

Nikulina, Olga

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Advantages Of Formation Of Innovative Clusters In Modern Economy

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ADVANTAGES OF FORMATION OF INNOVATIVE CLUSTERS IN MODERN ECONOMY

O.V. Nikulina, doctor of economic sciences, associate professor of chair «World economy and management department», Kuban State University

e-mail: olgafinans@mail.ru

Phone number: +79184111097

Abstract

In article the features of the cluster approach application at formation of national and regional innovative system are considered. On the basis of the historical development analysis the analogy between territorial and production complexes and modern clusters was created by the authors, their comparative characteristic is presented. The revealed advantages and cluster process lacks have allowed to define cluster development tendencies in national economy.

Key words: *clusters, territorial and production complexes, innovative development, innovative activity, the innovative project*

In current conditions response of economic entities on the impact of market forces and increased competition is the formation of networked structures inter-organizational interaction. Economic integration acts as an inherent trait of modern economic development. Inter-organizational integration is deliberately and consciously by economic subjects on the basis of emerging opportunities saving transaction costs, raising financial resources for large-scale research and development, focusing on core competencies and activity lines, the prospects of entering new markets. The rapid development of information technology will allow businesses to create new communication opportunities for the exchange of information, which greatly accelerated the process of networking. The benefits of economic subjects integration related to the harmonization of their interests, a reduced risk and substantial savings in transaction costs, that is achieved due to the synergy of interaction and reduce the flow of information. Institutional theory

justifies the choice of organizational form of integration with the internal and external environment on the basis of a comparative analysis of transaction costs of economic agents. Herewith, a voluntary association of companies in the networked structure most Russian writers as quasyintegration, identified as a key properties such cooperation informal associations, based on the implementation of control of the assets of legally independent companies with no control over their property. Analysis of the specific investment and innovation processes in different types of Russian business groups suggests that higher innovation activity showing participants networked intercompany integration than with holding companies, because of the possibility to implement the "too heavy for individual companies innovative projects without losing their own their control over business".

Using the approach G.B. Kleynera [1] to the synthesis of cluster strategies to support their particular niches in the space of economic analysis and synthesis objects, can be identified the following features of the clusters as a integration form of economic subjects with the rationale of economic approaches to their study:

1. Clusters have a number of features as an intermediate "link" between autonomous organizations, regional industrial complexes and industry alliances, combining the features of all of these systems, that can be considered as an integrated group of organizations able to influence the formation process of new approaches to innovation development of the economy. In this aspect, consider the cluster as a management project in the field of innovative development of the industrial enterprises, which can provide a multiplier effect of development of innovation activity of economic entities - cluster members (government agencies, financial institutions, facilities innovation infrastructure, industry, research organizations, universities, and small businesses) to into account the peculiarities of its development as a process of integration of the various participants, the composition of which can vary depending on the phases and stages of formation.

2. In view of the multifaceted and ambiguous as the clusters formation of networked structures, there is a need to develop new methodological basis for their

formation and development of the national economy in the result of the synthesis of institutional and evolutionary economic theory, the modern theory of the firm, the economic paradigm of systemic and strategic approach. The key moment in the formation of the cluster is the harmonization of the economic interests of its members, to be justified in terms of modern neoinstitutional theory, which "seeks to analyze and interconnect institutional environment that is perceived as a set of rules of the field of possible actions of the economic agents, and institutional arrangements that represent various combinations of activities under these rules to ensure effective support for the production and transactions"[3, p.26]. To understand the internal processes of interaction between economic entities of the cluster to apply provisions of the modern firm theory, which considers companies not just "a point", but as a firm, "has the structure of units, where decisions are made" [3, p.12] and line up contractual relationships. Systemic economic paradigm and strategic approach can justify "the need for new schemes and procedures of the strategic process applied to clusters" [1].

3. Clusters as a "mild" form of management can qualitatively improve the innovative activity of economic subjects, thereby providing a permanent innovative development of the national economy on the basis of the consolidation of technological interrelation between industries. "The most important factor of modern competitiveness clusters is the high level of development of the system of the related industries and institutions " [6, s.208], which ensures the development of effective competition and public policy. The advantages of cluster development are expressed in increasing efficiency and reducing costs of current activities of economic subjects in the integrated use of innovative potential cluster members when creating new products, processes and practices in the formation of innovation capital for further innovative development as a result of innovation to a new level.

4. In the cluster conditions occurs grouping and consolidation of innovative potential and innovation capital of all participants in the innovation process, which in turn results in the activation process of the integration of industrial enterprises with research organizations, educational institutions, government agencies and the

business sector. Learned experts UNIDO cluster development experience in eleven countries allowed to elaborate a generalized concept of institutional policy that the basic conditions for creating clusters as networked structures are recognized: the spread of ideas network of business organization, the restructuring of existing enterprises, strengthening the relationship between the private and public sectors. [5] Clusters are the drivers of the development Russian industry, based on reliable cooperative and co-evolutionary agreements of participants, providing reliable balance realization of their economic interests as a result of the integration of interaction and coordination of innovation.

Clustered structuring of the economy allows comprehensive state support of science, education, risky innovation, export activity, and will provide new opportunities for innovative business development in terms of integration and to create the conditions for the growth of socially and environmentally responsible businesses and expand their proactive environmental activities.

Clustering of the economy as the formation of clusters in order to enhance the competitiveness of regions considered in the economic literature, in terms of the concentration of the economic subjects in the geographic boundaries of the territory where the most favorable conditions. Currently, however, with the development of information technology and new ways of interacting economic subjects geographical proximity to each other suppliers, customers and research partners not the deciding factor. Widespread "virtual" clusters that are based on the formation of innovation networks and are not tied to a specific geographic region. Appropriate to define the essential characteristics of clustering economy considering of accumulated theoretical experience and features of realization of the cluster approach (Figure 1). Founder of the theory of clustering is M. Porter, which considered the cluster as "geographically concentrated groups of interconnected companies, specialized suppliers, service providers, firms in related industries, as well as problems related to their work organizations (e.g., universities, agencies, standards, trade unions) in certain areas of competing, but at the same time working together ". [4]

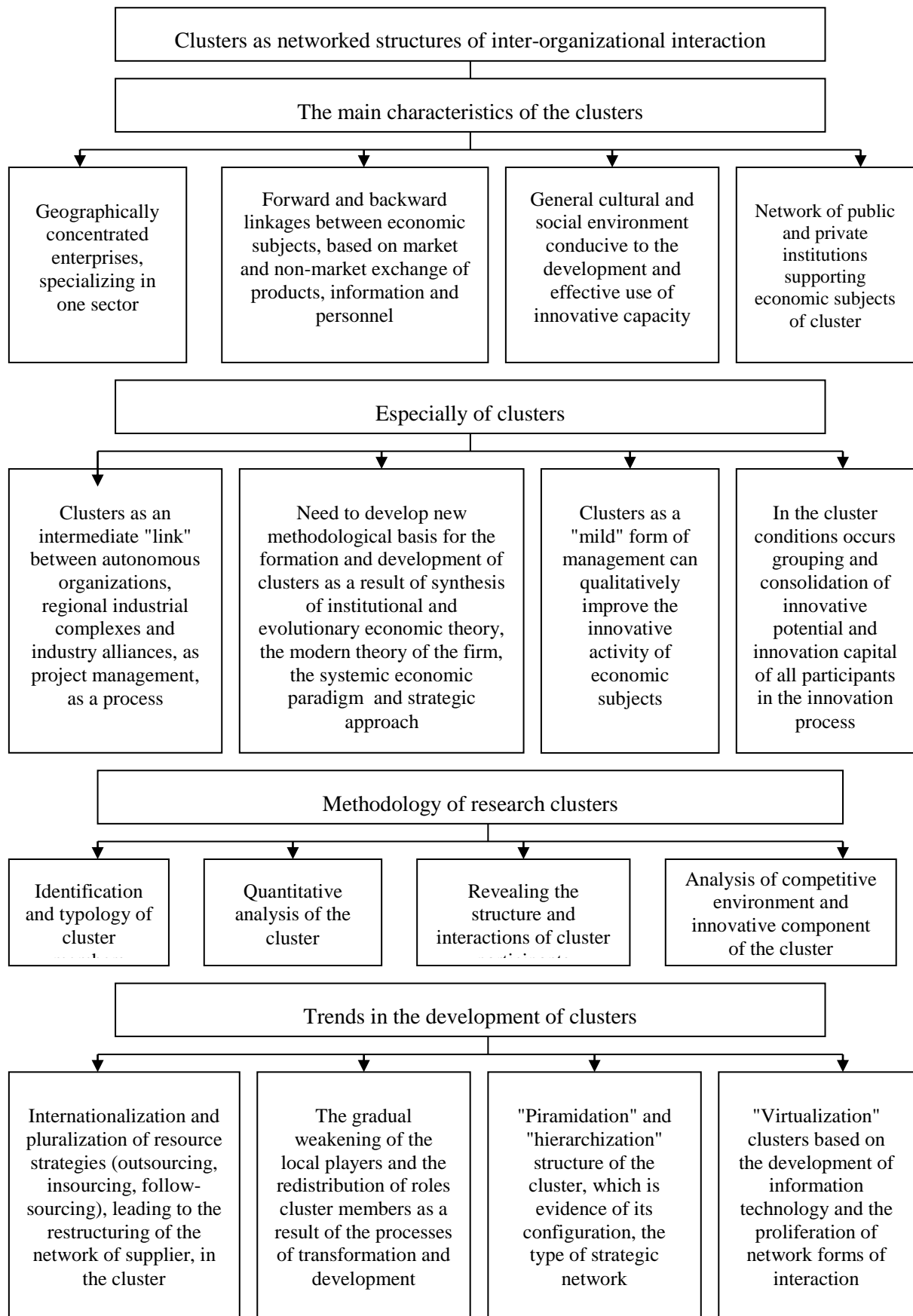


Fig.1. Essential characteristics of clusters as networked structures
(developed by the author)

On the basis of the main essential characteristics of the cluster can give the following author's definition: a **cluster** represents the integration of companies based on the networked form of business organization by forming strong links with the rules of cooperation and collaboration in a competitive environment, which contributes to the effective exchange of resources, technology, knowledge, and provides a high level of competitiveness.

Clusters have a number of features that differentiate it from other forms of joint activity of enterprises.

1. Feature clusters is a unique blend of co-operation, following cluster members a common strategy with simultaneous competition between the two.

2. In contrast to the strategic plans of development of individual industries or sectors which are quite disparate, and often contradictory, cluster development strategies ensure balanced development of all sectors of the economy of the country and its regions.

3. Within the framework of a functioning cluster, all the participants have the opportunity to realize their innovative goals and objectives and to obtain certain benefits from cooperation.

4. Clusters are more correlated with the concept of "open innovation" than other forms of industrial association, as it is in clusters of innovation are not isolated in one or more enterprises, and develop dynamically in interaction between members of the cluster. If we compare the quantitative indicators of innovation activity of enterprises in the cluster and "isolated" innovative enterprises (Figure 2), it is apparent excess considered indicators of innovation cluster members of similar indicators of enterprises operating in isolation.

4. Enterprises within the cluster are connected a unifying activity, is an area of specialization, but the clusters themselves can leave the links within a particular sector, covering various industries and areas.

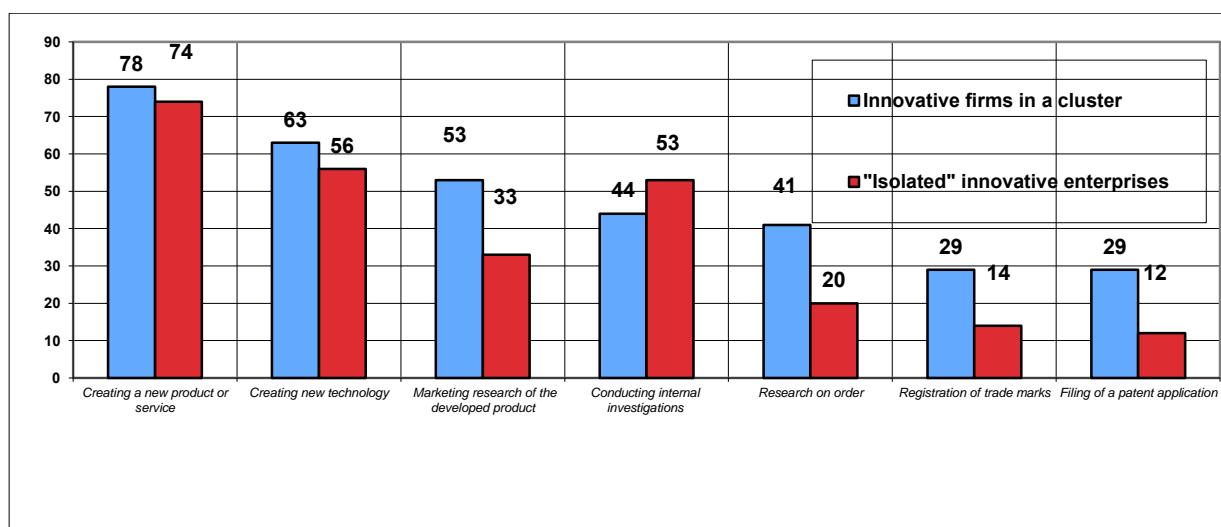


Fig. 2. Comparative analysis of quantitative indicators of innovation activity clustered and isolated enterprises (%) (compiled by the author based on [8])

The attention of scholars and experts to the clustering of the economy as a tool to improve its competitiveness due to the efficiency and flexibility of the clusters, which is determined by the following advantages compared to other forms of economic organization:

- large enterprises easier access to different types of resources;
- reducing the financial and credit risks on the one hand, and improving the stability and predictability of cash flows - on the other;
- increase sales efficiency due to the stability of logistic flows between enterprises of the cluster;
- reducing transaction costs, which are considered as the cost of the business organization, information, negotiation, sourcing, conclusion and execution of contracts, legal protection, building relationships with external parties as the enterprise, and with internal stakeholders;
- implementation of a quantum leap in the development of innovative enterprises in the cluster. The increase in innovative activity cluster members due to the fact that the cluster acts as a kind of "storage", knowledge, skills and experience of talented people who are specialists in the core business of the cluster. Accumulating and concentrating, new knowledge is becoming widely accepted and guide the participants to generate new ideas and create new developments that significantly accelerates the ongoing innovation in the cluster;

- formation within clusters is not only formal but also informal, personal relationships among its members, facilitating doing business and helping to better coordinate efforts to adapt to the changing conditions of the environment;
- implementation of forecasting and planning innovations based on timely identification of emerging technology trends;
- development of information and marketing relations between enterprises of the cluster based on modern technology, the formation in the interregional economic integration of the missing links in the value chain, common standards for the production, supply and management, the active development of cluster brands.

Important for the effective use of cluster strategies are different goals clustering states are at different stages of economic development. Shown in Fig. 3, the data suggest that if the developed and developing countries, the main goals of clustering is to increase the value of the finished product, as well as an increase in exports, the countries with economies in transition (which applies to international classifications Russia) as priority support by the challenged innovation and improvement in the business environment.

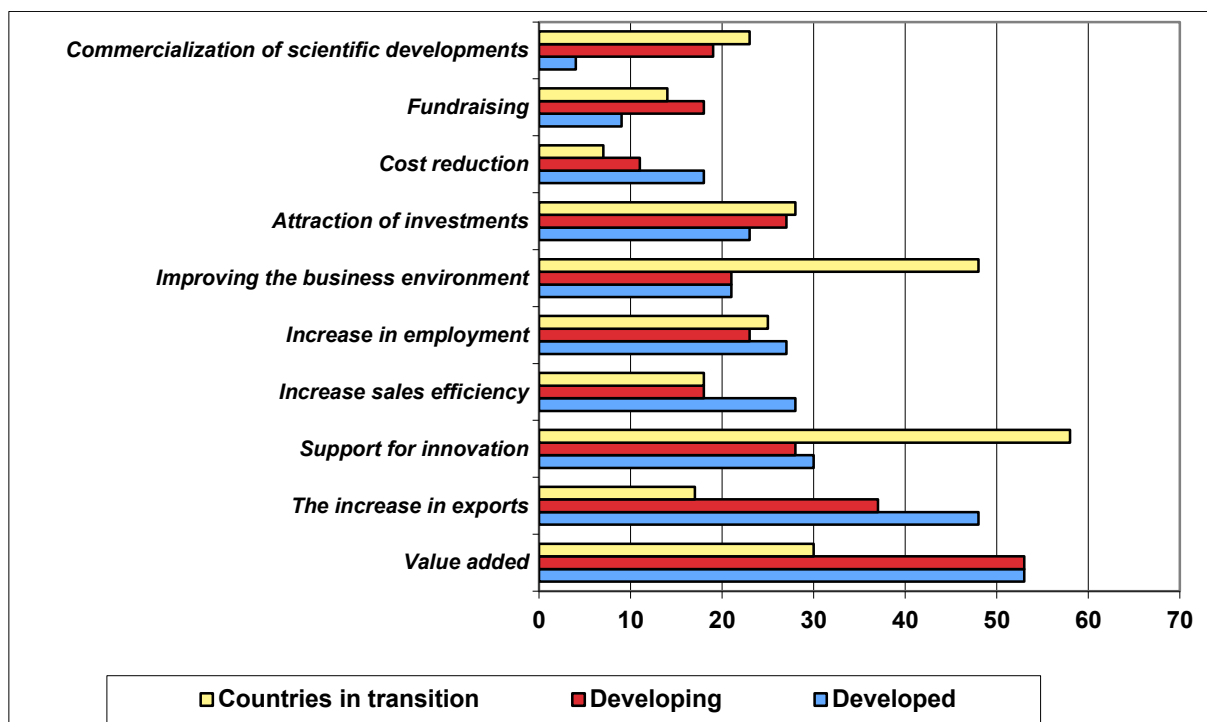


Fig.3. The main objectives of the clustering of developed countries, developing countries and countries with economies in transition, in% (had to choose three priority objectives)
(compiled by the author based on data from [7])

However, clusters are not a "silver bullet" for the economy, because in addition to the advantages they have several disadvantages, such as:

- the excessive concentration of business in domestic relations and ignoring the environment outside the cluster can lead to obsolescence of technology and reduce their competitiveness;
- closed cluster can decrease the flexibility of participating enterprises;
- lack of competitors within a single cluster "kills" the need for continuous improvement of the production and sales process;
- the uniqueness of each cluster leads to considerable complication of evaluating the effectiveness of its operation, as there is no opportunity for comparison with other clusters;
- dependence of the results of the entire cluster on the efficiency of each of its members (for example, if the shoe cluster of businesses involved in reindeer skin, make it qualitatively and sewing workshop uses outdated technology sewing or not qualified, the final product will turn out poor quality regardless of performance of the other participants).

Clustering of the Russian economy is not entirely new mechanism for regional development, and is a prototype created in the command economy of regional-production complexes (RPC). The formation of clusters in the national economy, in fact, is a "clone" of regional-production approach to the distribution of productive forces in the region. Studies on RPC, as the prototype of modern clusters, as the main differences between them are the differences in the initiatives, goals, and methods of their formation in a planned and market economies. One of the fundamental differences between the clusters and the RPC is the image of the system processes. RPC was based on chains of energy-production cycle (EPC), the theory of which was developed by N. Kolosovsky. [2]

Under the energy-production cycle is understood as "a set of manufacturing processes, consistently developing in the economic region of the USSR on the basis of a combination of this kind of energy and raw materials, from primary forms of production and refining of raw materials and energy, and management of

all components of the raw materials and energy resources". [2] Energy-production cycle (EPC) are classified by the industry in which the functioning of the RPC. The basis for the allocation of the EPC was the combination needed for the production of natural resources and energy.

Value chain, forming the basis for the formation of clusters, is a series of individual business processes, each of which there is a value addition to the unfinished product. From the point of view of each link in the cluster value chain presented to the cluster association, which adds value to the final product. Product to be ready in case he went through the whole system of business processes. Value chain model based not only and not so much on the availability of natural as labor, intellectual resources, innovation. Another difference from the EPC value chain is the fact that in the EPC performance criteria EPC is the minimization of costs, and in the value chain model as a basis for evaluating the effectiveness of playing several groups of criteria, among which the industrial, social, innovative group. Based on experience, the formation of clusters in the domestic and foreign practice are the following development trends:

- 1) The company focuses on the main directions and delegate authority for the production of intermediate products and the provision of services to other small and medium enterprises;

- 2) In terms of innovative economic development formed a mechanism to ensure a balanced contribution to the clusters created by the government and industry;

- 3) Increasing the number of clusters of the same specialty within the same region, which increases the competition between them and leads to "natural selection." In addition to the universal benefits of increased competition for the enterprises themselves, the trend is a positive way for the state, which is released from having to subsidize uncompetitive 1.2, but cluster forming industry.

- 4) A decrease in the emerging cluster attachment to sources of natural resources, while prioritizing the availability of human resources;

5) Traced the uniqueness and "exclusivity" of each cluster in different regions with the same potential for innovation, which is explained by differences in strategic management.

Practice shows that the highest level of regional competitiveness is achieved through the formation of innovation clusters. The key point in the definition of innovation cluster is the presence of an innovative synergy of all participants, which is provided by the establishment, capitalization and dissemination of innovations. A key role in the formation of innovation cluster is their interaction enterprises of science and education with production enterprises with the support of government agencies. The most effective clustering process is carried out in regions that actively create innovative infrastructure to support industrial potential of scientific and innovative and educational potential: in St. Petersburg successfully functioning innovation cluster, Tomsk region is the region where it was created in 1990. the USSR's first industrial park, on the basis of which now operates Tomsk International Business Center, unites all the elements of the innovation infrastructure of the cluster center "Skolkovo" is a prime example of active formation of innovation cluster in the suburbs.

Distinctive features of the innovation cluster, allowing the system to determine its essential characteristics are the following. First, the innovation cluster is a super system, as it can encompass many different types of clusters in the region (construction, oil and gas, medical, etc.), united by the process of innovation, which provides for the creation and dissemination of innovations in this environment. Second, the results of the participants in the innovation cluster is innovation, not only in production but also in management, organization, social work, etc. Third, the participants in the innovation cluster are seemingly "diverse" companies, but they have a common vision of the development and connected by a single innovation process, in which each of them can be well-defined function. Fourth, for the formation of innovation cluster not only a critical mass of companies in innovation, you must have a scientific basis, competencies, technical capabilities, logistic routes and channels of communication, a system of relations

which includes the implementation of a permanent innovation. Fifth, the relationship between members of the cluster are based on a combination of cooperation and competition, which ultimately leads to a successful cooperation and availability of key competencies and innovative potential partners to achieve a common result. Thus, ***the innovation cluster** is a collection of related innovation process companies, research organizations, government agencies, research centers, user communities, offering a permanent process of development, implementation and dissemination of innovations in various fields on the basis of a systematic development of their innovation and integration interaction able to bring the region's economy a positive synergistic effect.* For the formation of innovation cluster in the region requires the following:

- the presence of large enterprises on the basis of which can be tested and implemented on an industrial scale, innovative projects;
- create conditions in the region for permanent development of innovative activity of all participants in the cluster;
- creation of an innovative infrastructure to support innovation and development of small businesses and the cooperation of large enterprises and small and medium-sized businesses;
- the presence of a research center, which provides a fundamental scientific basis for the development of innovative ideas and projects;
- the presence of the University, providing training and retraining for innovative companies of the cluster;
- the use of existing and construction of innovative transport and logistics system of interaction of all participants in the cluster;
- formed tradition of business and practice of cooperation ventures in the region on the basis of the contractual relationship in the framework of the regional innovation policy;

- regional innovation policy to build demand for innovative products enterprises cluster as well as sales promotion of innovative products, both within the region and beyond;

- create conditions conducive to the consolidation of existing and potential clusters in a single system, which will provide the innovative development of the regional economy (innovation cluster is considered in this aspect as a super-system).

To create innovative tools necessary to form clusters of cluster development, and infrastructure support to develop methodology for the monitoring of cluster development, to define a system of stimulating innovative activity of enterprises in the cluster. The tools of cluster development are:

- support network development and transfer of knowledge and technology;
- fostering specialized companies;
- formation retraining programs and innovative personnel training;
- development of branding;
- promoting technological upgrading of enterprises;
- development of interregional and international exchange of innovation;
- organization of centralized investment and subsidies for innovative projects.

For effective functioning of the innovation cluster need to set up the event:

- develop the concept of the formation and management of the cluster;
- define project management system based on the development of the cluster network model of interaction;
- evaluate the innovative potential of the cluster and the possibility of demand in other regions of the cluster for innovative products;
- conduct "inventory" of production capacity of enterprises cluster and improve the operational efficiency of existing production processes throughout the production system;

- establish a system of contractual relationships of all participants in the cluster with the distribution of functions, powers, competencies and responsibilities;

- develop a system to assess the effectiveness of measures to support cluster development.

Innovation cluster formation is based on the existing "backlog" - established relationships and relationships with industry research and educational organizations, with the support of government agencies in order to implement innovative policy for the region. These connections and relationships are formed in the first stage, usually between economic operators of one of the region (except in the case of virtual clusters, whose activities go beyond geographical boundaries and covers the stages of development and the promotion of innovative ideas without the practical implementation of the production process). Given the multidisciplinary nature of the firms in the cluster, you can speak not only of regional but also the sectorial aspects of the interaction of economic actors. Ministry of Economic Development of the Russian Federation in the formation of the cluster strategy of national economic attaches great importance to the territorial localization of innovative cluster projects and sector specific innovation clusters, which make them a tool of regional development strategies and innovative policy instrument. According to the content of the innovation cluster of economic entities and dynamic processes of change both quantitative and qualitative composition, changes in the territorial limits of accommodation for participants and their belonging to certain sectors of the economy can be described as a super-system innovation cluster, presents certain advantages for the development of the region, industry, different groups of participants in the cluster (Table 1).

Table 1 - Advantages of innovation cluster formation
(developed by the author)

Advantages	For the region	For industry	For other members of the cluster
1. Economic	Growth of investment attractiveness of the region, increasing the number of taxpayers and tax charge base	Reducing transaction costs, investment risk innovative projects, co-financing market research	Reduce transaction costs, increase the availability of financial resources, lower research and development costs, the increase in sales
2. Social	Increase jobs, increase the efficiency of the system of vocational education, the growth of living standards	Skills development, the emergence of new knowledge, the implementation of social programs and projects	Building a network of stable relations that effectively transform inventions into innovations
3. Structural	Occurrence of conditions for economic restructuring in the region, the development of innovation, transport, infrastructure, building innovation capacity in the region	Cluster generates economies of scale of production, which is based on the presence of innovative nucleus, whose role do industry in close cooperation with science education organizations	The use of innovative potential of other members and the generation of innovative ideas form the conditions for diversification and the emergence of new areas of business innovation and attract new members
4. Communication	The emergence of new forms and tools for interaction with business development in the region	Mutually beneficial relationships with small and medium-sized business, scientific, educational organization of government structures	The free exchange of information, knowledge, and the rapid spread of innovations across all channels
5. Branding	Raising the political profile and create the image of innovative development of regions	Branding and brand image and reputation of the formation of an innovative enterprise	Improving the perception of prestige and quality evaluation of innovative products (services) cluster members

Thus, the presence of innovative clusters in the region changes the content of regional economic policy, when efforts are made not to support individual companies, and the development of the relationship between economic actors and public institutions.

Regional policy should be aimed at creating regional competitive advantage through the development of innovative clusters as an effective mechanism for the implementation of this strategic goal. Regional cluster policy is a master plan for the development of innovation in the region, which should be reflected not only the initial configuration of the industry, which is formed around the new key regional technologies, and specific system prospective industrial and technological schemes

with the existing resource, infrastructure, market conditions. Innovation cluster is a dynamic system that provides self-development through the implementation of synergies. Contributing to the formation of initial relationships in the region to produce innovative products, cluster policy should define the nature of technological progress at certain points, creating conditions for the development of the research base in the region and increasing innovation. One of the priority directions of development of innovation clusters in the regions should be the formation of innovative business, capable of breakthrough technologies, both in the domestic and overseas market. The basis of the formation of innovation cluster supposed to develop innovative industrial activities, providing the technological basis of the implementation of the innovation process cluster members in the establishment and effective functioning of the innovation infrastructure.

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