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Industrial and Innovation Clusters: Development in Russia

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ABSTRACT

The basis for the successful development of industrial-innovation clusters is “a symbiosis of cooperation and competition”, taking into account the positive synergy effects of territorial agglomeration. Sustainable partnership interrelated business entities may have potential that exceeds the simple sum of their capacities. The increase in capacity is the result of cooperation and effective use of capacities of partners in the long period. Due to the competition between participants of industrial-innovative cluster system as a whole is optimized, and through the exchange of information, experts, technology is the process of development of the system, including, the flow of financial resources to the sector that is most needed for the development of the cluster. The main advantages of regional economic systems, organized according to the scheme of the cluster. First of all, note that the cluster approach gives the authorities the tools for effective interaction with business. The representatives of the administration in the work of the coordinating Council of the cluster enables the authorities to directly influence the adoption of organizational and economic decisions in the cluster, acting as an equal partner. The cluster allows to identify the problems and strengths of a sector of the economy. Coordinating Council (representation) of the cluster has credible information of activity of the enterprises. The formation of the cluster leads to increase of efficiency of activity of small enterprises.

JEL Classifications: P25, P28, R1, R12.

Keywords: Cluster, industrial innovation cluster, resource management, regional resources, infrastructure.

1. INTRODUCTION

The basis for successful development of clusters is a “symbiosis of cooperation and competition”, taking into account the positive synergy effects of territorial agglomeration. Sustainable partnership interrelated business entities may have potential that exceeds the simple sum of their capacities.

The increase in capacity is the result of cooperation and effective use of capacities of partners in the long period. Due to competition between members of the cluster system as a whole is optimized, and through the exchange of information, experts, technology is the process of development of the system, including, the flow of financial resources to the sector that is most needed for the development of the cluster (Zakharov, 2006).

As a theoretical and methodological basis of research were used by Russian and foreign monographs, scientific articles and experts in the field of management of enterprises, production complexes and clusters of various types.

When doing research as a complex of methods was applied dialectical studies, systematic and logical analysis and synthesis.

2. CONDITIONS FOR THE EMERGENCE AND FUNCTIONING OF INDUSTRIAL-INNOVATIVE CLUSTERS

Businesses and organizations that comprise the cluster in most cases are independent economic entities, and competition inside the cluster – not less than an important driving force for the development of the cluster as a whole than cooperation. In the course of regular small conflicts (competition inside the cluster), the overall system is optimized and increases your opportunities to participate in global competition. At the same time the dissemination of know-how, and various technologies (including organizational) throughout the system of relationships in the cluster. These innovations are quickly becoming a factor of production in many firms, is processed in relation to market strategy for specific companies and, in turn, lead to a new round of innovative development. Constant interaction and information exchange within the cluster lead to the adoption and dissemination of internal systems constraints, which are expressed in the standards and standard procedures. The spread of technology and standard procedures leads to the development of the system of professional training and facilitates the movement of staff between business entities, which in turn leads to further dissemination of knowledge.

Two Basic Approaches to the Formation of Industrial Innovation Clusters

In the world experience it is possible to allocate two basic approaches to the formation of industrial innovation clusters:

- classical liberal (Anglo-Saxon) approach proposed in the 80-90-ies by M. porter and is based on the self-organisation of economic agents in the mechanisms of the “free market”. The use of such mechanisms does not involve direct government intervention and/or support.
- modern European approach, called “poles of competitiveness”, developed since 2006 in France and based on partnership between business, Central and local authorities. The state is interested in the global competitiveness of its economy and to achieve a “pole of competitiveness” world-class,

resulting in the provision of various forms of state support. Such support is provided in the framework of realization of strategy of development of territories.

This shows that the actual cluster is different from the analytically allocated to the aggregate of geographically close companies and organizations. As shown by V.V. Nikitaev, Deputy Director of the Department of Economic Analysis and forward Planning Minpromenergo of Russia, a conglomerate (“analytical proto-cluster”) can be a real cluster under the following conditions:

- the availability of appropriate infrastructures;
- existence of documented organizational and communicative structures that perform administrative (local government) functions and ensure the formation of the innovation community as a subject of development of the territory acting in partnership with businesses, Central and local authorities;
- refinement of the cluster in the framework of industrial and regional policies of the Central authorities adopted the local innovation community;
- the use of new managerial technologies.

In General, the emergence of the cluster, with rare exceptions, is carried out spontaneously, under the influence of a combination of certain factors, including the fundamental can be recognized entrepreneurial initiative. The basis for the formation of clusters is the ability and/or need to be shared by many business entities of one or more unifying factors, such as: basic technology, marketing channels, product promotion, training system, system of generating know-how related to a single product direction.

Stage of the Life Cycle of Industrial-innovative Clusters

Any cluster goes through a number of stages. They may not be the same for all clusters, and the rate of their development can vary. However, there is the internal logic of the way in which clusters develop, which makes it possible to distinguish some characteristic of the model. Even though the precise shape and direction will depend on the specific circumstances, the cluster goes through the following life cycle stages:

1. **Agglomeration:** Stage at which in the region there are a number of companies and other actors.
2. **Emerging cluster:** At this stage, some participants in the agglomeration start to cooperate around a core activity and realize common opportunities through their linkage.
3. **The developing cluster:** In connection with the appearance or involvement of new participants in the same or related activities in the region, at this stage there is an emerging link between all of these new players. Can appear formal and informal institutions sustain cooperation. Often begin to have names, web sites, General content related to the region and activity.
4. **A Mature cluster:** Stage in which a Mature cluster has reached a certain critical mass of actors. He has also developed ties beyond its borders, to other clusters, activities, regions. There is an internal dynamics of the creation of new firms through their formation of a joint venture by the Department.
5. **Transformation:** This stage is characterized by the fact that over time, markets, technologies, and processes change, as well as clusters. For a cluster to survive, be sustainable, avoid stagnation

and decay, it is necessary to produce innovations and to adapt to changes. It can choose the form of transformation into one or several new clusters that focus around other activities or simply to change the ways in which supplied products and services (Kravtsov, 2010).

The cluster feature is that it is not issued as a single legal entity and is not a single economic entity. The very emergence and development of the cluster in some cases is carried out in accordance with a certain scenario (for example, in the case of active participation in the development of the cluster authorities). Quite often the joint planning of economic activity by groups of economic entities, temporarily uniting for the implementation of joint projects.

It is fair to argue that the development of a potential cluster requires active intervention of the authorities interested in increase of efficiency of economy of the territory. In some cases, effective cluster development requires little effort, others require the implementation of large-scale projects.

Another important factor for the emergence and existence of the cluster is the geographical localization. Localization of the basic participants of the cluster, as well as transport and communications infrastructure to determine the possibility of interaction between participants of cluster cooperation, exchange of technology and ideas, and trained staff. At the present time in connection with the development of transport networks and modern means of communication (Internet, email) boundaries of the clusters expand.

3. A COMPARATIVE ANALYSIS OF APPROACHES TO THE ORGANIZATION OF INDUSTRIAL-INNOVATIVE CLUSTERS

M. Castells suggested a typology in which regional cluster is a phenomenon of the postindustrial economy or information capitalism. The postindustrial economy is characterized by the fact that “productivity and competitiveness factors and agents in this economy (be it firm, region or nation) depends primarily on their ability to generate, process and efficiently use information based on knowledge”.

Feature clusters, unlike other types of meso-economic systems, such as industrial complexes is the predominance of the structure of small and medium businesses (Ekimova & Fedina, 2009). As you know, the fundamental condition of existence, in some parts of the clusters is the presence of the production base, a critical mass of successful enterprises. However, this is a necessary, but not sufficient condition. The critical mass of production must implement the advantages of saving from the relative position and scale. In other words, efficiency and competitiveness are achieved through cooperation, i.e., coupling.

Consequently, clusters, like any system, have two main characteristics: elements (entities) and their relationships (vertical and/or horizontal).

L.S. Markov in his works devoted to clusters, identifies four distinctive symptom clusters:

The multiplicity and interrelatedness of

- critical mass of small and medium business;
- competition and cooperation (Kulikovsky, 2009);
- social embeddedness.

One of the key problems of implementation of cluster policy is that the cluster exists in the region, while the actors are independent of the company.

Approaches to Development of Territories in Different Socio-economic Systems

Approaches to development of territories in different socio-economic systems differ in the following:

- in conditions of centralized planning and management of regional projects are implemented solely on the basis of articulated government priorities and preferences as well as on the basis of established for the norms, rules and establish price ratios;
- in an economy based on market principles, implementation of regional projects is not only based on state priorities and preferences, but also on market forces and regulators (and, especially at the price proportions established by the market). The degree of freedom of the state is determined by the market environment (Sozinova, Novikov, Kosnikov, Nemchenko & Alenina, 2016). Its main task – to eliminate the “failures” of the market, to develop and maintain those areas that will improve the competitiveness of the economy.

In the first case, – the substitution of market forces and regulators, and the second embedding and addition with the purpose of realization of the national priorities and preferences. “The government should strengthen the growth of existing and emerging clusters and help them, rather than trying to create entirely new clusters. ...Most clusters are formed independently of government action – and sometimes in spite of these actions. Clusters occur where there is a base of local advantages to build them. To validate the development efforts of the cluster requires that certain germs in the cluster have been tested by the market...”.

However, again noted above, a cluster approach is largely normative: there are competitive environment and the wise, all-seeing and compassionate government. At the same time in the conditions of transformed economy, the formation of competitive environment and sound economic policy requires a considerable time. The main reason is the incompleteness of the system of norms and rules that structure the interaction of economic agents. Hence the crucial feature of the implementation of major projects in the conditions of incompleteness of rules and regulations – the possibility of distortion of perceptions of economic efficiency.

Territorial-production Complex

Category clusters associated with common in Russian economic literature the notion of complexes, territorial production.

Territorial production complex (TPK) is a combination of various technologically related industries General industrial and social infrastructure and includes the entire manufacturing sector, concentrated in a limited area, sharing resources and a single infrastructure .

The use of common production and distribution infrastructure enables all companies that are part of the TLC to obtain savings, but also creates opportunities for industrial cooperation. Thus, the presence of intra-industry and inter-industry interactions and obtaining emergent effect of agglomeration are common to clusters and TPK properties. And clusters, and TPK take advantage of horizontal and vertical integration (Izmest'ev, 2009).

The main difference between them lies in the coordination mechanisms (Table 1). Clusters are the product of the market approvals, minimizing transaction costs of its members and is creating additional competitive advantages. The cluster is usually formed from the bottom up, when the enterprises increase their competitiveness need to come to the Association. TPK - product of planned centralized management. As a category of the planned economy, it served as a tool of territorial distribution of productive forces and has been focused on the relationship of the structure of production with the economic resources inherent in the region.

Table 1: A comparative analysis of approaches to organization and industrial complexes

<i>Features</i>	<i>Territorial production complex (TPK)</i>	<i>Industrial cluster</i>
1. Emporary “Assembly point” concept, description	Occurs in the Soviet Union in the era of scientific and technological revolution (1950 - 60s). in the active recovery of the economy after the great Patriotic war and development of new resource territories	Occurs in the United States in the mid-1980s, and then developed in the countries of Western Europe (the most successful examples are Finland, Sweden) and the Pacific (Japan, China)
2. Political conditions	Construction of socialism	Capitalist relations
3. Geopolitical importance	Priority: the formation of “reference sites” for the development of defense capabilities in the context of the arms race and the cold war, the basis for the construction of resource Economics	Primary task: the capture of new markets and the formation of a unified semantic space on a global scale (Chernoutsan, 2008)
4. Economic conditions	The lack of competition, the planned economy, specialization nationalized industries	Competition, market economy, inter-industry diversification of private enterprises
5. Formation and control	Planned formation, policy management	Independent formation under the action of market forces “cluster initiative” (organized attempt to increase growth and competitiveness in the region, involving cluster firms, government and/or research institutes)
6. Interaction with society	The city-forming function, the creation of conditions for full employment, social infrastructure around the manufacturing core of the region, the development of science, education, and training of specialized personnel (Pilipenko, 2006, p. 138-142)	The provision of new jobs, increased social welfare and improvement of the territory, the development of science and education
7. Specialization of production	Heavy industry, mechanical engineering, production of means of production; – agricultural enterprises; focus on the manufacturer	High-tech industries: information and communication technology, electronics, electrical, medical drugs; the prevalence of innovative production; customer orientation.
8. Nature management, resource saving	Bet on the extensive development of the territory of the whole country with intensive development of individual production sites; reducing the impact on the natural environment due to spatial localization and efficient use of resources.	Bet on intensive development of each cluster and the region as a whole in extensive capture markets, the rate of active import and export; ecologization of production as a factor in the commercial success of a product
9. Space constraints	The concentration of enterprises in a limited, be sure to compact area to improve handling and connectivity TPK; TPK was created in undeveloped region with difficult conditions, being, thus, an Outpost of the further development of territory	Clusters are formed in developed areas, typically in large urban areas, using already existing production, i.e. transition to a clustered organization of production in the region means, as a rule, the closure of extensive stage of development and transition to intensive
10. Interaction of the components	Interrelatedness, interdependence (for the successful implementation of the plan)	Co-organization of the actions of independent participants of the process (to improve competitiveness); intensive exchange of information between the participants
11. Openness, the connection with the global economy	Not implemented; TPK has been focused on domestic economic needs; were often associated with secret (“closed cities”)	Mandatory requirement; transparency of economy and budget activities in the region is one of the priority conditions for the formation of the cluster; integration into the global market is one of the conditions of his success (Pilipenko, 2005, p. 491-502)

<i>Features</i>	<i>Territorial production complex (TPK)</i>	<i>Industrial cluster</i>
12. Risks	The emergence of the “avalanche of errors” in the General guidelines, the environmental disaster in areas of intensive industrial development as a result of irrational planning, reduction of product quality due to the lack of motivation of the individual worker	Market risks associated with “dirty” competition, dependence largest cluster of organisms from the world’s economic balance, the risks associated with different speed of response of the cluster members on the changing external environment

The Russian experience in the planning of the formation of clusters contributed to the rapid industrialization of the few developed areas, but the negative consequence was the monocultural structure of the economy of regions that violate the principles of balanced development.

Interdisciplinary Complex

Under complex inter-sectoral (agriculture, energy, transport) means the following:

As a rule, inter-industry complexes represent a vertical integration of the production process of any final product or service and are not tied to a particular territory, although the analysis may yield inter-industry complex of regions. The presence of specialization and vertical integration of inter-industry complexes coincide with the content of the cluster. However, the latter option is focused on the construction of the entire reproduction chain, but necessarily includes not only production, but also financial, scientific and regulatory organizations.

Despite the similarity of many signs that the cluster is fundamentally different from financial-industrial groups (firms) or vertically integrated structures. By its nature as a network of independent members, it does not use hierarchical relationships for the control and coordination of activities. Moreover, the classic cluster in the literature regarded as the antithesis and contrasts them.

Economic cluster can be confused with agglomeration. The distinction between agglomeration and cluster is not entirely clear, but the concept of a cluster entails a deeper meaning. Cities constitute the agglomeration of economic activity, but this does not mean that activity necessarily constitutes a cluster. On the other hand, a well-developed cluster can take the form of concentration of specialized firms. In this case, firms, which established mutual support interaction, retrieve and reproduce the specific area of specialization and division of labor among themselves. This interaction depends on spatial proximity, that is concentration. Thus, any cluster, in fact, is an agglomeration, but not every agglomeration is a cluster.

4. CONCLUSION

Industrial-innovative clusters are able to provide the greatest stability of the regional economy and the realization of its competitive advantages through synergy in the implementation of products; operational management; financial investment activities; management (Yudanov, 2008 p. 19-38). The selection of these types of synergies allows to determine the forms of territorial inter-firm network structures that make up a particular cluster of industrial-innovative (characterized by the presence of the first two types of synergism, covers the field of external cooperation of enterprises); financial management (characterized by the presence of the third and fourth types of synergies, is expected to cover most dramatically, the financial development of enterprises and organizations); depth-integrated (characterized by a combination of different types of synergies that are present in operational marketing and financial management forms).

The formation of industrial innovation clusters takes place in the framework of a pyramidal hierarchy of competitive strategies of the region, showing the relationship paradigms of the regional economy, and stages of development of competitive potential and methods to ensure competitiveness.

At the basis of the “pyramid” are the following regularities: the possibility of applying a particular strategy of competitive development due to the level of competitiveness of the region, especially its economy; higher types of strategies can be applied if implemented mission and goals underlying the policies that enabled territorial entity to acquire the desired properties, forming favorable for innovation-oriented development environment; hierarchical pyramid suggests the General orientation of regional development to continually increment the opportunistic and strategic competitiveness of the region.

Part of competitive strategies along with the basic (strategy of forming clusters) are strategies higher level: the strategy of capitalization of the region, strategy for sustainable development. The cluster as a regional development tool is not only versatile, but also integrative.

The latter is a comprehensive solution within the framework of the cluster approach objectives of the regional strategy aimed at improving the competitiveness of the regional economy, industrial policy aimed at creating a competitive industrial complex of the region of transition to the innovative model of regional development, development of a competitive environment, small and medium businesses in collaboration with the major, improve the educational level in the region, development of regional infrastructure, etc.

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