Industrial clusters in St. Petersburg as a basis for development of Arctic territories

Elena Khutieva¹, Alexander Maizel¹, and Marina Vlasova^{1,}*

¹Saint-Petersburg state university of economics, 21 Sadovaya str., 191023 Saint-Petersburg, Russia

Abstract. The exploitation of Arctic resources is becoming now one of the most important directions of Russia's strategic development. The coordination center for this project is St. Petersburg. The article assesses the potential of this region which forms an essential prerequisite for the effective implementation of the given work from the standpoint of the state and prospects of industrial clusters formed in its territory. The subjects of the cluster environment of St. Petersburg relevant programs of state support are divided into three categories: 2 innovative territorial clusters, 3 territorial clusters, 9 territorial clusters administered by the Center for cluster development. Specific recommendations for them are proposed on the basis of analysis of their strengths and weaknesses, as well as assessment of opportunities and threats to their development.

1 Introduction

Cluster analysis helps to identify the region's economic strengths and challenges and identify ways to shape its economic future.

More and more territorial clusters cover only part of the global value chains, it is particularly noticeable in high-tech sectors.

Thus the requirement of regional concentration of companies is losing universality. It is not enough to have a significant number of companies operating in a particular sector – these companies should be part of the network.

From this point of view, it is more important to have a system of interconnected companies present in a certain territory.

In 2013 under the leadership of the president of the State polar academy A. Chilingarov the first meeting of the Polar commission on the establishment of St. Petersburg Arctic cluster took place [1].

The strategy for the development of the Arctic zone of the Russian Federation until 2020 provides for the participation of the city in the development of the

Arctic cluster, since there are concentrated scientific and industrial organizations that are directly related to the development of the Arctic.

Since they are talking about the integrated development of the Arctic territories, it is «St. Petersburg which by definition is the structure-forming center of the North-West of Russia that can become the core of this complex development» [2].

* Corresponding author: vms68@yandex.ru

2 Research methodology and statistics

The formation of the city as a communication center that promotes the development of other territories requires a preliminary assessment of the potential of clusters located on its territory.

The subjects of the cluster environment of St. Petersburg relevant programs of state support include territorial clusters which are divided into categories as follows (as of October 21, 2016) [3]:

1. Innovative territorial clusters:
 - 1.1. Cluster of medical, pharmaceutical industry, radiation technologies;
 - 1.2. Cluster «Development of information technologies, radio electronics, instrument-making, communication and information and telecommunications in St. Petersburg»;
2. Territorial clusters:
 - 2.1. Innovation and technological cluster of mechanical engineering and metalworking of St. Petersburg;
 - 2.2. Cluster water supply and wastewater disposal in Saint-Petersburg;
 - 2.3. Cluster of creative industries in St. Petersburg;
3. Territorial clusters administered by the Center for cluster development:
 - 3.1. Territorial innovative industrial cluster «Composite cluster of St. Petersburg»;
 - 3.2. St. Petersburg cluster of clean technologies for urban environment;
 - 3.3. Cluster of machine tool industry of St. Petersburg;
 - 3.4. Innovative industrial cluster of transport engineering «Metro and railway engineering»;
 - 3.5. The HiTech and engineering cluster;
 - 3.6. The cluster of development of innovations in the energy industry;
 - 3.7. A cluster of jewelers of St. Petersburg;
 - 3.8. The cluster of laser technologies and equipment;
 - 3.9. Industrial automotive cluster «Automotive industry North-West.»

Specific recommendations for some of these clusters are proposed on the basis of analysis of their strengths and weaknesses, as well as assessment of opportunities and threats to their development [4].

In the Cluster of medical, pharmaceutical industry, radiation technologies there is a large number of enterprises producing uniform products, as well as close links between them, allowing to talk about horizontal integration.

Given the steady growth of the pharmaceutical market which is predicted, it is advisable to use this circumstance to deepen the specialization of cluster members: this will allow, firstly, to reduce production and pre-production costs, and secondly – to expand the range of products.

Both directions lead to growth of competitiveness in the regional and global markets, especially if to organize joint production with the foreign companies; possibility of the last is confirmed by existence at participants of a cluster of a certain experience of the international cooperation.

Furthermore, it should ease the conditions of lending to parties that will allow them to overcome the emerging shortage of resources and expand the training of specialists in educational institutions of the cluster.

The reduction in costs is particularly relevant in view of the declining purchasing power of the population in recent years which is unlikely to change in the foreseeable future.

The prospects of the Composite cluster are largely related to the further promotion of the policy of import substitution.

On the one hand, the state that has adopted it creates good opportunities for expanding the sales of cluster products domestically and possibly abroad; on the other hand, the use of

imported raw materials contradicts such a policy and sooner or later it will be necessary to make a choice.

Under these conditions, taking into account the fact that the circumstances that led to the desire for total localization remain for an indefinite time, it is necessary to seriously consider the possibility of switching to domestic raw materials – especially since they are available in the region under consideration.

Machine tool industry cluster of St. Petersburg deserves special attention because the city occupied formerly a leading position in the industry[5].

Today, as it turns out, the cluster enterprises do not have their own production areas, and fixed assets are worn out by 60 – 80%.

In addition, there is a lack of qualified personnel which is a natural result of a long decline and the planned recovery of the industry. Taking into account the preservation of the key competencies of the domestic machine tool industry and the high professional level of the heads of the cluster organizations, as well as the need for significant investments to launch the serial production of new types of equipment, it seems reasonable to attract foreign investors to the development of the cluster. The role of the state here is obvious – the provision of joint ventures with plots for the expansion of production on the most favorable terms.

Transport engineering cluster «Metro and railway engineering» has good growth prospects due, first of all, to the high concentration of industry enterprises in the territory of St. Petersburg; joining the cluster of St. Petersburg Polytechnic University; the modern level of technical re-equipment of enterprises engaged in the development and production of parts, components and components of a wide range; high concentration of objects of innovative infrastructure in the territory of St. Petersburg; intra-cluster cooperative chains, allowing to carry out almost a full cycle of creation of production; availability of modern competitive developments of new products, highly skilled technical workers and modern equipment[6].

However the high dependence on public procurement brings excessive uncertainty to these prospects.

In order to reduce it is recommended to expand sales markets, among them – on the basis of cooperation (in the form of subsidiaries and dependent companies, alliances, etc.) with local manufacturers and repair companies in other Russian regions.

The government of St. Petersburg can play a positive role in this by supporting such cooperation with tax incentives and credit assistance.

The St. Petersburg cluster of clean technologies for the urban environment has an excellent potential for rapid development, due to the high relevance of environmental issues.

A positive factor is that now it includes 36 organizations (including educational), which employ about 44 thousand people.

However, the weakness of the Russian social movements and institutions focused on the protection of the environment deprives the activity of the cluster any strong public support that exists in countries with more advanced social structure.

Under such circumstances the state is forced to replace social movements – as far as possible and as far as it wants.

The St. Petersburg authorities should take the initiative to lobby the interests of the cluster, first of all, at the Federal level. It is meant to tighten the norms regulating different aspects of interaction with the environment which implies active work in the relevant state structures (government, presidential administration, relevant ministries, etc.)

In addition, it is necessary to find channels of influence in the right direction on the authorities in other Russian regions.

Certain opportunities are seen in connection with Russia's membership in the APEC Organization where environmental issues are given considerable attention.

The energy and industry innovation cluster has many strengths.

These include the availability of competent professionals to solve innovative production problems in various fields of energy, experience in the formation of chains of interaction with large power grid and generating companies, experience in the formation of small innovative enterprises, experience in the implementation of a unified quality management system for several small businesses, the availability of patents for development and good prospects for obtaining new patents.

A particularly positive aspect is the high demand for cluster products in different regions, but it is combined with the resistance of potential customers to the introduction of new equipment and systems of Russian production (i.e. preference for imported equipment).

Since it is impossible and pointless to overcome this resistance, the only reasonable way is international cooperation in order to improve the characteristics of the cluster products to the level required by customers.

The above-mentioned strengths of the cluster form a real basis for the effective interaction of its participants with foreign manufacturers, which will eventually include a significant export component.

This will fully comply with the declared policy orientation of St. Petersburg on innovative development of industry and support for the development of small and medium-sized enterprises; as well as the state policy on import substitution and export support[7].

3 Results

The main recommendations for the development of clusters, as well as the characteristics of their determining factors in compressed form are presented in the following table.

Table 1. The main recommendations for the development of clusters.

Cluster	Characteristics of the condition	Recommendations
Cluster of medical, pharmaceutical industry, radiation technologies	Developed horizontal integration; sustainable market growth	Deepening of specialization and creation of joint ventures; easing of lending conditions; cost reduction; enhanced training of specialists
Composite cluster	State policy of import substitution	The transition to the domestic raw materials
Machine tool industry cluster of St. Petersburg	General decline (production areas, technical base, personnel)	Attraction of foreign investors; preferential granting of land plots
Transport engineering cluster «Metro and railway engineering»	Good resource conditions; excessive dependence on government orders	Expansion of sales markets; cooperation with regional enterprises; preferential taxation and assistance in lending from the government of St. Petersburg
The St. Petersburg cluster of clean technologies	Obviously high relevance of the direction; a large number of participants; weak public support	Lobbying of cluster interests at different levels (other Russian regions, Federal structures, APEC organization)
The energy and industry innovation cluster	Powerful resource and organizational potential; high demand; preference by customers of import production	International cooperation with the aim of improving the characteristics of products

4 Discussion

Further development of clusters (at least some of them), as expected in the introduction, is associated with going beyond a particular region.

At the same time, depending on the specific configuration of factors, it is advisable to use different forms of such expansion: cooperation with enterprises from other Russian regions (Transport engineering cluster «Metro and railway equipment»), attracting foreign investors (Machine-tool cluster and Cluster of medical, pharmaceutical industry, radiation technologies), cooperation with foreign companies (Cluster of innovation in the energy sector and industry).

The question is how relevant this is for other clusters, that is, to what extent they can be considered as such at all – with all the accompanying strengths and other characteristics – without going beyond the regional framework; this problem becomes particularly important due to the rapidly changing nature of Russia's relations with the rest of the world. Another controversial issue is the role of the state. Most of the clusters discussed in the article need active support from regional authorities: from the provision of land plots to lobbying at the international level. There is no doubt that it is of interest to find out, first, how to strike a balance between state assistance and limiting its interference in the functioning of the cluster; and second, whether there is an alternative to state participation (especially given the difficulty of achieving this balance).

5 Conclusions

The creation of the Arctic cluster should be based on the territorial clusters formed up to now in St. Petersburg. This initiative matches emerging trend which expands the composition of the clusters beyond the boundaries of specific territories.

It can be confidently argued that the identified condition for the successful development of a number of clusters – active support from the state – in this case will play a crucial role; but such support is fraught with certain problems. In addition, there is reason to believe that the effective development of most clusters requires the restoration of partnerships with developed countries.

References

1. Project of Russian Federal law «On the Arctic zone of the Russian Federation» (2013) <http://www.consultant.ru/cons/cgi/online.cgi?req=doc&base=PRJ&n=102357#031492186406365086>
2. A. Karlik, Expert North-West, **34** (2012)
3. URL : http://spbcluster.ru/monitoring1/monitoring_klasternoj_sredy
4. The order of the Government of St. Petersburg from 22.04.2016 No. 29-rp «On programs of development of territorial clusters in St. Petersburg» (2017)
5. URL : <http://spbstrategy2030.ru/UserFiles/Files/tom3final.pdf>
6. M. Vlasova, A. Pimenova, S. Kuzmina, N. Morozova, Procedia Engineering, **12** (2016)
7. V.V. Okrepilov, S.N. Kuzmina, V.L. Makarov, A.R. Bakhtizin, Economy of Region, **2** (2015)