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## Main Stages of the Formation of an Economic Cluster

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### ABSTRACT

The questions of the formation of cluster, their management and development in economy of Russia became in recent years a topic of numerous discussions, research studies by domestic economists. Cluster strategies of development are widespread in public authorities. Moreover, there are official documents considering the contents and directions of the main new formed economic clusters. Foreign and domestic scientists have more than once proved that development of countries, where a cluster approach is used, characterizes increased production efficiency, competitiveness growth, increasing population welfare. This issue on the formation of an economic cluster is urgent both for the state and other entities. Also the process of realization and introduction of this economic event is quite important. This paper is devoted to the main stages of the formation and application of an economic cluster.

**Keywords:** Stage, Cluster, Economic Process, Innovation, System

**JEL Classifications:** O10, A19, A39

### 1. INTRODUCTION

Provisions of the theory of economic clusters are developed on the basis of existing approaches to the concept of clustering essence and clusters in economy: The definition is specified and the expanded meaning of an economic cluster is presented, the classification of clusters by the main signs allowing to combine clusters into uniform groups is presented, the basic structure of an economic cluster with inclusion of innovations as a basic element is proved.

During the termination of the XX century industrial clusters became a necessary factor of economy development in the conditions of the market (Efimychev and Zakharov, 2008). The regions, where clusters are formed, become the leaders of economic development establishing competitiveness of economy of this country.

Due to a set of various interpretations of the concept “an economic cluster” their authors have the same opinion that “the clots of

enterprises” forming a cluster have positive impact on the growth of economy in general.

The concept of an economic cluster presented in the paper, represents it as the economic system being a set of enterprises, organizations (production, service, universities, research institutes, engineering centers, founders of innovations, technologies, market institutes, consumers) located in the unified territory in cooperation subject to agreement without discrimination of any of the members working for achievement of certain purpose (to reach the economic growth by using innovations), which is characterized by certain stability creating a synergetic effect in coordination of participants.

### 2. MAIN PART

According to Porter, there are four basic preconditions for successful development of the cluster (Porter, 1998):

- Factor conditions. The presence of a cluster of human and natural resources, scientific and information capacity, capital, infrastructure, necessary for the conduct of competition.

Moreover, in the first stage of formation of the cluster the main role is played by such simple factor conditions, as the availability of raw materials, cheap labor (hourly cluster in Hong Kong) or the enabling environment (for shrimp culture in Ecuador). These factors have been crucial, compared to special factors such as a highly professional workforce, or research base represented by universities and research centers;

- The conditions of the domestic demand. The condition and the nature of demand for the products or service industries in the domestic market, conform to the trend of demand in the global market, the development of the volume of demand. For example, often for various reasons, some kind of necessary goods unprofitable or impossible to buy in other countries, as a result there are domestic manufacturers;
- Related and service industries. The presence or absence of interconnected and related industries competitive in the international market. These include local producers of specialized equipment, components and services that are the basis for innovation in industries serving them, as well as local innovative companies in industries interrelated technology competencies and customers. An example is the cluster for the production of medical dressings in Saint Etienne (France), which was established on the basis of production of tapes. In Dalton, GA (USA), a cluster of rugs has been created on the basis of the company, which produces bedspreads, etc.;
- The strategy and structure of companies, inter-sectoral competition. The dominant structure in the country and the strategy of firms and industries, and their control system, and the level of intra-industry competition. For example, the Chinese cluster for the production of phones more actively in comparison with other companies of the industry adopts technology strategy and closely following the research and development, thus attracting high quality staff to strengthen the technological capabilities (Aleinikova et al., 2008; Silnov and Tarakanov, 2015).

Also, the formation of the cluster can be influenced by two additional variables – government policy and the will of the case, that is unplanned events. Such events can be, for example, to create a company that spawned the formation of other new companies, which are the core of the cluster, or the reason for the creation of a cluster can be a long strike, which forced buyers to look for alternative manufacturers of products necessary to them (the strike textile workers in Bombay led to the creation of textile cluster Bhiwandi, India) (Porter, 1998).

Thus, we can say that the appearance or the emergence of clusters is basically a stage is not controlled by the state. At the same time carrying out the identification of potential clusters in the early stages of formation, and further state support for their development programs can, in practice, significantly accelerate the process of creating a competitive industrial clusters.

By Feser (Feser, 1998). There are two types of cluster policy.

The first type is a policy target of cluster strategies. In this case, the government objective is to promote the emergence and development of specific clusters. With this approach, the first stage is carried out identification and mapping of clusters defined by

their characteristics and economic profile. The main characteristic of the target cluster strategy is a comprehensive support for the development of a particular cluster with the help of carefully planned activities in the field of demand and supply.

Policy target cluster strategy actively pursued by the Government of the European Union countries. The European Commission is directly supporting the development of clusters in Europe.

The second type of cluster policy is called “cluster-informed policies” (Tsikhan, 2003).

The principal objective of the use of such strategies is to promote the already partially carried out by the clusters of their development programs. This option involves only partial involvement of national and regional governments in the development of clusters.

This approach is not carried out the geographical identification of clusters, but can be used by some elements of cluster technologies. Cluster-informed strategies used to study certain aspects of the cluster, for example, to study the supply chain, if it is a weak link in the cluster and prevent its further development. Countries such as France, Germany, Italy and Spain tend to use just such a cluster development policy.

Many researchers believe that at the present time in most countries used cluster strategies both types, and they also use the target cluster strategies at both the state (Sweden, Finland), and regional (Wales, Scotland) levels. With the exception of the Netherlands and the Scandinavian countries, only a few have a strong state cluster policy (Oleinik, 2007; Zakharov et al., 2016).

Thus, summarizing the above concept of the cluster, we have identified the following essential features it:

- The presence of the leading companies that can have a significant share in the domestic and foreign markets, supplemented by specialized service organizations;
- The concentration of cluster members in a limited area, representing a unique advantage;
- Availability of infrastructure, ensuring a transfer of knowledge and technology;
- The interaction between the cluster members are for the purpose of issue of products competitive in domestic and foreign markets;
- Presence of internal competition between the parties to the cluster;
- The accelerated spread of the innovations developed by the information network;
- Stability of economic ties of firms participating cluster system;
- Reduction of transaction costs,
- Access to technology, suppliers of skilled labor;
- Flexibility of composition and structure, the lack of strict formal constraints and barriers to expansion and contraction of the cluster;
- Openness of the cluster as a system.

Thus, the cluster is a system of interrelated technological and territorial community of businesses, organizations, infrastructure, financial institutions, research, promotional and investment firms,

providing optimal operation of all structural elements based on innovative products and technologies.

In essence networked cluster is formed by the cooperation of the companies based on the process of creating a given product.

Isolation of these approaches has allowed to formulate its own definition of a cluster or a cluster association.

Cluster is a sustainable territorial and sectoral voluntary association of enterprises of various spheres of industrial and service sectors aimed at improving their competitiveness in both domestic and foreign markets.

Clusters are one of the faces of a rhombus (related and supporting industries), but it is best to treat them as a manifestation of the interactions between all four edges (Feser, 1998; Arzhakov and Silnov, 2016). In addition, each of the faces is a direct link between them. This association allows clusters affect competition in three ways: First, by increasing the productivity of their member firms and industries; secondly, by increasing the ability to innovate and thus to improve performance; and, thirdly, by encouraging new businesses, supporting innovation and expanding the boundaries of the cluster. Many of the advantages of the cluster based on the external economy or overflow advantages through different companies and industries. (Many of the benefits of clusters also apply to divisions within the firms themselves, such as research and development department, production department). Thus, a cluster can be defined as a system of interconnected companies and organizations, the importance of which as a whole is greater than the simple sum of the components (synergistic effect).

When considering the institutional arrangements intra-cluster integration denote the main factors determining the intra-firm collaboration:

Firstly, access to specialized factors of production and labor.

Positioning within the cluster can provide privileged or cheaper access to such a specialized production factors such as components, machinery, business services, personnel, compared with options for remote locations – the vertical union, formal alliances with external entities or “import” production factors. Thus, the cluster is a spatial organizational form, which is in its intrinsic nature may be more effective in linking the factors of production – in the case of the availability of competitive local suppliers.

Secondly, access to the information. Inside cluster, firms and local organizations, are accumulated extensive knowledge in marketing, technology, and other specialized types of information. Access to this information can be better organized and less costly for businesses within the cluster, allowing them to work at the expense of more productive and enter the advanced level of performance. This impact has also the flow of information between departments of one company. The proximity to each other, due to supply and technology, as well as the presence of regular personal contacts and public relations facilitate information flows within clusters.

Third, complementarity. The cluster enhances productivity not only by acquisition and fit factors of production, but also the fact that it provides a complementarity between the development activities of cluster members.

Fourth, access to organizations and public goods. Clusters create a lot of factors of production, which otherwise would be too costly in public or quasi-public goods/services.

Fifth, incentives and performance measurement. Clusters can solve or mitigate the negative effects of organizational problems in more isolated geographic areas and firms with greater vertical integration. Clusters enhance the value of the incentives within the company to achieve higher productivity for several reasons. First of all – due to competitive pressures.

Thus, on the basis of 5-allocated us the benefits of inter-firm cooperation within the cluster, we can say that the clusters can improve the performance of their member firms and industries, increase susceptibility to innovate and create additional conditions to encourage the development of new businesses.

In opinion, association of industrial enterprises, financial institutions, research centers and public authorities on the basis of voluntary cooperation form the additional benefits (access to specialized factors of production and the labor force, access to information, synergies, access to organizations and public goods, stimulating and performance measurement) for each incoming in it the business entity that ultimately contributes to its competitiveness at the regional, interregional and global markets.

In this connection it should determine the principles according to which clusters are formed.

### 3. DISCUSSION

Success of a cluster depends on many conditions which concern the following major types: State support, factored terms (people, capital, environment, quality of life), scientific organizations, the innovative strategy and effective organization of a cluster.

The classification of economic clusters which is based on the most significant signs allowing to unite clusters into quite unified groups with a certain set of properties characteristic for this group is presented for systematization of judgments about this economic category.

A cluster as the economic system starts and takes this or that form under the influence of real initial terms in the region: Available production, innovative and market potential, historical accidents, boosting strategy of the enterprise, development of communications in the region, stages of socio-economic development, competition and other terms.

The preference of the rational organizational structure of a cluster is one of the major tasks solved at its basis (Gakashev, 2013).

Innovative technologies should be used at all stages of the production process by manufacturing a new product, processing

of raw materials, production of intermediate and final products, forming technologies, equipment. Allied and ancillary industries and entities allow a cluster to work further effectively. They are additional investments and external resources of other fields of activity of economy, and the government with bodies coordinating activity of a cluster.

The unity of the cluster infrastructure, goods conditions for exchange of knowledge and assistance of new ideas, the indivisible market of labor and small organizational and information barriers allow companies and organizations entering a cluster to accept advantages resulting from geographical proximity. Participation in such networks becomes for them an important factor of education of their own competitiveness.

The newest method of the union of economic clusters created on rating estimates of productivity (Kuznetsova et al., 2011; Mingaleva, 2003), innovative activity and interconnection of economic entities for approval of decisions on the cluster formation as a form of research and production cooperation of selected entities is presented and the stages of the organization of an economic cluster are developed.

If at the first stages of the formation of economic clusters it is enough to be governed by common sense, to be based on qualitative analysis, experience and indisputable interrelations between the subjects of research and production activity, in the course of time there is an urgent problem of the use of quantitative methods of analysis and choice of the subjects forming a cluster.

Considering inevitability of assessment of both quantitative and qualitative characteristics, it is more expedient to take the method of expert, relative, weighed and rating estimates of factors of economic entities for the definition of the structure of a cluster as a methodical basis of the organization of an economic cluster.

The methodology including this method consists of six stages presented in Figure 1.

The first three stages are carried out with the use of the quantitative and qualitative analysis on the basis of factors characterizing the

territory (region). Among them it should be noted the statistics that reflect whether the creation of an economic cluster is admissible. They are the following: A factor of placement, an indicator of production per capita in the region, an indicator of focus of the region to the established sector, a factor of innovation of the enterprise in the structure of the predetermined sector and sector in comparison with others. Quality indicators has an indicator of presence and availability of natural, material, labor, infrastructural, intellectual and other resources.

If the mentioned factors are equal or higher a unit, it is possible to assume that the appointed enterprises in the structure of a sector of the region are the main in specialization of this sector of the region and that in the territory of this region the creation of economic clusters is possible (Mingaleva and Gershanok, 2012).

The fourth stage of development of an economic cluster consists in collection of information about the possible participating enterprises which can be located in structure of a cluster.

The fifth stage is assessment of potentials of each possible participant and choice of the optimal structure of a cluster is methodically shown as the most difficult and responsible. The selection of groups of probable participants should be the first step at this stage. The second step consists in the formation of systems of factors and standards necessary for analysis and estimates of participants of each group. The third step consists in the determination of values of estimated factors and their processing up to the fixation of total rating estimates of each possible participant and the selection on this basis of participants with quite significant estimates for the introduction into the structure of a cluster.

The sixth stage is a choice of forms of the organization and registration of economic relationship between the subjects realizing a cluster consists in a choice of certain organizational decisions from all variety of organizational and legal forms of the corporate relations.

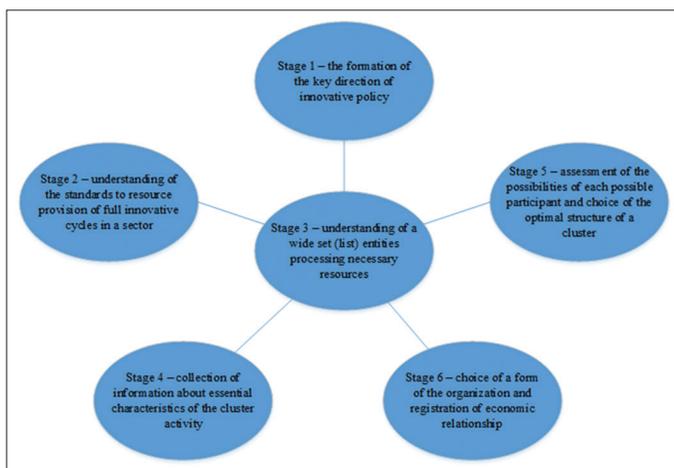
## 4. RESULTS

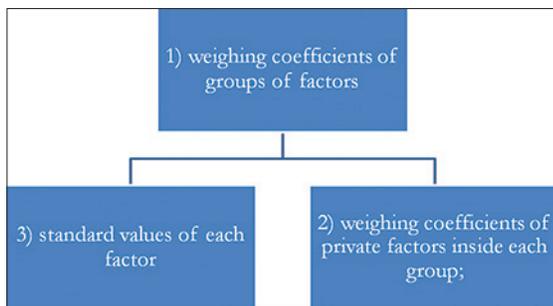
The enterprises and organizations which perhaps can be a part of a cluster according to their duties in innovative processes in a cluster share are divided into 3 groups: Enterprises of this sector (food industry), enterprises and organizations for equipment production and distribution for the food industry, the scientific research institute, higher education institutions and other similar institutions. The appropriate systems of estimated indicators considering originality and functions of each structure of a group of participants are presented for each of these groups (Lahmiri, 2016). The Standards necessary for methodology application are in Figure 2.

The methodology has determined:

1. The creation of a data file of a certain enterprise and organization for specified factors;
2. The calculation of relative values of all indicators (Öhman et al., 2015);

**Figure 1:** The structure of a sectoral innovative cluster



**Figure 2:** The standards necessary for methodology application

3. Multiplying all relative values by weighing coefficients of corresponding factors;
4. The determination of general weighed estimates on each group of indicators by summing up private, weighed estimates of indicators of its structure;
5. Weighing of obtained group estimates by multiplying them by weight coefficients expertly established for relevant groups (Kutan and Yigit, 2009);
6. The search of total rating estimates of each enterprise by summing up weighed group estimates.

The organization of economic clusters can become one of the ways for overcoming economic crisis by the Russian economy which are positively influencing production efficiency and competitiveness.

## 5. CONCLUSION

The reasonable creation of sectoral and regional innovative clusters in Russia allows to restore sectoral innovative economic systems including research and development, process design, pilot testing, and manufacturing enterprises and organizations.

Within the single economic system a complex of organizations and enterprises which are necessary links of a chain “science-production” will be developed. Direct and long-term interaction of participants of this chain reduces time and costs of carrying out of a complex of consecutive works on the creation and distribution of innovative solutions, expenses of researchers and developers for the search of enterprises-customers, and enterprises of a sector for the search of innovative solutions and their developers.

Close interaction of participants in a cluster optimizes information streams between them, allows to use the mutually advantageous schemes of financial relations, to accelerate reaction to change a competitive situation and other conditions. Influence of sectoral science on the quality and competitiveness of technologies and goods of enterprises of a sector increases.

The prerequisites of joint decision by the members of a cluster social and environmental problems are created, the conditions for

concentration of efforts on development and implementation of large perspective innovative and investment projects are improved.

The probability of timely preparation of the qualified personnel capable qualitatively to realize innovative technologies at enterprises of a cluster is provided.

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