The Concept of Cluster and Its Implementation in Regional Development Strategies

József BENEDEK
„Babeş-Bolyai" University, Cluj-Napoca, Romania

Introduction

The elaboration of the theory of clusters is implicitly related to the name of Michael E. Porter, who, in his paper entitled *The Competitive Advantage of Nations*, published in 1990, developed a microeconomic theory of the national and local competitivity, in which theory clusters play the central role. The theory and its main concept, the cluster, bring forward a series of prescriptive-strategic values, more and more intensively used as normative models of regional development. Therefore, the forming/creation/building/setting up of some networks, or/-clusters- of production and services, strongly integrated into the local and regional context, rank among the main objectives of regional development. The decrease in the importance of the distance factor through the development of modern transportation and communication systems eliminated a serious obstacle for the development of some production relationships between settlements and regions at a long distance one from another. Despite this, the most intense relationships are still the ones established within spatial agglomerations, as well as the ones within the local and regional clusters of production. In what the latter are concerned, the costs for production can be reduced by situating the providers and producers in the spatial proximity, by creating clusters, meaning by concentrating spatially the production relationships.

In this research article we will synthesize the main ideas concerning the theory of clusters having the fact that, in Romania, the regional and/or local strategy of development based on the concept of a cluster is now in its initial stage of elaboration.

The theory of clusters

The elaboration of the theory of clusters is implicitly related to the name of **Michael E. Porter,** who, in his paper entitled *The Competitive Advantage of Nations*, published in 1990, developed a microeconomic theory of the national and local competitivity, in which theory clusters play the key role. The main idea is that the role of spatial localizations in the process of development is diminished not even under the influence of globalization. This offers the companies/firms the possibility to obtain the necessary capital or technology from long distances and to choose the optimum location. Accordingly, distance does not constitute a first rank factor of localization anymore. Nevertheless, Porter considers that the comparative advantages of a firm or of an economic sector do not consist in their inner, but in their outer space, precisely within a specific localization/location, that of a cluster (M. Porter, 2000). Basically, the theory of clusters carries on the tradition of the sector raising poles, initiated by F. Perroux, defining **clusters** as "geographical concentrations of interconnected firms, specialized providers, services, firms of associated industrial branches and various institutions (universities, agencies, commerce associations etc.) parts of particular fields both in competition and cooperation" (id., p. 253). Clusters constitute new elements of the economic space that reflect the major changes, which occurred since the 80's of the last century, towards developing a dynamic and complex economy, based on knowledge.

As it stands from the definition mentioned above, clusters are constituted from a series of elements represented by different organizations and institutions:

- economic organizations and institutions: multinational firms that are locally or regionally dominant, which constitute poles of clusters formation, firms that provide raw materials, products and services, firms that produce complementary products, financial institutions, commerce associations, chambers of commerce etc.;
- private or state institutions that provide special infrastructure (education, research, transportation and communication etc.): central public administration, local public administration, development agencies etc.;
- Not-for-profit organizations.

Therefore, the cluster is a wider concept that crosses the borders of the economic sphere, including a series of social and political institutions involved in the process of development. The component elements of the clusters are difficult to be empirically identified because they appear in statistics as part of sector categories (various industrial branches and sectors of services) that do not reflect the existing relationships between different firms or sectors of activity.

The **spatial extension** of clusters extensively differs from the inferior scale level represented by settlements, to the superior one, constituted by groups of states. This flexibility results from the fact that the limits of clusters are determined by the relationships and complementarities established between different organizations and/or economic sectors, as well as by the intensity of dispersion and its effects upon productivity and innovation (id.).

There are no prescribed or causal patterns for the **creation of a cluster**. What is important is the existence of a critical density threshold reached by firms and other organizations and institutions. This can be differently generated: by vertical disintegration of big companies, which hand over some production phases and/or some operations (outsourcing) to other firms, or by horizontal disintegration (spin-off), case in which some managers give up their initial companies and build new ones, who maintain a series of relationships with the original firms and with their subcontracting parties. The dynamics of clusters, implicitly of its limits/borders, is determined by the evolution of its components, of great importance being the dynamics of firms and industrial branches, to which we can add the development of technologies, markets, communications and transportation. The evolution of these alters the relationships between the elements of the clusters, allows the creation of new relationships, determines the disappearance of some old ones and modifies their intensity and spatial orientation. Consequently, clusters can be considered both distinctive spatial categories and special inter-institutional cooperation forms that ensure global competitivity to a region.

The **relationships** within clusters are characterized both by cooperation and competition. Firms and organizations wish to cooperate only to a certain level and under certain circumstances inside a specific economic branch. Cooperation between firms is based on a series of issues, common necessities, common risks and obstacles. Thus, the mutual organization of some activities such as provision, subcontracting, marketing, commerce/trade, commonly using some factors of production like workforce, infrastructure, and knowledge, changing information, products and services allow the reduction of the production costs. Porter mentions that firms or other organizations and institutions are not always fully aware of the fact that being within a cluster, they do not consciously develop relations of collaboration in all cases.

Porter suggests the usage the concept of **competitive advantage** instead of that of comparative advantage (minimizing the costs for some production factors like capital and work, advantages offered by scale economy) that cannot explain regional specialization. Competitive advantages group together those factors that allow the firms in a region to be long term and globally competitive (innovative capacity, using some cheaper factors of production etc.). Development is not explained by comparative advantages, but through **competitivity,** expressed by **productivity** and it can be measured through generated incomes, work productivity, level of active population etc. Economic sectors know a different dynamic of productivity. This grows more rapidly in the sectors that produce for export or global markets due to the large competition and dimensional economy, both of them influencing the continuous technological innovation, while the productivity of the sectors oriented towards local and regional markets grows slower (including services for household), due to the smaller

competition and request. As for the regional level, productivity and competitivity of a region, these are influenced by the interaction between more factors (id.):

- the characteristics of *input* factors: a) quantity and cost of the factors of input: natural resources, human resources, capital resources, physical infrastructure, administrative infrastructure, informational infrastructure, scientific and technological infrastructure; b) quality of the input factors; c) specialization of factors;
- the strategies of the firms and the local conditions for competition that determine the price of the products of the firm and the efficiency of production. The strategies are constituted of two parts: the operational efficiency, which is the way in which firms adopt the best production international practices, use new technologies and adequate techniques of management. To these the types of strategies used in competition are added: choosing the combination of *input* factors, diversifying production etc. the local competition conditions refer to the local business environment: transport infrastructure, modality of adjusting, legislation etc., which can consume resources without directly contributing to production. In case of advanced economies, the characteristics of business environment are related to clusters (pole of qualified workforce, universities, and specialized providers) respectively related to judicial and political factors, hence to localization. The latter especially influences the increase of productivity, which happens the moment that, at a macroeconomic level, the abilities are improved. At a macroeconomic level (legislation, policies) it is established the frame of both potential productivity growth and investments;
- the request conditions displayed by the existence of sophisticated local consumers and of a local demand separated into special segments and that can be globally satisfied;
- the presence of local providers and of some associated and competitive industrial branches.

There are three ways in which clusters can influence the competitive advantages resulted from the factors presented above (id.):

- the increase of static productivity, meaning firms and clusters, by:
  - ✓ superior access to specialized *inputs* and workforce. The activity of production becomes more profitable if local competitive providers are present;
  - ✓ superior access to information and knowledge. The flux of information and knowledge within clusters is more intensive due to proximity, technologies and personal relationships based on trust. Therefore, a special importance is given to informal relationships between firms, based on trust, and to informal human relationships that create non-commercial interdependencies.
- complementarities between the activities of participants. The success of an element within a cluster depends on the competitivity of the other constitutive elements;
- access to institutions and public goods, like infrastructure, qualified workforce, knowledge, etc;
- stimuli resulted from measuring its own and the other participants performances having the possibility to make comparisons between firms that dispose of external conditions for similar business, thus the differences between performances stay within them. Under these circumstances, the financial sector monitors more efficiently its customers, loans becoming more efficient;
- increasing the innovation and productivity capacity of the firms. Firms within clusters more easily perceive both the necessity and the opportunity of innovation, these being easily transformed into competitive advantages. The pressure of local competition constitutes another propeller for innovation. On the other hand, there can appear negative phenomena as well; meaning that within clusters there can be created macro-cultures, homogenous mental models, which constitute impediments for innovation;
- stimulating the creation of new firms, through which innovation and development of the cluster is supported. Thus, clusters provide better information about opportunities, even the existence of the cluster itself being an opportunity. Input

obstacles within a cluster are less significant than in other places, due to the concentration of input factors and the existence of a local financial sector that efficiently monitors its customers.

Production relationships

Production relationships between settlements situated within clusters result from the spatial distribution of production units from different sectors of economy. Considering that two thirds of the total number of economic transactions, as indicator of production relationships, take place between firms (M. Storper, 2000), concentrated in large and middle-sized urban centres, this results in a significant geographical concentration of firms, production and production relationships as well. Although reducing the importance of the distance factor by developing modern systems of transport and communication took off a serious barrier against developing some production, relationships between settlements and regions at a long distance, the most intense production relationships remain the ones established within a spatial agglomeration, as well as within local and regional clusters of production.

There are three different production relationships between firms (Dicken, Lloyd, 1999): proper production relationships, provision relationships, and services and marketing relationships. Thus, the position held by the firms in the production process is important, the most intense interactions being present between firms with a complementary profile: relationships concerning provision of raw materials, materials or parts of an assembly, consulting services, advertising, financial services, etc. A third of the production relationships of firms are supported by the final consumers (households) towards which goods and different services are delivered. Since consumers are spatially highly concentrated (urban regions) it means that the most intense relationships between firms and consumers will be established within these regions, respectively between the regions and settlements situated outside the large urban regions, but in which production takes place and the urban regions, as well.

Downstream relationships are mostly determined by transportation costs, which, in the last decades, have had a general tendency to decrease (M. Storper, 2000). Much more, the characteristics of the demand altered, fact that impelled locating the firms nearby outlets, respectively spatially concentrating production relationships downstream. Upstream relationships are more complex and expensive, especially in the case of industrial branches with a complex and fragmented division of labour. Costs can be reduced through locating providers and producers in the spatial proximity, through the building of clusters, that is, spatially concentrating production relationships.

The classification of production relationships do not reveal an important aspect of the relationships between firms, and which do not only consist in *input-output* type relationships, based on contracts, but they comprise informal or indirect relationships between them as well. These non commercial interdependencies are constituted from the dispersion (*spill-over)* of knowledge, ideas, human relationships etc. These are especially important for industrial branches with not standardized and fast technological changes. These non-economic relationships, based on trust, are difficult to be operated and quantified, but they partly explain the formation of some spatial concentrations like clusters or industrial districts.

The typology of clusters

The typology of clusters can be established by using more criteria (after Buzás, 2000, with modifications). Thus, by the criterion of spatial scale we can identify three clusters:

- macro-clusters;
- regional clusters;
- micro-clusters.

As we noticed above the extension of clusters is determined by the amplitude of the intensive cooperation and competition relationships established between different firms and organizations.

According to the level of development of clusters we distinguish:

- developed clusters, found in the advanced economies, with a high potential of innovation (research-development), and globally competitive. Even their components, taken separately, like firms, are globally competitive;
- increasing clusters, found in depressed markets, with a stable but incomplete structure. The potential for innovation is not enough for becoming globally competitive;
- potential clusters, based on dynamic and competitive firms, having some increasing research-development activities, and presenting general favourable conditions for building up clusters;
- latent clusters, in which the economic actors are present, but the possibilities for accessing international markets are not developed, and, consequently, they lack in the engine of developing clusters.

According to the modality of organizing clusters we have:

- integrated and global system related clusters, which organize themselves around a multinational corporation, relying on global factors;
- natural resources based clusters. They comprise smaller, innovative firms that provide research-development activities;
- political clusters, created by the state as a means of developing some strategic industrial branches;
- relationship clusters (the clock industry in the region of Jura, Switzerland);
- technological clusters (Silicon Valley);
- dynamic clusters (The Third Italy) of high adaptability.

M. Storper classified even the various models of development and localization based on the production relationships established between firms and consumers. Therefore, according to the costs involved both by upstream relationships (transactions, externalities) and downstream ones (transportation costs and the costs involved by transactions to market) different spatial models of localization result between the extremes represented by concentration and isolation (Storper, 2000):

- isolated, dispersed factories, situation in which transportation costs and transactions towards the market as well as upstream transactions, the externalities and dispersion effects are insignificant;
- isolated factories located in market areas, case in which the costs for market access are higher, and the costs of upstream relationships remain low;
- interconnected clusters, case in which transportation and downstream transaction costs are low and externalities, spill-over and upstream costs have high values;
- isolated clusters located in market areas, while the costs for market access increase, the characteristics of upstream relationships remain unchanged as compared to the previous type;
- big and dispersed factories, large interconnected clusters, while the access to market is smooth, upstream transaction costs are of medium level;
- under the same circumstances, but with a rather more difficult access to the market, big interconnected factories appear;
- In the same conditions, but with a more difficult acces to market, big factories appear in market areas.

To conclude, clusters represent the best alternative for locating the economic activities, offering the firms within them a series of comparative advantages, by offering better conditions for increasing productivity, by the existence of a bigger innovation capacity, by the presence of competitive providers, a developed infrastructure, diversified workforce etc. even if the costs of the input factors or the taxes within the clusters are higher than those in the periphery areas, the total costs of the system, resulted from the comparative advantages, are smaller.

The main **critics** to the theory of clusters underline the status of clusters, these being considered simple reflections of the evolution cycle of (the) industrial development (Glasmeier, 2000). The new and dynamic firms of the informational intense sectors, like biotechnology, indeed have a tendency towards agglomeration, but only in their early stages of evolution. Later on, though contradictory to the basic logics of the theory of clusters, a spatially diffused development begins. Instead of focusing our analysis on the grouping together of the economic activities, an analysis of the concentration of some professions and professional abilities and

the diversity of information and institutions is being suggested (id.). The process of collective learning, which represents the pillar of innovation and change, depends on routine, and the latter rather gives an interpretation of the past, reproducing old relationships, than anticipates the future by changing the existent relationships. Much more, the model of cluster development can be applied only to the complex economies, on which the creation of new markets and industrial connexions rely.

Bibliography

Buzás, N. (2000), „Klaszterek: kialakulásuk, szerveződésük és lehetséges megjelenésük a Dél-Alföldön", în *Tér és Társadalom*, 4, 109–123.
Glasmeier, A. K. (2000), „Economic Geography in Practice: Local Economic Development Policy" în: **Clark, G. L., Feldmann, M. P., Gertler, M. S. (ed.)**, *The Oxford Handbook of Economic Geography*, Oxford University Press, 559–584.
Dicken, P., Lloyd, P. E. (1999), *Standort und Raum – Theoretische Perspektiven in der Wirtschaftsgeographie*, Stuttgart, Verlag Eugen Ulmer.
Porter, M. E. (2000), „Locations, Clusters, and Company Strategy", în: Clark, G. L., Feldmann, M. P., **Gertler, M. S.** (ed.), *The Oxford Handbook of Economic Geography*, Oxford University Press, 253–274.
Storper, M. (2000), „Globalization, Localization, and Trade", în Clark, G. L., Feldmann, M. P., Gertler, M. S. (ed.): *The Oxford Handbook of Economic Geography*, Oxford University Press, 146–168.