The European Proceedings of
Social & Behavioural Sciences
EpSBS

ISSN: 2357-1330

https://doi.org/10.15405/epsbs.2019.12.05.128

MTSDT 2019

Modern Tools for Sustainable Development of Territories. Special Topic: Project Management in the Regions of Russia

CLUSTER APPROACH AS AN INNOVATIVE TECHNOLOGY OF REGIONAL DEVELOPMENT

Yu. V. Daneykin (a), O. P. Ivanova (b)*, V. A. Trifonov (c), M. M. Kozyrev (d), K. Yu. Voloshenko (e)
*Corresponding author

(a) Yaroslav-the-Wise Novgorod State University, ul. B. St. Petersburgskaya, 41, Veliky Novgorod, Russia, Yury.Daneykin@novsu.ru
(b) Yaroslav-the-Wise Novgorod State University, ul. B. St. Petersburgskaya, 41, Veliky Novgorod, Russia, prof-ivanova@rambler.ru
(c) Yurga branch (Institute) of the national research Tomsk Polytechnic University, Yaroslav-the-Wise Novgorod State University, ul. B. St. Petersburgskaya, 41, Veliky Novgorod, Russia, v.trifonov@rambler.ru
(d) Yaroslav-the-Wise Novgorod State University, ul. B. St. Petersburgskaya, 41, Veliky Novgorod, Russia, Mikhail.Kozirev@novsu.ru
(e) Immanuel Kant Baltic Federal University, Alexander Nevsky st, 14, Kaliningrad, Russia, KVoloshenko@kantiana.ru

Abstract

The analysis of programs of development of territories of the advancing social and economic development (PSEDA) in monotowns shows that some of them are based on use of the cluster approach to structuring of the industry in the city. However, in addition to the possible advantages of using clustering within regions, it is necessary to assess the problems and limitations of creating municipal clusters. This article presents the results of a study of the problems and obstacles to the emergence and development of industrial clusters on PSEDA single-industry towns. Possible risks, problems, limitations of clustering in single-industry towns are identified not only on the basis of systematization of existing research in this area, but also as a result of a survey of potential participants of clusters in the Kemerovo region. Identified issues, risks, constraints clusterization in the framework of the program of creation of PSEDA in single-industry towns classified by sources of their occurrence: due to the characteristics, features of the single-industry towns; and depend on the characteristics, the characteristics of the PSEDA, and in particular, requirements for the residents and their investment projects; determined by the existing risks and difficulties in the practice of cluster formation and functioning of clusters. Also used the principle of dichotomy when assessing the possibility (or impossibility) of clusterization on the PSEDA single-industry towns, representing the opposition: the success factor for the sustainable development of the municipal cluster restriction (risk) of occurrence of successful development of the municipal cluster PSEDA single-industry towns.

Keywords: Cluster, risks of cluster policy, single-industry town, territory of advanced socio-economic development.

https://doi.org/10.15405/epsbs.2019.12.05.128
Corresponding Author: O. P. Ivanova
Selection and peer-review under responsibility of the Organizing Committee of the conference
eISSN: 2357-1330

1. Introduction

In the second half of the twentieth century, a new economic space began to take shape in the world, based on the market economy. The world community has entered a period of its development, when global processes and problems began to determine the fate of mankind. The global economy is unfolding processes, collectively referred to as globalization.

There was a sharp revolutionary leap in information, based on the latest advances in electronics and space communications systems. The information revolution has found its fullest expression in the development of the worldwide electronic communications network - the Internet, which represents a vast supranational flow of information in any area of public life. Progress in telecommunications allows you to get the necessary information from anywhere in the world in real time and make quick decisions.

The international division of labor in modern conditions is increasingly determined by the development in different parts of the world of clusters specializing in the production of high-quality competitive products (services) in accordance with the competitive advantages of local (national) conditions. Clustering of economies in many countries of the world has become widespread and has become part of state policy to increase the competitiveness of these countries. In mesoeconomics, the cluster is becoming a new innovative technology for regional development.

2. Problem Statement

Analysis of scientific research has shown that the subject of scientific research is not only to find the methods to identify clusters, but also to analyze the methods of cluster formation (Karayeva, 2016). A large number of papers on the topic of clusters and the strategies for their development have been published in the last decade. In particular, the studies of the results of the implementation of clusters' programs are presented in the papers by Abashkin, Boyarov and Kutsenko (2012). Cluster policy is analyzed in the works of Islankina, Kutsenko, Rudnik and Shadrin (2017). The following sources (Gokhberg & Kuznetsova, 2011) show the studies of the influence of regional features on clustering processes and review the preconditions of cluster formation. Gokhberg and Shadrin (2013) conducted research, analysis and systematization of the best practices of the cluster approach. In their article systematized the work of Russian and foreign researchers on cluster policy. The article also analyzed the organizational aspects of cluster policy, and identified three levels of its organization. Moreover, it gave the typology of organizational structures of cluster policy. Nevertheless, it should be noted that there are practically no studies focused on the analyzing the joint use of the cluster approach and the mechanism of PSEDAs in monotowns.

It makes sense to consider the interpretation of the term "cluster" and to identify the advantages and disadvantages of cluster formation for their participants and their territories, based on the publications of foreign and Russian researchers. Back in the early 20-th century, Marshall (1920) suggested that external effects can be generated by the companies united by the agglomeration bonds. This regional clustering effect is conditioned, in particular, by the exchange of information and knowledge in the cluster (Porter, 1990; Krugman, 1991). The research done by Porter and Krugman attracted attention of some professionals. The topic of scientific theoretical and empirical studies is the interaction between industry clusters and entrepreneurial activity in the region.

https://doi.org/10.15405/epsbs.2019.12.05.128
Corresponding Author: O. P. Ivanova
Selection and peer-review under responsibility of the Organizing Committee of the conference
eISSN: 2357-1330

3. Research Questions

Disclosure of the above stated problems necessitates the search for answers to the following questions:

- What is a cluster and what are the reasons for the clustering of the regional economy?
- What types of clusters currently exist? What are their distinguishing features, what are the advantages and disadvantages?
- What is the effect of clustering on the development of single-industry towns? What consequences does it lead to?
- What are cluster initiatives and what is their role in strengthening the innovative component of the economy?

4. Purpose of the Study

The goal of this article is not only to review the existing scientific research and development in the field of clustering of the regional and municipal economy, as well as to create a term-base for the topic of this research, but also to assert the possibility of joint use of the cluster approach and the mechanism of PSEDAs in monotowns for the purpose of solving social and economical problems of mono-profile territories.

5. Research Methods

The methodology of our research is based on a successful and effective for scientific research, in our opinion, the methodological approach used in the work by Russ and Jones (2008). The essence of this methodology is to conduct an integrative literature review using screening when searching for keywords in headlines and abstracts. A summary of the research process is in Figure 01.

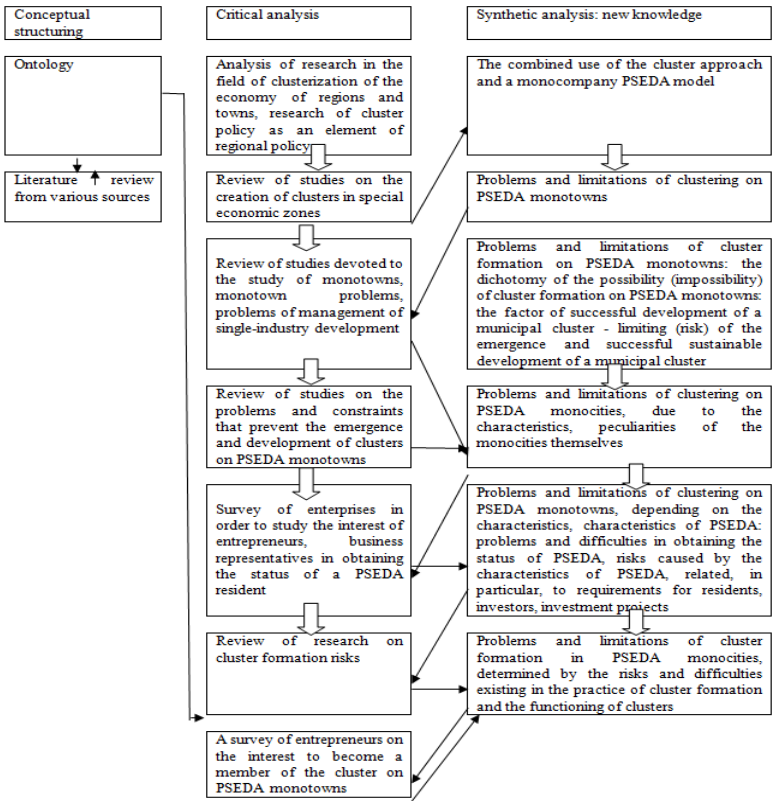

Figure 01. Research Methodology

https://doi.org/10.15405/epsbs.2019.12.05.128
Corresponding Author: O. P. Ivanova
Selection and peer-review under responsibility of the Organizing Committee of the conference
eISSN: 2357-1330

The use of ontology as a specification of conceptualization, a tool for structuring information, a system of a set of concepts and a set of statements about these concepts allowed us to form an idea of research in the cluster sphere conducted by Russian and foreign researchers.

6. Findings

Two concepts, “a cluster” and “a cluster initiative”, are used in scientific research. A cluster is a complex entity; it is the alliance of various companies for joint activities. Cluster presumes cooperation based on the participation in the value delivery systems, as well as competition. R. Breault defines cluster as a multisectoral concentration of companies that creates jobs, exports goods and services, and has common basic economic needs and unites the public sector of economic development with legislatures of different levels, universities and colleges, the educational community, as well as foundations and all other stakeholders (Breault, 2000).

A cluster is the concentration of companies that are capable of producing synergies due to their geographical proximity and interdependence, even though the number of employees in them may not be too noticeable. Cluster is also defined as a number of mutually supportive companies in manufacturing or service sectors, as well as public, private and semi-public research schools, and schools of development that are linked by the labor market and / or input-output connections, and/or technological contacts.

Regional clusters are industrial clusters in which the participating companies exist in geographical proximity. These clusters belong to the geographically limited concentrations of interrelated companies, and they can be used as a key word to denote the earlier concepts of industrial areas, specialized industrial agglomerations and local production systems.

An industrial cluster is a set of process owners in the industrial field that are connected by relations due to their territorial proximity and functional dependence. They are located either on the territory of a single constituent entity or in the territories of several constituent entities of the Russian Federation.

A cluster initiative is defined as a project developed and implemented by the consolidated efforts of business, authorities and/or scientific organizations. Their common goal is to form and develop a cluster, and ensure its competitive advantage. Such project involves commitment of representatives of public and private sectors to identify the cluster, as well as to justify and implement its strategy. This is a complex project carried out by cluster organizations. In particular, the goal of such cluster organizations is to create a favorable institutional environment within a cluster, and to facilitate the cluster participants in the implementation of joint projects. Cluster initiative is the type of institutional agreement aimed to organize the best cooperation of cluster participants in order to receive various benefits.

Cluster initiatives are effective mechanisms that stimulate innovative development and implement regional economic policy via a bottom-up method. In practice, not all cluster initiatives have solid grounds (i.e. clusters). Successful cluster initiatives emerge in a supportive institutional environment. The Russian institutional environment does not have the features that fully contribute to the successful implementation of cluster initiatives. This is often due to the weak horizontal interactions of the potential participants, and due to the presence of monopolistic structures in the regions.

Cluster formation in the territories enables regions and cities to ensure an increase in their competitive ability and productivity by facilitating access to specialized resources, as well as to increase

https://doi.org/10.15405/epsbs.2019.12.05.128
Corresponding Author: O. P. Ivanova
Selection and peer-review under responsibility of the Organizing Committee of the conference
eISSN: 2357-1330

innovation potential through competition within the cluster. These are the advantages of cluster formation for a monotown: growth of tax base due to deployment of the companies, including subcontractors, as well as activation of innovation process, and improvement of socio-economic situation for the population. Cluster formation helps to improve the quality of the prepared strategic documents through the use of the knowledge of the regional environment by cluster participants. This forms true and qualitative representation of the professional community, which is necessary for creating programs of development of PSEDAs in a monotown. Benefits of cluster performance are as follows: clusters strengthen the potential of a territory in order to create jobs and improve the quality of life; they stimulate regional economic development, and increase the participation of the private sector, as well as scientific organizations and the local community in the management of the economic, political and social circles of a territory; clusters promote creation of a flexible, innovative and competitive economic structure; they are also able to adapt more quickly to the changes in the market. Companies and organizations, the participants of a cluster, receive benefits, as industrial companies and financial organizations, and scientific institutes enter into long-term contracts, a single information field is formed, and pricing is optimized. Therefore, cluster members benefit from lower production costs and increased productivity.

The possibility of sharing a cluster approach and the PSEDAs model in order to diversify the economy of monotowns is explained, in particular, by the revision of the paradigm of cluster policy. The most important are not structural changes, but the creation of new industries as a result of building additional value chains and restructuring the old ones (Kutsenko, 2015). In 2012-2013 the European Cluster Observatory, together with PwC, developed a methodology for identifying so-called emerging industries in the EU, resulting in the creation of new or drastic transformation of existing value chains. They also developed a methodology for assessing clusters in certain regions needed to determine the effectiveness of creating world-class clusters. Clusters actively participate in the development and implementation of regional strategies (smart specialization). In addition, as shown by recent studies in the field of regional development, knowledge-based economy, and clusters, economic indicators (performance indicators) are needed in order for industrial regions to transition to their development. Such transition is based on knowledge-based economy and is considered at the level of a region, a sub-region (a city) and a cluster. The above mentioned article (Russ, and Jones, 2008) came up with a set of such indicators. Those indicators allow to assess the progress of the regional economy within the process of development of joint initiatives, as well as to identify the trends. The development indicators can form the basis for regional strategies, and be a tool to communicate with public, as well as with the authorities. In the process of creating such a system of indicators, the authors of the article use the following principles: focus on the construction of a new economy (knowledge economy), transition to joint economic development, and change of regional image, as well as social and cultural thinking. In addition, the authors emphasize the principle of promoting the development of industrial clusters. Furthermore, Russ M. and Jones J. K. considered it important to support cooperation in the region, and also the need of practical development of the strategy of strategic planning as a process of management and economic development. This system of indicators includes indicators of the regional level (in particular, cultural factors, and the quality of infrastructure, and quality of life, and education, as well as human capital, and financial capital, and market capital, and reconstruction capital). It is recommended that the selection of

https://doi.org/10.15405/epsbs.2019.12.05.128
Corresponding Author: O. P. Ivanova
Selection and peer-review under responsibility of the Organizing Committee of the conference
eISSN: 2357-1330

indicators at the sub-regional level is based on the criteria that reflect the uniqueness of a territory in a regional context. The above mentioned criteria are not enough to monitor the development of clusters. That is why it was suggested in addition to the criteria that was chosen with the participation of the public and leading cluster participants, to use a cluster performance assessment methodology. It was proposed the following: to take into account the evolutionary nature of clusters; to consider the complex, systemic nature of a cluster; to make note of social and anthropic characteristics; and to measure knowledge and competencies; and also to identify the networking of a cluster with the external environment; and to find funding.

Initially, the clusters formed in developing countries under the influence of "market forces" or "accidental causes". Clusters successfully appear in special economic zones and industrial parks. It is possible to apply the concept of a "mixed approach", i.e. creating free economic zones and using the cluster approach. Effective use of these two tools is possible in case of a timely assessment of internal strengths and market opportunities. A number of clusters in China emerged and developed precisely in the special economic zones, in particular, clusters of information processing and communication technologies in Zhōngguāncūn (Beijin), and electronics and biotechnology cluster in Pudong (Shanghai). The above mentioned clusters appeared as a result of effective functioning of special economic zones in which they were formed. In fact, these zones created "a greenhouse effect" for the clusters. Experience has proven that free economic zones and clusters in China tend to converge and overlap the effects of each other (The Cluster Initiative Greenbook).

In the Russian Federation, cluster initiatives are also beginning to emerge and develop in the territories with a special status and privileges (namely in science cities, Closed Adnistrative-Territorial Units, and special economic zones). They are formed mainly by the top-down approach, and represent an administrative mini-vertical (Kutsenko, Islankina, & Abashkin, 2017).

However, according to some scientists, Russian cluster initiatives are often primarily focused on solving the current problems of large state-owned companies, while small and medium size businesses are not only poorly represented in such interactions, but also are not fully involved in the strategic cluster management. To ensure the development of clusters, including PSEDAs in monotowns, it is necessary to analyze the problems and limitations of cluster formation within such areas, as well as to come up with the recommendations for the writers of cluster policy in the regions and monotowns.

7. Conclusion

To the cluster formation in the industry contributes the presence of at least ten industrial companies, objects of technological and industrial infrastructure, scientific and educational organizations located in the territory, and connected by cooperative relations that exist due to their territorial proximity and functional dependence. These companies might become the basis for the implementation of potential joint projects of the industrial cluster members in the short term (2-3 months are called as a prerequisite for the creation of an industrial cluster). In addition, the following could be also called as factors determining the feasibility of the formation of an industrial cluster: a positive current dynamics and a favorable prognosis for the development of sectional markets for a specific cluster; the prospect of growth in sales volumes of cluster members' products in these markets; intensification of the processes of

creating small and medium size businesses that specialize in the sphere of activities of the cluster on its territory; increase of the investment attractiveness of the area where a cluster is based and presence of private investors interested in the creation of a cluster and the implementation of joint projects of its potential participants. Taking into account the previously mentioned principle of dichotomy, it should be noted that the limitations of a cluster formation in the PSEDAs of monotowns could be the following: a town has less than ten industrial companies, objects of technological and industrial infrastructure, scientific and educational organizations; cooperation between different companies is developed poorly; the markets where the clusters can offer their products have a small capacity and a tendency to reduce the demand; the territory has a small number of small and medium size businesses, and the process of opening such businesses is complicated; there are no investors who are interested in the town.

Clustering is a process of co-location of companies and other active participants within a concentrated geographic area, co-operation around a specific functional niche, and establishing close relationships and working alliances to enhance their collective competitiveness. The principles of clusterization include the interdependence and complementarity of cluster members, the eagerness of the enterprise to increase individual competitiveness through participation in the cluster's operation, as well as the geographical proximity of cluster members, and networking of participants.

Acknowledgments

The article was written with the support of the Russian Foundation for Basic Research as part of the project “Development of methodological tools for managing single-industry towns of the Kemerovo Region using predicative analytics to counter the dangers of society and the economy”; No. 18-010-00244 A.

The authors want to express their heartfelt and sincere gratitude to Tatiana Lammers, a highly qualified Professional Translator (http://russiantranslator.synthasite.com) for the prompt, high-quality, accurate and easy-to-read translation of the article in which all the suggestions proposed by the editors of the Journal were taken into account. We hope for a long and pleasant future cooperation with this experienced, professional and talented translator.

References

Abashkin, V., Boyarov, A., & Kutsenko, E. (2012). Cluster Policy in Russia: From Theory to Practice. *Foresight, 6*(3), 16-27.

Breault, R. (2000). *The Evolution of Structured Clusters.* Retrieved June 30, 2019, from http://www.photonicsclusters.org/whatisacluster.html.

Gokhberg, L. M., & Shadrin, A. E. (2013). *Pilot Innovative Territorial Clusters in the Russian Federation*. Moscow: National Research University Higher School of Economics. [in Russ.].

Gokhberg, L., & Kuznetsova, T. (2011). S&T and Innovation in Russia: Key Challenges of the Post-Crisis Period. *Journal of East-West Business, 17*(2-3), 73-89.

Islankina, E. A., Kutsenko, E. S., Rudnik, P. B., & Shadrin A. E. (2017). *Innovative Clusters as the Leaders of Investment Attractiveness Worldwide.* Moscow: National Research University Higher School of Economics. [in Russ.].

Karayeva, F. E. (2016). Identifying the economic conditions for clusterization in a region. *European Social Science Journal, 1*(4), 456-461.

Krugman, P. (1991). Increasing returns and economic geography. *Journal of Political Economy, 99*(3), 483-499.

Kutsenko, E. (2015). Pilot Innovative Territorial Clusters of Russia: a Model of Sustainable Development. *Foresight, 9*(1), 32-55.

Kutsenko, E., Islankina, E., & Abashkin, V. (2017). The Evolution of Cluster Initiatives in Russia: the Impacts of Policy, Life-Time, Proximity and Innovative Environment. *Foresight, 19*(2), 87-120.

Marshall, A. (1920). *Principles of Economics*. London, UK: Macmillan.

Porter, M. E. (1990). *The Competitive Advantage of Nations*. New York: Basic Books.

Russ, M. & Jones, J. K. (2008). Regional Economic Development Indicators for a Knowledge-Based Economy in a Knowledge Deprived Region. *Journal of Regional Analysis and Policy, 38*(2), 189-205.