

THE MECHANISMS OF CLUSTER INFLUENCE ON THE SUSTAINABLE DEVELOPMENT OF THE REGION

UOT 332.1

DOI: <https://doi.org/10.30546/3006-0346.2025.2.86.280>

ALI BABAYEV

*Azerbaijan University of Tourism and Management, doctoral student**E-mail: alibabaish@outlook.com**ORCID <https://orcid.org/009-0002-8477-1533>*

Introduction

Today, cluster is seen as an important tool for increasing the competitiveness of regions and creating sustainable economic growth.[8]

The mechanisms of influence of clusters on sustainable development are diverse. They promote the introduction of new technologies, innovations, improvement of product quality, creation of jobs and development of social infrastructure.

In the context of economic instability and global challenges such as climate change, global market crises and pandemics, regions need to find new ways to develop sustainably. Clusters, by creating economic ecosystems, become catalysts for change. In addition, sustainable development requires the integration of economic, social and environmental aspects, which is impossible without creating effective intersectoral links, as envisaged in cluster initiatives.

Given the above circumstances, the need to develop conceptual frameworks aimed at ensuring the long-term competitiveness of cluster formations in the non-raw materials sector of Russian industry is growing significantly. This is becoming especially important in the context of dynamically developing global economic processes and strategic guidelines for industrial development.

Methods

The study was based on the application of a wide range of general scientific methods, such as analysis, analogy and synthesis, as well as an in-depth study of theoretical and practical approaches. Particular attention was paid to the system method, which allows us to consider the cluster as a complex socio-economic structure. The results of the study made it possible to propose a methodology for ensuring the sustainable competitiveness of regional industrial clusters, which comprehensively takes into account both internal aspects - innovative activity, quality of management and the level of cooperation among participants, and external factors, including public policy, development of infrastructure facilities and the dynamics of market conditions. The developed model is an integrated system of interrelated elements that provide a synergistic effect and

contribute to the sustainable and long-term development of clusters in the conditions of the modern economic environment.

Results

The concept of the cluster approach continues to attract the attention of researchers and government officials, as it is considered an important mechanism for stimulating innovation activity at the level of individual enterprises, industries and regions. Cluster support programs should be adapted to the specific conditions of each cluster, taking into account the characteristics of the market, industry specifics and regional features, which excludes a universal approach to cluster policy [5]. The most important component of successful cluster development is the effective combination of local characteristics and global flows of knowledge and innovation.

In the context of cluster evolution, researchers identify three basic strategies for regulating them:

1. The strategy of specialization (monoculture), which is aimed at deepening specialization within the cluster, focusing on increasing its integrity and concentration on a specific area.

2. The hubbing strategy, which involves the development of clusters through geographical expansion and strengthening their ties with external economic and innovation centers.

3. An integration strategy aimed at strengthening ties between cluster enterprises and other related industries, stimulating knowledge exchange and developing cross-industry innovative solutions [1].

The mechanisms of the impact of cluster formations on the sustainable development of a region can be considered through several key aspects, each of which has an impact on the socio-economic, environmental and institutional dynamics. Cluster, which is a concentration of interconnected production units, scientific and educational institutions in a limited area, acts as important agents for stimulating economic growth and innovative progress through synergistic interaction between participants [8].

1. Economic growth and innovation processes

Clusters stimulate innovative activity and enhance the competitiveness of regions by concent-

rating entrepreneurial activity, which creates the preconditions for intensive exchange of knowledge, technologies and production practices. Cooperation within clusters facilitates accelerated implementation of new products and advanced production technologies, increasing the overall efficiency of organizations in the conditions of tough competition. Specialization and cooperation of enterprises reduce transaction costs and ensure more rational use of production factors, which strengthens positions in external and internal markets. Development of close ties with scientific, educational and financial institutions turns clusters into attractive objects for direct and portfolio investments, which, in turn, facilitates scaling and diversification of production processes.

2. Creating jobs and improving the quality of life

The development of cluster formations leads to the expansion of the labor market both within the clusters themselves and in related industries, such as the service sector and infrastructure. The introduction of new technologies contributes to the growth of wages, which has a positive effect on the overall dynamics of income of the population and social mobility. The expansion of the number of jobs reduces unemployment and improves key socio-economic indicators of the region. In addition, cluster structures contribute to the improvement of the skills of the workforce by investing in education and scientific infrastructure, which strengthens human capital and increases its competitiveness.

3. Social development and integration

Clusters influence social infrastructure, providing opportunities for effective interaction between different social and ethnic groups. Initiatives implemented in cluster structures help reduce tensions and increase social harmony. Corporate social responsibility programs aimed at improving working conditions and developing sustainable environmental initiatives help increase social and economic stability, providing a solid foundation for sustainable development of the region.

4. Environmental sustainability

Cluster structures optimize the use of natural and energy resources through the joint use of infrastructure, waste recycling, and the introduction of environmentally friendly technologies. Clustering is used to implement methods to minimize environmental damage, which helps to increase environmental sustainability. Rapid integration of environmentally sustainable technologies, such as renewable energy sources and modern emission re-

duction techniques, supports the long-term preservation of natural resources.

5. Geographical and infrastructural development

Clusters influence the development of regional infrastructure by improving transport and communication links, which reduces logistics costs and improves interaction between different economic sectors. The integration of local economies improves the mobility of labor and goods, and also activates cooperation between the private and public sectors. Clustering contributes to the creation of new business and residential areas, the modernization of existing infrastructure and an improvement in the quality of life, which contributes to the growth of economic stability and social sustainability of the region.

6. International competitiveness of the region

Clusters have a direct impact on the expansion of the region's export potential and the attraction of foreign investment. Intensive development of cluster structures contributes to the deep integration of local producers into international markets, which increases the region's competitiveness in the global economy. The development of successful clusters helps strengthen the region's brand, improve its image and create favorable conditions for attracting foreign investment, tourists and entrepreneurs. This allows for an increase in not only the level of regional but also national economic growth by attracting global capital flows and technological innovations [8].

Thus, cluster structures play a key role in stimulating sustainable economic and social development of the region, influencing production, environmental, infrastructural and social aspects of functioning. Effective clustering contributes to both short-term economic growth and long-term sustainability of the region in the global competitive environment.

To realize the innovative potential of clusters, the availability of highly qualified personnel with the necessary educational and professional competencies is critically important. In regions with a personnel shortage, the development of industrial clusters often does not reach the expected levels of innovative activity [5; 10].

Key factors for the successful functioning of clusters include the presence of leading enterprises capable of initiating innovation processes and involving other organizations in their implementation, a high level of human resources potential, a developed innovation infrastructure, an effective partnership between the public and private sectors, as well as large-scale and flexible government support that ensures synergy within and between clusters [4].

The competitiveness of innovative industrial clusters at the regional level is formed through the interaction of macroeconomic, sectoral, territorial and microeconomic factors. The key role in this process is played by the economic and political situation, technological development, resource base and infrastructure capabilities, which influence the evolution of clusters [3].

The conditions that develop in the context of these factors determine priority areas of strategic development, such as ensuring technological sovereignty, increasing economic security, digitalization and import substitution.

The implementation of national and cluster strategies is carried out through public administration mechanisms and interaction with the private sector. Cooperation between clusters, which is key to their sustainability and competitiveness, includes the formation of alliances between suppliers of raw materials, manufacturers of components and services, which contributes to the creation of a common infrastructure and the solution of problems requiring the coordination of efforts of several clusters [5, 9].

Methods of intra-cluster interaction to improve competitiveness can be divided into several categories:

- ✓ methods for optimizing the use of the resource potential of participants;
- ✓ methods of improving the organizational structure;
- ✓ management techniques, including strategic and project management;
- ✓ practices of social and environmental responsibility;
- ✓ methods of digital business transformation [2, 10].

The implementation of strategic goals and regulatory measures within the framework of intra-cluster and inter-cluster interactions strengthens the competitiveness of clusters, associations and territorial economies, stimulating the development of related industries.

Metrics of sustainable competitiveness of industrial clusters are formed on the basis of integration of traditional indicators of resource and operational efficiency with modern methods oriented towards socio-economic sustainable development [5,6,8]. This approach provides not only a current assessment of the functionality of clusters, but also determines strategic directions for their long-term growth.

The main criteria for sustainable competitiveness of regional clusters include the concentration of resources among participants, localization of production capacities, volume of capital investment and employment, commercial efficiency, innovative capabilities, pace of technological progress, as well

as integration into international sustainable growth and digitalization initiatives. In the context of digital transformation, increased attention is paid to the degree of digitalization [3,4,7].

Conclusion

As a result of the study of the mechanisms of influence of cluster structures on sustainable development of regions, it was established that clusters play a key role in the formation of a flexible and sustainable economic system capable of effectively adapting to the challenges of the external and internal environment. For the successful functioning of clusters, highly qualified personnel, developed innovative infrastructure and effective partnership between the public and private sectors are necessary.

Thus, the creation and support of cluster initiatives is becoming an important step towards sustainable development of regions, allowing them to overcome economic, social and environmental challenges. It is important to note that the success of clusters depends on competent regulation, as well as taking into account local characteristics and international trends. Ultimately, the cluster approach can not only ensure the growth and stability of regional economies, but also lead to the harmonious development of society, improving the quality of life of the population and creating more sustainable production and environmental systems.

REFERENCES:

1. Akatov N. B. *Approaches to the formation of a modern model of industrial cluster management* / N. B. Akatov // *Bulletin of Perm National Research Polytechnic University. Social and Economic Sciences*. - 2015. - No. 4. - P. 19-35.
2. Bolgova E. V. *Economic clusters: institutional nature and conditions for the effectiveness of the regional innovation framework* / E. V. Bolgova // *Economic sciences*. - 2019. - No. 61. - P. 249-252.
3. Korableva A. A., Karpov V. V., Kapoguzov E. A. *The relationship between territorial innovation clusters and sustainable development of the region* // *Russian Journal of Economics and Law*. 2018. No. 4 (48). URL: <https://cyberleninka.ru/article/n/vzaimosvyaz-territorialnyh-innovatsionnyh-klasterov-i-ustoychivogo-razvitiya-regiona> (date of access: 20.02.2025).
4. Koryakov A. G. *Theoretical prerequisites for the development of Russian regions in the context of the concept of sustainable development* // *Theory and practice of social development*. 2012. No. 6. P. 186-191.
5. Krakovskaya I. N. *The concept of ensuring*

sustainable competitiveness of industrial clusters in Russia: basic provisions / I. N. Krakovskaya // *Economy, entrepreneurship and law*. - 2023. - Vol. 13, No. 2. - P. 343-364. - DOI 10.18334/epp.13.2.116984

6. Prosalova V.S., Nikolaeva A.A. *The role of innovative clusters in ensuring the import substitution program* // *Bulletin of the Altai Academy of Economics and Law*. - 2022. - No. 7-1. - p. 138-143. - doi: 10.17513/vaael.2311.

7. Mirolyubova, T. V. *System-spatial methodology for assessing the impact of an industrial cluster on the socio-economic development of a region* / T. V. Mirolyubova, D. A. Koshcheev // *Journal of New Economy*. - 2022. - No. 4 (23). - P. 69–86.

8. Novokshonova E. N. *Cluster policy and economic growth* // *Corporate governance and innovative development of the Northern economy: Bulletin of the Research Center for Corporate Law, Management and Venture Investment of Syktyvkar State University*. 2017. No. 2. P. 74–84.

9. *Strategies for sustainable development: economic, legal and social aspects: monograph* / A. V. Minakov, L. N. Ivanova, V. A. Borovkova [etc.]; Ch. ed. E. V. Fomin; Chuvash State Institute of Culture and Arts. – Cheboksary: Wednesday, 2023. – 172 p.

10. Fedorova N.V., Minchenkova O.Yu., Makeeva V.G. *Clusters in the system of formation of social stability of regions. Bulletin of the Russian State University for the Humanities. Series Economics. Management. Law*. 2021; (3 part 2): 172-186. <https://doi.org/10.28995/2073-6304-2021-3-172-186>

SUMMARY

This article examines the mechanisms of influence of clusters on sustainable development of regions. The author examines key aspects of the cluster approach, such as innovative activity, job creation, improvement of quality of life and introduction of environmentally friendly technologies. Various strategies of cluster regulation are discussed, including specialization, hubbing and integration, and factors determining the successful functioning of clusters at the regional level are identified. The article emphasizes the importance of state support for cluster initiatives and partnerships between the private and public sectors to achieve long-term sustainability. The conclusion provides recommendations on the effective use of clusters to increase the competitiveness of regions, ensure socio-economic stability and develop environmentally sustainable production practices.

Keywords: cluster, industry, region, competitiveness, sustainable development, mechanism, digitalization.

Klasterlərin regionun davamlı inkişafına təsir mexanizmləri XÜLASƏ

Bu məqalədə klasterlərin regionların davamlı inkişafına təsir mexanizmləri araşdırılır. Müəllif klaster yanaşmasının innovativ fəaliyyət, iş yerlərinin yaradılması, həyat keyfiyyətinin yaxşılaşdırılması və ekoloji cəhətdən təmiz texnologiyaların tətbiqi kimi əsas aspektlərini araşdırır. Klaster tənzimlənməsinin müxtəlif strategiyaları, o cümlədən ixtisaslaşma, mərkəzləşdirmə və integrasiya müzakirə edilir və regional səviyyədə klasterlərin uğurlu fəaliyyətini şərtləndirən amillər müəyyən edilir. Məqalədə uzunmüddətli davamlılığa nail olmaq üçün klaster təşəbbüslərinə dövlət dəstəyinin, özəl və dövlət sektorları arasında tərəfdaşlığın vacibliyi vurğulanır. Nəticədə regionların rəqabət qabiliyyətinin artırılması, sosial-iqtisadi sabitliyin təmin edilməsi və ekoloji cəhətdən dayanıqlı istehsal təcrübələrinin inkişafı üçün klasterlərdən səmərəli istifadəyə dair tövsiyələr verilir.

Açar sözlər: klaster, sənaye, region, rəqabətqabiliyyətlik, davamlı inkişaf, mexanizm, rəqəmsallaşma.

Механизмы влияния кластеров на устойчивое развитие региона РЕЗЮМЕ

В данной статье рассматриваются механизмы влияния кластеров на устойчивое развитие регионов. Автор исследует ключевые аспекты кластерного подхода, такие как инновационная активность, создание рабочих мест, улучшение качества жизни и внедрение экологически чистых технологий. Обсуждаются различные стратегии кластерного регулирования, включая специализацию, хаббинг и интеграцию, а также выявляются факторы, определяющие успешность функционирования кластеров на региональном уровне. В статье подчеркивается важность государственной поддержки кластерных инициатив и партнерства между частным и государственным секторами для достижения долгосрочной устойчивости. В заключении приводятся рекомендации по эффективному использованию кластеров для повышения конкурентоспособности регионов, обеспечения социально-экономической стабильности и развития экологически устойчивых производственных практик.

Ключевые слова: кластер, промышленность, регион, конкурентоспособность, устойчивое развитие, механизм, цифровизация.