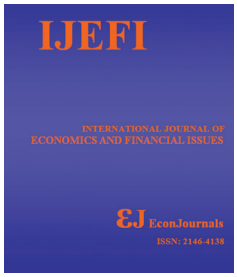

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# Peculiarities of Formation of Innovative Territorial Clusters in Russia

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**ABSTRACT**

The current situation in the Russian economy urges participants of economic processes to search and implement the effective technologies of interaction and management. High saturation of sectoral markets currently does not allow their members to gain competitive advantages only through production technologies. More and more companies choose ways to raise the level of competitiveness through the formation of long-term, trusted relationships with business partners. At the same time, during the formation of such relationships, the organizations and enterprises group together in clusters, thus usually seeking to raise the competitiveness in foreign markets and increase the level of professional competence through intra-cluster allocation of resources. For objective historical reasons (the Russian economy was built out of the market), the development of clusters in Russia is facing serious obstacles. Therefore, the emergence of historically conditioned natural clusters described by Porter is virtually impossible in Russia. However, the cluster approach is very promising: The formation and development of clusters is able to raise the competitiveness and efficiency of the economies of the subjects of the Russian Federation. The formation of the cluster and its prospects depend on many factors, so the risk remains that the cluster will not be able to follow the desired trajectory without state support. This article is devotes to the issues of the application of the cluster approach in the formation of Russian innovative economy in general and the formation and development of innovative territorial clusters in particular. The main problems preventing the effective implementation of the cluster approach have been identified on the basis of the analysis of Russian experience in the formation and development of innovative territorial clusters.

**Keywords:** Cluster, Cluster Policy, Innovative Development, Regions, Competitiveness
**JEL Classifications:** C38, R12, P25

## 1. INTRODUCTION

In the last decade, they began to pay attention to the introduction of the cluster approaches in Russian economy, in particular, to the formation and development of innovative territorial clusters. It is believed that they will allow to: Reduce the high dependence of the economy and the Russian budget on the commodity sector; bring the Russian economy to an innovative path of development; increase the high-tech component in the Russian economy; ensure the inflow of foreign investment in the industry with high value added figures; raise the competitiveness of a particular region or industry and the state as a whole.

Interest in this approach is also determined by the large-scale positive experience of clustering of the economy of many countries (USA, Italy, UK, Canada, France, Germany, etc.), which proved the effectiveness of the use of cluster structures to raise competitiveness in practice.

It is particularly pleasant to note that to date Russia has also accumulated the positive experience of the formation of innovative

territorial clusters, and even the results of the first years of their support were summarized. Thus, the Russian Ministry of Economic Development initiated a program to support innovative territorial clusters in 2012. Following the results of the competitive selection, a list including 25 innovative territorial clusters was approved. To date, the list has been expanded to 27 clusters. In 2013-2015, the Russian subjects, where the innovative territorial clusters are localized, have been granted subsidies from the federal budget totaling 5.05 bln rubles for the realization of measures under regional programs of cluster development.

Undoubtedly, the cluster approach is a relatively young and dynamic area of economic science, which finds wide application, but it has not yet reached the level of completion of basic concepts, ideas and approaches. Among other things, there are no "natural" prerequisites to a market economy in our country (due to historical conditions of economic development), and, consequently, there are no historical conditions for clusters in Russia.

Given the promising outlook of the cluster form of spatial organization of economic interactions, a system solution is required for the challenges of the implementation of the cluster approach in Russia, taking into account market imperfections and state measures. The main problems today are inconsistencies in the legislation, the need for large investments in the early stages, and lack of understanding by the cluster participants of its concept and importance.

## 2. METHODS

The starting point of the cluster research dates back to the theory of distribution of the German economist (Thünen, 1826). The concept of the abstract geographic model proposed by him was such that the existence of transport costs leads to the fact that the production circles around some center.

The backgrounds of the "cluster" concept can also be found in the writings of a neoclassical Marshall. The description of the term "localized production" - the production concentrated in certain areas - allows to understand that we are talking about clusters with sufficiently deep inter-firm division of labor. The Marshall's book "Principles of Economics" tells "about the industrial district. (area), which is widely recognized as a prototype of the cluster" (1993).

Professor at Harvard Business School Porter, one of the most authoritative experts in the field of strategy and competition, including in the international markets, is considered to be the founder of the modern cluster approach. The main provisions of the concept of the cluster approach are set out in his works "The Competitive Advantage of Nations" (1993) and "On Competition" (2005). According to the Porter's theory, a cluster is "geographically concentrated groups of interconnected companies, specialized suppliers, service providers, firms in the relevant sectors, as well as organizations connected with their activities (e.g. universities, standardization agencies, trade associations) in certain fields - competing, but at the same time collaborating."

Certain aspects of the cluster theory were reflected in the works of Lundvall and Johnson (1994) who proposed the concept of "development blocks" that represent sectors or territorial production association, which are the source of development and competitive advantages of the national economy and assume the continuous process of education involving the entire population of the country.

Further, the development of the theoretical aspects of the concept and formation of clusters in the economy continued in the works of Bergman and Feser (1999), Dalum et al. (2002).

As the analysis of publication activity showed, the scientists has begun to show interest in the problems of implementation of the cluster approaches in the economy relatively recently in the Russian economic scientific community. A significant number of Russian authors' works are devoted to general issues of the cluster theory and cluster analysis, clustering process in Russia, and issues of the economic cluster approach in the regional aspect.

A large layer of modern research is represented by the works of Arkin et al. (2012), Bespalov et al. (2010), Galimov and Klyukovkin (2010), Kondrashina and Tretyak (2010), Tretyak (2011).

Among scientists who focus on the problem of the development of innovative territorial clusters in Russia, the works of Korolev (2010), Kutsenko (2014), Smorodinskaya (2013) should be noted.

## 3. CREATION AND DEVELOPMENT OF INNOVATIVE CLUSTERS IN THE TERRITORY OF RUSSIA

Russia took the path of the innovative cluster development significantly later than European countries and the United States, which was due to a long closeness of the country's economy from the global economic community.

In modern Russia, the introduction of cluster approaches is usually carried out "from the top:" In particular, the Strategy of socio-economic development of Russia through to 2020 pays attention to the cluster policy. The implementation of the cluster policy is carried out within several federal initiatives, including support programs of the Russian Ministry of Economic Development, Russian Ministry of Industry and Trade, Russian Ministry of Communications and Mass Media, Russian Ministry of Education and Science and development institutions.

The Russian Cluster Observatory (in online format) successfully works today, where you can freely obtain information about the pilot innovative territorial clusters included in the list of innovative territorial Russian clusters, including information about the participants and geography of the cluster, peculiarities of operation, long-term plans for development of the individual cluster and the corresponding region; strategic tasks solved by the Government in the implementation of the region's cluster policy.

Cluster policy in Russia, which refers to the measures taken by the authorities on the creation and support of the development of clusters in certain territories, is carried out in sequence, by stages (Figure 1). It takes quite a long time to form a cluster: Years or even decades. As a result, long-term work is needed, in which state support of the cluster also passes several stages.

Indeed, today the role of the state in the formation of cluster strategies has increased. But before answering the question whether it is for good or for bad, let's recall that the clusters were originally formed independently, solely under the influence of market forces ("invisible hand"). The Russian government has realized the benefits of clusters in strengthening the competitiveness of the country's economy and began to "grow" them artificially in the sectors that have the greatest potential for innovation.

Innovative territorial clusters are the most important for the modernization of the Russian economy and ensuring its competitive development.

An innovative territorial cluster is understood as a combination of enterprises and organizations (cluster participants) located in a limited area, which is characterized by the presence of:

- The scientific and industrial chain that unite the cluster participants in one or more sectors (key types of economic activities);
- The mechanism of coordination of operation and cooperation of the cluster participants;
- The synergy expressed in increasing the economic effectiveness and efficiency of each enterprise or organization due to their high degree of concentration and cooperation (Kutsenko, 2015).

In our view, this definition should be expanded to include at least the active use of new technologies, which will complement the listed characteristics of clusters.

An innovative regional cluster is characterized by the established innovative infrastructure that includes the interaction between the cluster participants, which can be:

- Industrial enterprises,
- Scientific and educational organizations and enterprises,
- Technology transfer centers,
- Tech parks, business incubators,
- Non-governmental organizations,
- Financial institutions, etc.

A distinctive feature of innovative clusters from the industrial ones is availability of close ties not only between enterprises, customers and suppliers, but also between research organizations, which are an integral part of innovation and ensure the educational potential of the region.

An innovative territorial cluster of Tomsk region is in the first place by the number of participants in Russia (about 300 organizations).

In Russia, unlike most European countries, an insignificant number of small and medium enterprises are involved in innovative clusters (Figure 2).

The following key directions of state support of the innovative clusters are currently implemented (Lundvall and Johnson 1994):

- Providing the subsidies to the Russian regions to implement the measures provided by the programs of development of innovative territorial clusters;
- Providing support for the implementation of the measures of the programs of development of innovative territorial clusters in the framework of the federal special purpose programs and state programs of the Russian Federation;
- Involvement of public institutions of development to implementation of programs of development of innovative territorial clusters;
- Promotion of the participation of large companies with state participation that implement the innovative development program in the activities of innovative territorial clusters;
- Extension of the part of tax benefits to the territory of the innovative territorial clusters.

**Figure 1:** Stages of the cluster policy implementation in Russia

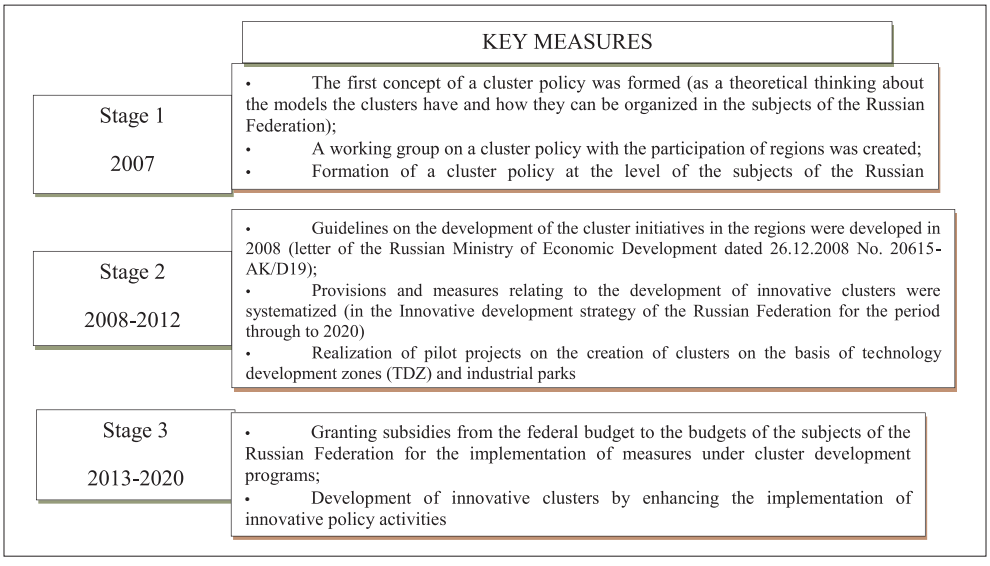
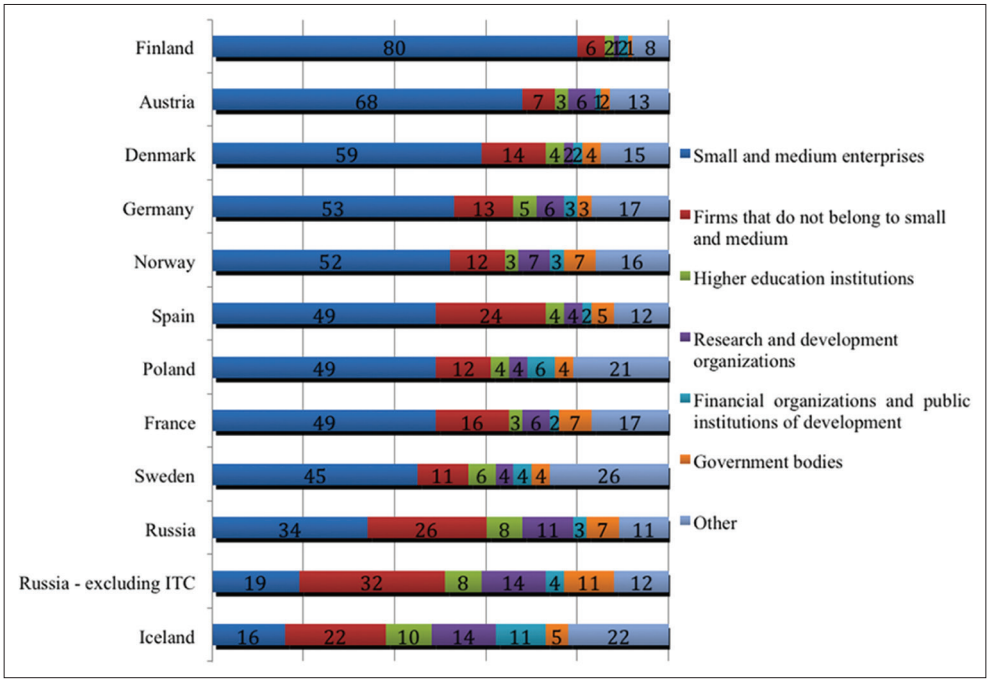


**Figure 2:** Proportion of various categories of cluster participants in the EU and in Russia (%) (Bergman and Feser, 1999)




In general, the listed directions of support of the development of innovative clusters provide an integrated approach to solving the existing problems.

The main restriction of the Russian economy in the implementation of a successful cluster policy lies in the fact that clusters are created in an unusual business environment, namely, in the conditions of weak competition. In 2014, according to the Doing Business rating of favorable business conditions, Russia ranked 62 among 189 countries. By the individual components that are measured in this rating, Russia occupies the lowest places, such as by "Dealing with Construction Permits" - the 156-th, by "International Trade" - 155-th, by "Connection to Electric Networks" - 143-th (Bortnik at al., 2015). Consequently, the complicated access to infrastructure is an obstacle faced by Russian clusters.

In addition, there are certain risks when assessing the potential of the territories at the federal level for the future formation of innovative clusters. According to Porter's et al., Ketels, the state should not select the potential cluster participants, their projects and development priorities for subsidy purposes. Its part in the cluster policy should be limited to co-financing and the initiation of clusters, support of the existing and emerging clusters in all sectors of the economy (and not only in the advanced and fast-growing ones), ensuring the available statistics at the level of each cluster, etc. (Dalum et al., 2002).

## 4. RESULTS AND DISCUSSION

Household structures with cluster features have existed both in the USSR and Russia. Territorial and industrial complexes (TIC), industrial and scientific-production associations can be prototypes of the clusters.

In Russia, according to experts of the Russian cluster observatory of the HSE, there are at least 125 regional clusters, of which more than half have formed governing bodies, and one-third - the developed strategic and program documents regulating their development. Of these, more than 70 get the methodological and consultative assistance in the framework of the cluster development centers.

The Ministry of Economic Development of the Russian Federation selected projects of innovative territorial clusters in March-June 2012 to determine the pilot projects of development of territorial innovative clusters.

94 applications in total were received from 50 regions, of which, following the results of the competitive selection, the list was approved containing 25 innovative territorial clusters (ITC) from 19 subjects of the Russian Federation, divided into the first and second groups.

The first group included 14 ITCs that are a priority in receiving state funding (through the provision of subsidies from the federal budget in the amount of up to 5 bln rubles, over 5 years from 2013).

The second group included 11 ITCs, which are also supported but do not receive funding from the federal budget at the first stage.

The main vector of innovative development can be traced quite clearly: It is planned to develop medicine and pharmaceuticals - 7 of the selected clusters are more or less engaged in them; information and communication technologies (6 clusters); nuclear and radiation technologies (6 clusters); manufacture of aircraft and spacecraft (5 clusters); new materials (4 clusters); oil refining (3 clusters); mechanical engineering, instrumentation and automotive industry (2 clusters each), as well as the chemical industry (1 cluster).

Thus, the largest number of ITCs relate to the following enlarged areas of technological specialization: "Information and communication technologies and electronics" and "Pharmaceuticals, biotechnology and medical industry."

It should be noted that after the merger of similar clusters by specialization and geographical location, their total number in the final List decreased, and the combined clusters "Innovation cluster of information and biopharmaceuticals in Novosibirsk region" and "Pharmaceuticals, medical technology and information technology of Tomsk region" acquired a mixed inter-sectoral nature.

Kamsky innovative territorial and production cluster of the Republic of Tatarstan leads by the number of employees in organizations participating in the cluster (about 370 thous. people). The cluster of Tomsk region is ahead of all others by the number of participants (about 300 organizations). The cluster of the Republic of Mordovia is first by the proportion of cluster participants involved in joint projects (86%). The largest number of joint research and innovation projects in 2014 has been organized in the cluster of Tomsk region (35 projects). Clusters of Zelenograd and Dubna outstand by the number of joint "business-to-business" (B2B) projects. The most long-term training of cluster managers was held in the cluster of Kaluga Region in 2014, which lasted a total of 42 days. The largest number of communication activities were carried out in 2014 in Tomsk region (Lundvall and Johnson 1994).

The innovative territorial clusters include the leading Russian scientific institutes of Russian Academy of Sciences (in particular, the national research center "Kurchatovsky Institute"); leading national research universities (in particular, MIPT, MIET and MISA, etc.); leading engineering companies (in particular, State Corporation "Rosatom," CJSC "Sukhoi Civil Jets," JSC "Kamaz," etc.) and the companies of the information and communications sector (in particular, JSC "Rostelecom," JSC "Yandex," etc.), as well as leading companies in the biotechnology sector (in particular, JSC "Valenta Pharmaceuticals," JSC Chemical and Pharmaceutical plant "Akrikhin," etc.); largest enterprises of the fuel and energy complex (in particular, JSC "Gazprom," JSC "Tatneft," JSC "Nizhnekamskneftekhim," etc.).

Basically, the innovative territorial clusters are concentrated in the macro-regions of the European part of Russia (18 clusters), due to the highest density of population and economic activity. The vast majority of ITCs are located in regions with traditionally high level of innovative activity: Volga (9 ITCs), Central (6 ITCs, of which 5 are in Moscow and Moscow region) (Table 1).

It should be noted that despite the fact that more than 1/3 of clusters are located in Volga FD, the clusters themselves are not large. Volga FD is almost on the same position as Central FD by the number of resident enterprises, which can be explained by approximately equal production capacities in these regions.

According to the information from the Russian Ministry of Economic Development, the clusters included in the program produced goods worth about $2 trln rubles in 2015,

**Table 1: Innovative territorial clusters by federal regions of the Russian Federation**

| Federal region of the Russian Federation | Number of clusters | Number of clusters in % of the total number |
|---|---|---|
| Central FD | 6 | 24 |
| Northwest FD | 3 | 12 |
| Volga FD | 9 | 36 |
| Ural FD | 1 | 4 |
| Siberian FD | 5 | 20 |
| Far East FD | 1 | 4 |
| Total | 25 | |

- 0.5 bln. rubles more than in 2013. The most successful clusters are the Bashkortostan petrochemical cluster, the cluster of pharmaceuticals, biotechnology and biomedicine of Kaluga region, the cluster of information technology of Novosibirsk region, and the aerospace cluster of Samara region.

The Russian Ministry of Economic Development expanded the program to support territorial innovation clusters in Russian regions in 2016 to include the Perm cluster of optical technologies.

## 5. CONCLUSION

It is important to note that the cumulative effect of the operation of enterprises inside the innovative territorial cluster exceeds a simple sum of the effects produced by individual enterprises in market conditions (synergy). This factor is one of the most fundamental in the determination of the cluster creation goals.

A closer examination of what we call innovation clusters is rather an imitation thereof. After all, what is a cluster, according to the classical definition? It is formed in a business environment with open mechanisms of competition, a high level of trust between economic agents, legal regulations that are valid and respected by all parties, and an innovative infrastructure. Our clusters meet virtually none of these criteria or meet only in small ways. Instead of real clusters, in practice the structures are formed that better suit territorial and production clusters or scientific protoclusters (multi-industry agglomerations around the major institutions). Such structures have also existed in our country before.

In Russia, the ITCs are created through the realization of the state policy, i.e., "from the top," their specialization has not passed the preliminary "market test." With this approach, when the state plays the leading role in stimulating the clustering of territories, there are a number of disadvantages and risks. A major shortcoming of almost all pilot ITCs is insignificant contribution of business and inadequate internal competition. The cluster ideology implies that its functions are necessary in the first place for the participating enterprises, and therefore business forces should mainly finance the cluster operation. The sustainable competition and competitiveness of enterprises participating in the cluster are not ensured. This is primarily due to the fact that the infrastructure and enterprises of the clusters are "fueled" by the funding within the state programs at the initial stage, thus creating elements of unfair competition and hence uncompetitive products in the case of the termination of funding.

To a lesser extent, this applies to the clusters belonging to the fields of ICT and electronics, pharmaceuticals, biotechnology and medical industries. In at least ten pilot clusters, the proportion of companies is very low - <50% (World Bank Group, 2016). The sectoral structure of the ITCs participating in the competitive selection of the Russian Ministry of Economic Development cannot be called unexpected. On the whole, the participants of the competition were TIC that have developed back in the Soviet Union, whose major changes in the post-Soviet era were changes of ownership and business owners. Therefore, one of the distinguishing features of ITC is an insufficient number of small and medium-sized firms, which are the main target group of cluster initiatives abroad (Kurbatov et al., 2015; Kurbatov et al., 2015).

ITCs in the territory of Russia should also develop after discontinuation of state support, becoming drivers of innovative development of economy of Russia and its regions.

Of course, in general, the measures of the cluster policy in Russia are relevant, valid and logical. At the same time, the priority vector of further ITC development should be the implementation of the strategy of the innovative market expansion with the focus on the world market and interaction with other clusters both within the region and beyond, including international cooperation. In addition, it is assumed that a broad announcement of the success of a number of supported clusters will lead to the involvement of a larger number of enterprises in the processes of self-organization and the development of joint projects. Such an increase in the number of clusters can significantly increase the efficiency of the cluster policy, reinforcing competition between clusters for receiving state support.

We also believe that the state should be the main investor at the initial stage of the cluster formation, while the further development requires the transition to a mixed funding, and even self-financing. Therefore, the algorithm of the implementation of the cluster policy will be required to repeat. It is necessary to improve the system of financial support of the clusters and avoid unnecessary care for the cluster participants. This will ensure uniform cluster development in both the European and Asian parts of Russia.

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