburg (2001), Hoen (1999), among others, propose definitions regarding this concept, but the concept of the cluster goes beyond the networks developed by companies that operate in the same market of final goods, which are part of the same industry and which cooperate in certain areas, including strategic alliances. To approach the concept, it is necessary to analyze the theoretical approaches of the cluster, starting from the approach of classical economists such as Marshall (1890), the theory of industrial location of Weber (1929), the theory of industrial interactions and industrial districts. Becattini (1992) and the new economic geography of Krugman (1995), in addition to the competitive advantages of Porter (1990) among others.

Another of the key aspects is to place the cluster as a global or regional development strategy in the global and local context, due to which it allows to interrogate the impact through its analytical theoretical bases and study the success cases and their contributions to the economies local. To know the formation of industrial clusters it is necessary to know the value chains and identify the processes and the interrelated parts that compose it. Some key factors to identify a cluster are technological development, commercial linkages, cooperation between firms and, according to Porter, subcontracting (Corrales, 2007, page 171).

Many researchers agree that the cluster consists of a critical mass of companies, generally small and medium-sized, specialized in the same sector or related productive activities, located in a specific and relatively small geographical area. Other authors suggest that a cluster includes institutions that interact with companies that affect their competitive performance.

Finally, some others explicitly refer to the existence of collaborative relationships between all these actors and highlight the importance of social, historical, political and cultural factors that promote or hinder collaboration between actors

2. CONCEPTUAL THEORETICAL BACKGROUND

A. ANALYSIS OF THE CONCEPT

This concept has its origins in the industrial districts of Alfred Marshall (1963) when he tried to analyze the reasons why industry emerges concentrated in certain localities in which he points out, that some elements that constitute industrial concentration: physical conditions, for example, nature of climate and soil, needs of local consumers, families and businesses, infrastructure (roads) and access roads (transport). This author emphasizes three aspects: mutual proximity of companies in an industrial district, which exchange information, new ideas and inventions; appearance of subsidiary activities or companies that reduce costs, and concentration of specialized labor (Garnica & Rivero, 2004, page 144).

To this Krugman agrees with Marshall. However, Krugman (1992) adds that other aspects to consider in the conformation and growth of an industrial belt are: increasing returns to scale, arbitrary and accidental components, and historical and cumulative phenomena. The convergence of these processes contributes to the integration of a specialized labor market (Garnica & Rivero, 2004, page 145). But it was Becattini (1992) who reused it to describe and analyze the success of industrial conglomerates in Italy in the modern era; nevertheless, it corresponded to Piore and Sabel, (1984) through a Second Industrial Divide of 1984, to make known to the world the success of some regions of Italy through industrial districts (Corrales, 2007, pp. 186-187).

According to Vera (2007, pp. 303-306), a cluster is a sectoral and / or geographical concentration of companies that work in the same activities or in closely related activities, both backwards, towards suppliers of inputs and equipment, and forward and to the sides, towards processing and user industries as well as services and activities closely related to important and cumulative external economies, agglomeration and specialization due to the presence of producers, suppliers and specialized labor and services annexed to the sector and with the possibility of carrying out a joint action in search of collective efficiency.

For Porter cited in (Vera, 2007, page 306) the clusters are geographical concentrations of interconnected companies, specialized suppliers, service providers, related sector companies and related institutions that compete but also cooperate. In its character of critical masses of unusual competitive success in determined areas of activity, in an activity characteristic of all or almost all national, regional and even metropolitan economies, especially that of the most advanced countries. Not only applies to local geographic sectors but also to the national environment, an important fact is that, as there are rival companies within the cluster, this will promote innovation and the competitive development of firms.

While for Roldan (2019) a cluster is a geographical concentration of support institutions and companies that produce and complement each other in a specific field. Functionally, it is articulated in associative schemes with value network structures, with the main objective of improving its profitability and competitiveness. Another author who defines the cluster and is a pioneer in the new economic geography is Gala (2005, pp. 9-10), who in a general way can define the clusters as a group, geographically close, of interconnected companies and associated institutions in a particular field and linked by externalities of various types, which can be seen as processes in the sense that they can be considered a way of understanding how the economy works and organizes its strategies, as well as results, observing the clusters as a critical mass of firms interconnected geographically.

On the other hand, Krugman (1991) considers the cluster is a product of history and economies of scale propitious by the behavior of the market; for Scott (1986), clusters are the spatial consequence of the vertical disintegration of large companies; while for Harrison (1992), the cluster is constituted by companies specialized in one or more phases of the production processes, which leads to cooperation and to exchange tools and information to improve the collective processes of the regional industry. On the other hand, Storper (1992 and 1997), based on the findings of Piore and Sabel (1984), suggests that the clusters are the result of flexible specialization.

A simpler way to define it is the one proposed by Rosenfeld (1997) cited in the Regional Quantitative Analysis Research Group of the University of Barcelona (2005), a cluster is used very simply to represent concentrations of companies that are capable of producing synergies due its geographical proximity and the existence of interdependencies between them, despite the fact that their weight in total employment is not preponderant or even relevant.

It is necessary to consider that economic clusters do not only have to do with sectors and support institutions, but they have to do with them as much as they are more competitive due to the relationships they establish between them, this facilitates the exchange, potentiates the synergies and minimizes transaction costs. Altemburg adds that a cluster is an agglomeration of a significant number of companies in a defined geographical area that has a clear profile of specialization and in which the degree of division of work and interactions between companies is high (Garnica & Rivero, 2004). Then the clusters are in the majority networks, trans-sectorial networks that comprise complementary companies and specialized in a link or knowledge base in the value chain.

B. THEORETICAL APPROACHES

The first proposed approach is that of the classical economists who divide this approach into two basic currents: The Marshallian perspective or the theory of interaction and the industrial districts, exposed by Marshall (1890) and the theory of industrial location with contributions from Weber (1929) and Hoover (1937) later Krugman (1995) and Borja and Castells (1997).

On the one hand, the theory of industrial location and economic geography tries to explain why activities tend to be concentrated in certain areas and are not distributed randomly. It emphasizes the relative weight of the cost of transport in the final cost, which would explain why some activities are usually located close to natural resources, close to markets and others anywhere, in which benefits are produced and called economies of agglomeration and on the other the theory of interaction aims to explain that the most propitious conditions for there to be learning are based on interaction. What, according to this approach, would explain the success of the industrial districts. Likewise, the interaction accelerates the dissemination of knowledge and innovation, which is a social good internalized by all the companies in the district (Garnica & Contreras, 2007, page 311).

The theory of cluster growth and sectoral agglomeration in turn attempts to explain the development of clusters, whether or not they are based on natural resources. First, these new theories have demonstrated the importance of the accumulation of a specific resource to explain economic growth (Garnica & Rivero, 2004, page 312).

The new economic geography explains why certain activities agglomerate in a certain region. The decisions of firms' locations depend on the interrelation between production costs and the ease of access to markets (of goods, factors, etc.). If transport costs are reduced, then the sites of the firms are highly sensitive to the differentials of productive costs. On the other hand, if the above costs are high, companies will find themselves more linked to certain given markets and, consequently, they are less sensitive to disparities in production costs. It promotes growth through the innovation of economic activities, which in turn benefits a reduction in the costs of innovation and, consequently, a higher growth, so that a circular causality is generated between growth and geographical concentration of economic activities (Garnica & Contreras, 2007, page 313).

Another approach is that of the industrial districts and the collective efficiency in which two mechanisms that lead to the formation of this are distinguished, on the one hand, are the positive external economies that are the savings that a company can make due to the actions of other actors. These arise when the actors cannot incorporate all the costs and benefits of an activity and on the other side is the joint action that acts as a deliberate measure, by including the association with other stakeholders to ensure the interests of the union, exchange information or contract a service that shares the costs. This action can take place directly between two or more companies or comes through trade associations and promotion institutions (Vera, 2007, page 315).

Within the theoretical approaches, the one of the competitive advantage of the nation stands out that according to Porter (1990) it indicates that the competitiveness of a nation depends on the capacity of its industry to innovate and improve. The competitive advantage is created and maintained through a very localized process influenced by very characteristic of a nation, such as its values, culture, economic structure, institutions and history, and for this the theory of resources and capabilities is taken into account. Because in the clusters a collective strategy originates, which recognizes the existence of a strategy of a strategic scope superior to that of the cooperation and the business unit and that would be shared by the organizations of the same field or niche, this when referring to a cooperative strategy on the part of the companies involved and that share in such a way resources and specialization.

The following is a summary of the various types of approaches (See Table 1):

Table 1. Cluster theoretical approaches

Theoretical approach	**Author**	**Description**
New Economic Geography	P. Krugman	Prepared from A. Marshall's pioneering contributions: The agglomerations result from the cumulative action induced by the presence of local external economies. External economies are incidental and the spatial structure of the economy is determined by processes of invisible forces. There is little space for public policies.
Business economics	M. Porter	Emphasizes the importance of geographically restrictive external economies, concentration of highly specialized skills and knowledge, institutions, competitors, related activities and sophisticated consumers, also in international competition. Local strategies are part of the business strategy. The government must provide education, physical infrastructure and rules for competition.

Regional Economy	A. Scout	Economic geography and industrial performance are interrelated. There is an endemic tendency in capitalism in the direction of local clusters that are constituted in intensive regional economies and in transactions that, in turn, are linked by structures of dispersed interdependence. The construction of competitive advantages lies in the extra market coordination and public policies.
Innovation economy	D.B. Audretsch	Local proximity facilitates the flow of information and the dimension of knowledge. Economic activities based on new knowledge are likely to be grouped into geographical regions.
Small businesses and industrial districts	H. Scmitz	In addition to the incidental or spontaneous local external economies, there is a strength derived from the consistent cooperation between private agents and the public sector. The concept of collective efficiency combines the spontaneous effects (unplanned) and those consciously sought (planned), and is defined as the competitive advantage derived from local external economies and joint action.

Source: recovered from (Roldan, 2019, page 14).

Beyond the reasons for the initial location of a cluster, once the specialization pattern is established, cumulative trade gains are generated. There is a strong path dependence in the patterns of specialization and commerce. Commerce and location are integrated. When an industry has a leading development within a region, that region will continue to specialize in that industry Quintanar and Gatto (1992), the Italian industrial districts were characterized as small and medium industrial firms with successful recent experiences for their dynamic development and highly competitive internationally that they managed to harmonize (Gala, 2005).

According to Rebelloti (1995) this model was constructed from the presence of four main characteristics. In the first place, it was constituted by small and medium-sized companies that were geographically concentrated and specialized sectorially. Second, they established ties back and forth based on the exchange of goods, people and services both by means of market mechanisms and outside of it. Third, these companies were characterized by having common cultural and social backgrounds that favored the creation of codes of conduct both explicit and implicit. Finally, they were characterized by the presence of a network of local institutions, both public and private, that supported economic agents within the cluster (Gala, 2005, page 15).

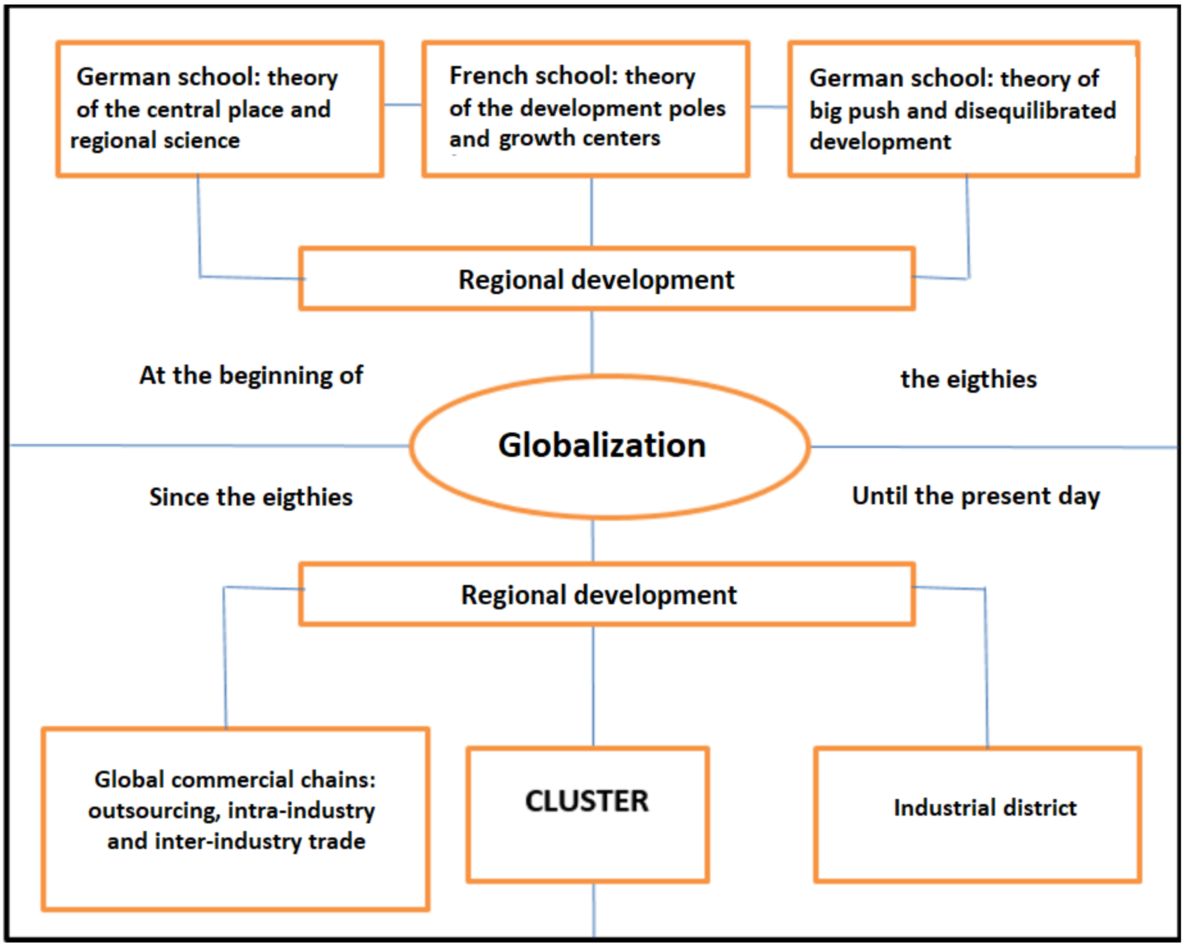
The focus of global value chains looks at the recent changes in production systems, distribution channels and financial markets, which gained speed as a result of the globalization of product markets and the spill of IT technologies, suggest that it is necessary pay more attention to external linkages. In this regard, the approach of global value chains allows to account for the activities that occur outside the cluster and, above all, to understand the meaning of the relationships of local producers with the main external actors. This approach is nourished by two theoretical sets (Pyke, 1998, Helmsing, 2001 and Nadvi, 1995).

On the one hand, it uses the literature on industrial clusters to account for the role of local institutions and networks in strengthening the conditions for the upgrading of local producers (Gereffi and Kaplinsky, 2001). On the other, it applies the literature on value chains to emphasize how the role of global buyers and the way of organizing the value chain define the opportunities for modernization of local companies. This model, as developed by Pietrobelli and Rabelloti (2004), is based on four elements: value chains, governance, upgrading and tactical knowledge (Gala, 2005, page 17).

On the other hand, Gordon and McCann (2000) suggest three basic types of industrial cluster: 1) The classical model of pure agglomeration, based on Marshall's ideas and characterized by the absence of cooperation between agents, free membership and the importance of the co-location. 2) The model of the industrial complex, characterized by the existence of stable and identifiable relationships between companies, which give rise to a closed club, and the need to share the same location in space. 3) The model of the social network, based on the strength of social interactions between companies, in which personal trust plays a preponderant role and where membership is not completely free although it is not a completely closed club.

Spatial localization is not essential, although it favors the establishment of the bonds of trust that sustains the network (Regional Quantitative Analysis Research Group of the University of Barcelona, 2005). Thus, we see how both the sectoral dimension and the geographical dimension play a fundamental role in the definition, although the problem arises when it comes to delimiting both dimensions. Although for this Porter mentions that the delimitation of a cluster is often a matter of nuance. Involving a creative process that must be determined by knowledge of the links and complementarities between companies and institutions (Figure 1).

Figure 1: Table 2. Theoretical approaches and cluster development



Source: own elaboration from (Garnica& Contreras, 2007).

3. CLUSTER AS DEVELOPMENT STRATEGIES

For Latin America, Altenburg and Meyer-Stamer (1999) propose a typology of clusters with three different characteristics: those of survival, composed of micro enterprises and small businesses that generate low quality consumer products for local markets, have a low degree of labor force specialization; the clusters that produce for the massive consumption, that prospered in the stage of substantive industrialization of imports, whose production destined it to the national market; and the clusters that supply transnational corporations (Corrales, 2007, pp. 190-191):

A. The survival clusters were developed in poor areas and are dedicated to the manufacture of shoes, furniture, clothing, among other products and services. Altenburg and Meyer-Stamer (1999) and Altenburg (2001) found imitation practices among their promoters, low levels of education and trust, as well as predatory and opportunistic attitudes.
B. The clusters that produce massively to the national market are constituted by medium and large companies with good administrative organization and technological capacity. These clusters lack technological innovation, with the exception of their suppliers, who buy automated machinery with state-of-the-art technology.
C. The clusters formed around the transnational companies carry out a set of activities more technologically complex, such as the assembly and manufacture of parts for the electronics and automotive industry. Given the technological level with which they operate, there are many barriers to the entry of local companies as suppliers or subcontractors.

Another way to develop a cluster is through sector analysis Porter (1998) cited in (Garnica & Rivero, 2004, pp. 145-146) which is to understand the competition is the sector. A sector (manufacturer or service) is a group of competitors that manufacture products or provide services and compete directly with others. Sectors differ from the nature of competition and not all sectors offer the same opportunities to achieve sustained profitability. The second essential issue in the strategy is the positioning within the sector. Some positions are more profitable than others, regardless of what the average profitability of the sector may be.

Although it is worth mentioning that according to (Garnica & Rivero, 2004) there are studies mentioning that the sectoral analysis is limited because it concentrates on quantitative or statistical aspects, therefore, qualitative interconnections linked to knowledge flows arising between inter-network networks are neglected. business, focuses only on groups of companies producing similar final goods, are not considered links that the company can create with customers, suppliers and specialized institutions, there are doubts about whether the companies that make up the sector can establish cooperation ties with their rivals and seeks diversity in existing industrial trajectories, rather than synergies.

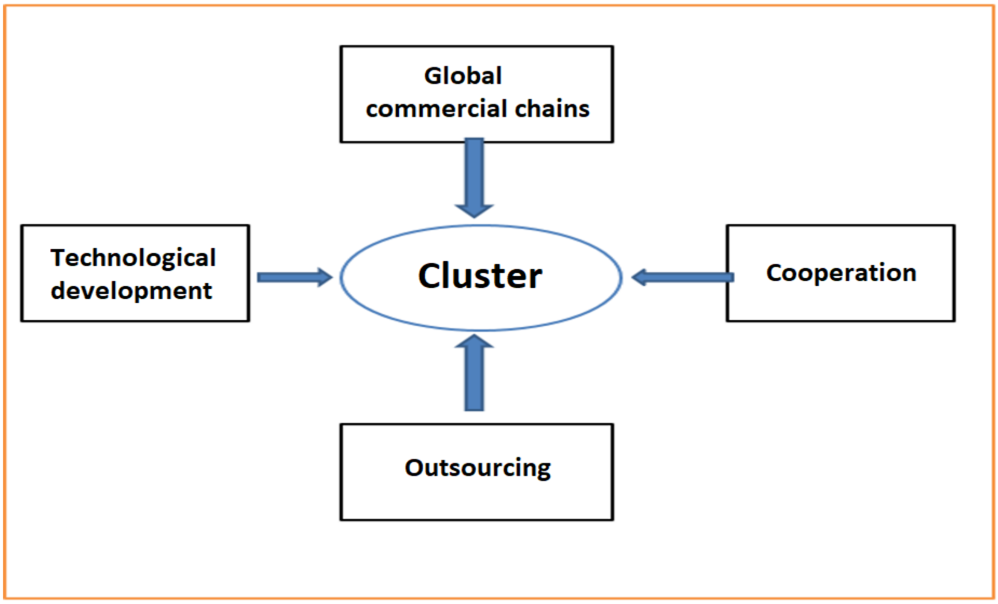
A central element to consider the analysis of the cluster is that of inter-company networks. A network is defined as: a set of explicit, selected links with preferential patterns that occur jointly of companies based on complementary advantages and market relations, with the static and dynamic reduction of uncertainty as the main goal (Freeman, 1991: 501) cited in (Garnica & Rivero, 2004, page 150), where this type of networks arises for several reasons:

a) Need to coordinate processes of productive and technological specialization of companies
b) Rapid and widespread introduction of new information and communication technologies
c) Rediscovery of the influences of static and dynamic externalities) in the different members of a group.
d) Decrease in the trend towards vertical integration and boom in outsourcing processes

Social and institutional innovations that contribute to the solution of complex socio-economic problems, that neither the market nor the company can offer an adequate response

An important element for the emergence of the cluster is cooperation and this is achieved through networks and trust ties, because this reduces transaction costs and generates linkages (see table 3).

Table 2. Determining factors for the operation of the cluster



Source: own elaboration from (Corrales, 2007).

Clusters are not the magic formula for economic growth and sustainable regional industrial development, but in several parts of the world they have yielded results and generated economies of scale. The proximity between companies and the establishment of institutions and processes to support industries within a specific geographical area has advantages. Some of them include the proximity of raw materials and markets, a constant supply of skilled labor and the support of institutions and government. There are also elements that can hinder the growth of geographically agglomerated companies, the model of development through clusters also has considerable disadvantages (Martin and Sunley, 2003, Pacheco-Vega, 2004, Palazuelos, 2005). The negative aspects include the increase in competition between companies (predatory behavior), both in the aspect of final customers and in terms of the availability of skilled labor (Pacheco-Vega, 2007).

The popularity of the clusters is due not only to the Italian literature and its analyzes of the economic boom and the industrial regional development of the Third Italy (Becattini, 2002, Grandinetti and Tabacco, 2003, Paniccia, 1998, Rabellotti, 1995), but also to the interest in Saxon literature by industrial groupings (Feldman et al., 2005, Harrison, 1992, Porter, 1998, 2000, Quadrio-Curzio and Fortis, 2002) (Pacheco-Vega, 2007). The spatial distribution of the cluster feeds the commercial and non-commercial relationships and also generates resource supply indirectly to some sub-sectors of the related economy. The emergence of a cluster is part of the process of restructuring the economy in the focused delegations of a city (Mercado & Moreno, 2011).

4. CONCLUSIONS

Although all the theoretical approaches to the concept are relevant, we can conclude that several authors coincide in the assumptions and some parts of the conceptual definition subtracting a simple definition is that the cluster is a group of companies that perform in the same activities or activities closely related both backward, forward and sideways. The cluster according to the authors cited can be a natural or artificial, natural regional development strategy like the one that has already been formed due to supply and demand and the artificial ones created through public policies to encourage the development of a region.

Although several theoretical approaches have been analyzed, it is pertinent to mention that all of them subscribe to this topic of relevance, the cluster cannot be defined by means of a focal lens or through a perspective.

For future empirical research it is necessary to start from the theory because there are empirical studies that do not give great value to the theory, this being the support of knowledge generated through the application in case studies.

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