

The effects of territorial clusters formation

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Abstract — In the course of this work, the effects of creating territorial clusters have been identified and grouped, including economic, social, structural, and organizational effects; Recommendations on adjusting the development strategies on clusters in the Kemerovo region are proposed. The research indicated that the prospects for the development of clusters are related to the necessity of actualization the development strategies of territorial clusters, since the ambiguity of benchmarks of existing strategies, the lack / insufficiency of indicators and their values does not allow assessing the possibility of clusters in solving problems of structural disproportions in the region. In addition, it makes more sense to synchronize the development strategies of the territories and the relevant clusters, which will contribute to the balanced development of the region, municipalities and territorial clusters; will increase the effectiveness of territorial planning overall.

Keywords — regional development, cluster, cluster policy, synergistic effect, multiplier effect, strategy, benchmarks

I. INTRODUCTION

At this moment, one of the most important priorities of the Russian Federation's State policy in accordance with the Decree signed by RF President «On the national objectives and strategic goals on the development of the Russian Federation for the period up to 2024 » is the formation of a number of industries: manufacturing, agriculture and the services sector of global competitive non-commodity sectors, the total share of exports of goods (works, services) which should be at least 20 percent of the country's GDP [1].

The cluster policy has a large potential in solving this problem at the regional level, the instruments of which are territorial clusters that improve region's competitiveness, as well as integration and diversification of the regional economy. In addition, the clusters contribute to overcoming the structural imbalances of the mono-structural economy of the regions with a pronounced industrial specialization, which is especially important for the Kemerovo Region, as a region that is a leader in the number of mono-cities. This status has 24 cities of Kuzbass.

The modern cluster approach is based on several theoretical concepts: from the concepts of Marshall, Schumpeter and Porter to the concept of «triple helix» G. Etzkowitz and other modern approaches. Summing up a variety of approaches to the definition of a «cluster», it can be concluded that a cluster is a set of interrelated, innovatively active organizations aimed at the continuous improvement of their competitive advantages, usually geographically concentrated and united by a common field of activity (functioning within one or several related industries).

The development and functioning of clusters create the growth effects of their potential by combining and obtaining mutual access to the resources of the participants. The potential of clusters is connected with the formation of a number of positive effects at the regional level, assessment of which is the goal of this research.

The effect of a cluster creating is a positive result obtained during the implementation of the cluster program, which is absolute. Among the effects of the formation of clusters, it is possible to identify multiplicative and synergistic.

According to J. Keynes, the investment multiplier is equal to the ratio of the income increment to the investment increment. The emergence of a cluster's multiplier effect is due to the influence of such factors as investment promotion in the development of strategic projects of cluster participants, geographic location, growth in exports of goods to other regions, the stability of relations in the cluster, etc. [2, p. 41]. In the practice of research, assessment of the multiplicative effect of a cluster is a complex task due to the problems with the availability of the necessary information, in particular, investment data by participants of territorial clusters into joint projects.

The synergistic effect is the result of coordinated actions of various mechanisms that raise qualitative changes in the system (cluster). The existence of the synergies in the cluster makes possible to create additional competitive advantages. Ultimately, synergy leads to reducing the costs of goods, the emergence of unique and competitive properties of the cluster

products and the region where it's based. The development of clusters can be considered as regional «growth points» which, due to the synergy effect, can ensure the diversification of the economy, stimulate the development of new industries and manufactures, streamline the production structure, and also contribute to the formation of a unified infrastructure of participants, reducing individual costs for its creation and maintenance. [3, p. 495].

II. MATERIALS AND METHODS (MODEL)

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In this work, performed an attempt to assess the synergistic effects associated with the formation of territorial clusters. From our perspective, they can be divided into several groups. For example, a number of scientists distinguish groups of

social and economic effects [see 2, 4]. But since one of the important tasks of the socio-economic development of the Russian economy is to diversify the regional economy, reduce their mono-structural dependence, it is important to allocate the structural effects of cluster formation - changing the sectoral structure of production, increasing diversification rates, the emergence of new industries and manufactures, including those based on introduction of innovations; as well as organizational effects, consisting in the creation of cluster development centers, territorial development management centers, cluster projects, the formation of a territory brand, and the provision of various support to clusters by specialized structures.

Therefore, it is possible to consider the synergistic effect of clusters, the components of which are the economic, social, structural and organizational effects. These effects are formed both at the level of cluster members (internal effects) and at the territorial level (external effects). [3, 496]

It appears that from the regional development's point of view, clusters have the potential to create the following effects, in which the potential of synergy is realized (Table 1).

TABLE 1 - CLUSTER FORMATION EFFECTS

Internal	External
Social effects	
1. The increase of employment at enterprises in the cluster 2. The increase of employee incomes in the cluster enterprises 3. The growth of the educational level of workers in enterprises of the cluster.	1. The increase of employment in the region 2. The increase of incomes in the region 3. New jobs creation. 4. Development of educational infrastructure of the region. 5. Formation of standards of education, health care, culture of the region's population in accordance with the requests of enterprises – cluster's participants
Economic effects	
1. The increase of fixed investment a) by own-account investments; b) at the expense of the federal and regional budgets. 2. The growth of labor productivity. 3. The increase of production volumes. 4. Expansion of markets. 5. The growth of competitiveness of cluster participants. 6. The growth of incomes of cluster participants. 7. The reduction of transaction costs. 8. Cost savings on the introduction and development of knowledge-based and innovative technologies.	1. Increase of gross domestic product. 2. Increase of tax revenues in the budget. 3. Attracting investment in the regional economy. 4. Expansion of markets for regional production. 5. Improving the competitiveness of the regional economy. 6. The growth of economic efficiency in the region. 7. Opportunities for receiving funds from state programs to support priority areas of economic development.
Structural effects	
1. Development of cooperation between cluster participants: a) commercial (common brand, organization of joint marketing, joint procurement); b) production and technology (agro-industrial parks, industrial parks). 2. The emergence of new industries (cluster initiatives, cluster projects). 3. The increase in the number of small and medium enterprises - cluster participants. 4. The increase in the number of small innovative enterprises engaged in technological innovation. 5. Sharing of cluster resources (development of joint industries, using the collective potential of chain partners). 6. Development of a joint cluster infrastructure.	1. The emergence of «growth points» of the regional economy. 2. Diversification of the regional economy 3. Development of infrastructure of the region: industrial, scientific, educational, innovative (deepening processing). 4. Development of innovative industries. 5. Development of non-core industries. 6. Changing the structure of exports. 7. Facilitating technology transfer. 8. Access to new technologies 9. Changing the relationships of enterprises. 10. Strengthening cooperation of regional enterprises.
Organizational effects	
1. Joint cluster development programs. 2. The emergence of cluster management structures (management companies, «anchor» residents). 3. Attracting investment for the implementation of joint cluster projects. 4. The emergence of organizational structures of joint resource-sharing (agropark, industrial park, cluster development centre). 5. Joint promotion of cluster products / projects (marketing, advertising, brand book).	1. The emergence of regional development «control centers» (regional technoparks, cluster associations, cluster development centers, etc.). 2. Development of the possibility of results-based («dotted») financing of cluster projects.

At the moment, 4 clusters of various sectors of specialization are registered in the Kemerovo region - the cluster «Integrated processing of coal and technogenic waste», the biomedical cluster, the agricultural cluster and the tourism-recreational cluster of the Kemerovo region.

The clusters development prospects in the Kemerovo region are interesting to evaluate for their ability to contribute to one of the most significant problems of the socio-economic development of the region: the problem of structural imbalances. As already mentioned, clusters have significant potential in solving the problem of structural imbalances of a territory. This potential is based on the ability to create multiplicative and synergistic cluster effects.

Assessment of the multiplier effect of the cluster is possible when there is an information base on the investment volumes and the growth of the core indicators of socio-economic development, both of the cluster participants and the territories. The current state of available information on the clusters of the Kemerovo region does not permit a full assessment of the multiplier effect.

It is possible to assess the synergistic effect of creating clusters, since this effect is a consequence of organizational and management decisions, organizational changes, combining the resources of the organization's participants, their recombination. The synergistic effect of clusters can help, as a result of their development, to solve the problem of structural imbalances of a territory.

Assessing the synergistic effect was carried out using the method of formalized analysis of documents. In order to assess the potential for the development of clusters in the Kemerovo region, documents on the strategic development of clusters were analyzed, named «Development Program of the Pilot Innovative Territorial Cluster «Integrated processing of coal and technogenic waste», in the Kemerovo Region for 2014–2020» «Development Strategy of the Kuzbass tourist and recreation cluster for the period up to 2025», «Development Strategy of the agricultural cluster of the Kemerovo region for the period up to 2020», «Development Program of the biomedical cluster of the Kemerovo region for the period 2012 - 2020».

Due to the absence of meaningful indicators of clusters activity, the analysis was carried out according to targeted benchmarks for creating clusters as defined in cluster development strategies and programs.

III. RESULTS AND DISCUSSION

Based on the analysis of the «Integrated processing of coal and technogenic waste» Cluster Development Program for the period 2015–2020 and its target indicators, it can be concluded that reducing the mono-structural dependence of the economy of the Kemerovo region is not its main priority. [5] However, a formalized analysis of the Program allowed to identify the effects, indirectly aimed at overcoming mono-structures.

Among the planned *social* effects of the cluster, first of all, it is necessary to note an increase of educational resources for the population of the Kemerovo region, as well as an increase of workers' safety in the coal industry, which contributes to the development of human capital in Kuzbass.

Analysis of the *economic* effects of the cluster allowed to identify the most significant effect affecting regional economic development: attracting investment through the sale of cluster products with high-value-added. This could allow increasing the values of indicators of economic development - both the branches of the cluster specialization and the regional economy in general.

Analysis of the *structural* effects of the energy coal cluster led to the conclusion that the cluster is aimed at the formation of principally new branches of the regional economy, at changing the technological platform of the coal industry. In addition, the functioning of the cluster entails the development of transport, energy, utilities and housing infrastructures in the region.

The list of organizational effects of the cluster is quite extensive. One of the most significant is the possibility of creating a «roadmap» for the balanced development of the coal industry in Russia generally.

The development of territories in which the cluster enterprises are located can contribute to the reduction of the mono-dependency of the regional economy through establishing zones of the economic favored nation, manufactured and industrial parks, and so on.

It should be noted that the development program of this cluster is most fully coordinated and updated in accordance with the latest requirements for development strategies, as well as consistent with the benchmarks of the social and economic development of the Kemerovo region.

A formalized analysis of the Development Program of the Biomedical cluster of the Kemerovo region for 2014–2020 showed that the cluster, as well as other clusters of the Kemerovo region, despite the absence of a targeted focus on overcoming the mono-structural nature of the economy of the Kemerovo region, nevertheless creates a number of effects aimed on the effective development of the regional economy and reducing its mono-dependence. [6]

First of all, it should be noted that the biomedical cluster has a serious potential in maintaining the health of the population since through the output of products and services of the cluster helps to reduce the incidence of diseases of the cardiovascular system. This is the *social* effect of the cluster.

Among the *economic* effects, special attention deserves the growth of tax revenues of the budget. The development potential of the cluster is also based on the fact that, through its activities, it is possible to access international markets with highly specialized niche products for surgery and expand the geography of sales, and therefore enhance the competitiveness of both the cluster and its production, and regional health care in general.

An important *structural* effect of the functioning of the biomedical cluster is that the products of its activities are innovative-oriented and have the potential to attract large-scale investment. In this regard, the biomedical cluster itself is a regional «growth point» and contributes to the development of non-core industries, which, in turn, makes a certain contribution to the process of diversification of the economy in the Kemerovo region.

According to the Development Program, the cluster has significant potential in the context of creating *organizational* effects, including the formation of a supporting center of competence at the international level in the areas of cluster specialization with subsequent replication of positive experience in medical organizations in the Russian Federation. Therefore, a positive look and image of the cluster will be formed and with it the region as an innovation-oriented.

A formalized analysis of the «Development Strategy of the Kuzbass tourist and recreation cluster for the period up to 2025» showed that the cluster, due to the short period of operation, is not focused on overcoming the mono-structural dependence of the regional economy. [7] Nevertheless, the identified effects allow to conclude that the cluster has a certain potential in solving this problem.

Firstly, despite the fact that the Strategy of cluster Development does not have a targeted focus on creating long-term *social* effects, tourist and recreation cluster has the potential to reduce structural unemployment in the region through the development of a system for training and retraining staff through the existing educational infrastructure and the creation of supplementary education infrastructure, and retraining staff.

Secondly, the tourist and recreational cluster is focused on creating such an *economic* effect as increasing the competitiveness of the internal tourist market, which could increase the flow of tourists to the region, thus contributing to an increase in socio-economic development indicators of both the tourist industry and the regional economy generally.

Analysis of the structural effects of the tourist and recreational cluster showed that it has significant potential for the development of tourist and recreational areas, concentrating mainly around the mono-cities of the Kemerovo region, which can contribute to the development of small and medium businesses in these cities, as well as be viewed in terms of «growth points» formation of regional economy. In this case the subclusters «Gornaya Shorya», «Salairsky», «Mariinsky», «Pritomsky» act as «growth points». The development potential of educational and informational regional infrastructures also appears to be significant.

The current stage of the tourist and recreational cluster development shows that the main expected effects of its creation are *organizational*. They are mainly associated with the creation of mechanisms to improve the competitiveness of the cluster, the creation of marketing effects (regional brand «Kuzbass»); the formation of «control centers» for the cluster development, as well as the signing of inter-regional and international agreements regulating mutual cooperation in the

aspects of tourist activities; creation of resource chain centers, a tourist information center of the Kemerovo region.

From the point of view of contributing the reduction of the monostructurality problem, promising appear to be the mechanisms of public-private partnership based on the development and coordination of cluster development strategies with the strategies of socio-economic development of municipalities, hosting tourist and recreation zones, destinations, since in their development are interested both territories and business structures. First of all, it concerns the development of transport infrastructure, traffic system, tourist accommodation. Furthermore, tourism it is a sphere of development of small and medium-sized businesses. Therefore, the development of the tourist-recreational cluster can be considered from the point of view of the possibilities of solving the problem of structural unemployment in the territory.

However, there are a number of problems in the «Development Strategy of the Kuzbass tourist and recreation cluster until 2020», which do not allow to assess fully the potential of the cluster in solving the problem of the mono-structure of the regional economy. For example, the program does not define the effects of industrial cooperation of enterprises belonging to a cluster and does not explicitly define joint projects of cluster participants. The possible directions of tourism development existing in the Strategy are focused, primarily, on the development of tourist-recreational zones and specific types of tourism. The strategy does not reflect the aspects of innovative activity within the cluster, which indicates the absence of an innovation component. The disadvantage of the Strategy is also the fact that it does not contain any indicators to assess the effectiveness of its implementation in practice.

A formalized analysis of the «Development Strategy of the agro-industrial cluster of the Kemerovo region for the period up to 2025» showed that the agro-industrial cluster, as well as the tourist and recreation cluster, is not focused in a targeted way on overcoming the mono-structural dependence of the regional economy. [8] However, based on the data of the Program, it can be concluded that the functioning of the cluster has a certain potential for solving this problem, even more than the above-mentioned clusters of the Kemerovo region.

First of all, it should be noted that the agro-industrial cluster is focused on obtaining long-term social effects, which consist of raising the standard of living of the rural population and employment in rural areas. In addition, the cluster is intended to raise the prestige of the professions of agro-industrial complex among the population and to attract young specialists through the provision of state support measures.

The analysis of the Strategy allowed to conclude that the agro-industrial cluster is focused on obtaining such an *economic* effect as improving the competitiveness of the agro-industrial complex of the Kemerovo region, as well as the growth in the production of food and processing industry in the Kemerovo region.

Among the *structural* effects, it should be noted that the cluster is aimed at increasing the share of the agro-industrial complex in the structure of the gross regional product, which indicates the intention to develop a non-core sector of the regional economy. It is also important that the cluster's activity is directly related to the involvement of the largest possible number of small and medium-sized business entities (according to this indicator, the agro-industrial cluster leads in comparison with other clusters of the Kemerovo region). As mentioned earlier, an increase in the share of small and medium-sized business entities and the development of non-core industries are among the most important conditions for the diversification of the regional economy. In addition, the cluster has the potential to create innovative products.

The *organizational* effects of the cluster consist in the development of comprehensive regional measures to enhance the scientific potential in the field of agriculture (consolidation of the laboratory base of organizations, a regional order for scientific research); participation in the largest federal integrated structures (agro-industrial complex technological platform).

However, despite the apparent potential in solving the problem of mono-structural regional economy, the Cluster development strategy has multiple shortcomings, including lack of coherence with the Strategy of social and economic development of the Kemerovo region, the lack of a number of indicators to fully assess the potential of the cluster.

IV. CONCLUSION

Based on the research, it can be concluded that the clusters of the Kemerovo region have the potential to create significant synergistic effects for regional development.

Possible social effects of clusters are: improving living standards and employment; reduction of structural unemployment, reassignment of employment; staffing of enterprises participating in the cluster; labor safety increase; maintaining public health.

Among the economic effects of clusters, the most significant is the creation of competitive advantages based on new technologies and high value-added products; attraction of investments to the economy of the region; increase in tax revenues to the budget; access to international markets; increase the competitiveness of the regional economy.

Significant for the modernization of the regional economy are such structural effects, as the development of new branches of the regional economy, the emergence of non-core specialization enterprises; development of regional infrastructure; the creation of «growth points» of the regional economy; development of territories where cluster enterprises operate.

Possible organizational effects of the clusters are joint promotion of products; introduction of a quality control system; stimulation of innovations, creation of regional management centers, including the Center of cluster development, the Center of technology transfer, expert

councils; the formation and implementation of «road maps»; signing agreements on international partnership; the creation of regional brands and so on.

The analysis of the clusters target orientations of the Kemerovo region showed that they are not focused directly on solving one of the key problems of the Kemerovo region - reducing the mono-structural dependence, overcoming the structural imbalances of the Kuzbass economy.

To solve this problem, it is necessary to synchronize the indicators of the «Strategy of the socio-economic development of the Kemerovo region until 2035» with the Strategies of the development of territorial clusters. Updating the Cluster Development Strategies will allow monitoring their implementation, will contribute to the task of balanced development of the region, individual municipalities and territorial clusters; will increase the effectiveness of territorial planning in general.

References

- [1] O nacional'nyh celyah i strategicheskikh zadachah razvitiya Rossijskoj Federacii na period do 2024 goda : Ukaz Prezidenta Rossijskoj Federacii ot 7 maya 2018 goda № 204.. [On national goals and strategic objectives of the development of the Russian Federation for the period up to 2024: Decree of the President of the Russian Federation of May 7, 2018 No. 204.]. Available at: <https://www.prilib.ru/item/1155783>. Reference date: 21.02.2019.
- [2] Bekmansurova O.O. Mul'tiplikativnyj i sinergeticheskij efekty kak ekonomicheskij rezul'tat ot sozdaniya promyshlennyh klasterov [Multiplicative and synergetic effects as economic result from creation of industrial clusters]. Vestnik SamGU [Bulletin of SamSU], 2014, № 4 (115), pp.39 -42.
- [3] Lipova Y.S., Zatepyakin O.A., Aparina N.F., Stepanova N.N. Effekty territorial'nyh klasterov kak instrumentov razvitiya otrasli zdravoohraneniya v regione [The Effect of Territorial Clusters as a Tool for the Development of the Health-Care Industry in the Region]. Ekonomika i predprinimatel'stvo. [Economy and Entrepreneurship], 2017, №. 12 (Part 4), p. 495.
- [4] Minenkov, D. I. Strategicheskie klastery v razvitii ekonomiki regiona [Strategic clusters of the development of the regional economy]. Social'no-ekonomicheskie yavleniya i processy. [Socio-economic phenomena and processes], 2015, № 11, p. 81-86.
- [5] Rasporjazhenie Kollegii Administracii Kemerovskoj oblasti ot 20.10.2014 № 676-r «Ob utverzhdenii Programmy razvitiya pilotnogo innovacionnogo territorial'nogo klastera «Kompleksnaya pererabotka uglja i tekhnogennyh othodov» v Kemerovskoj oblasti na 2014 - 2020 gody». [Decree of the Collegium of the Administration of the Kemerovo Region dated October 20, 2014 No. 676-r "On Approval of the Development Program of the Pilot Innovative Territorial Cluster" Integrated Processing of Coal and Technogenic Waste "in the Kemerovo Region for 2014–2020"]. Available at: www.ako.ru/zakon/PDF/15-p%202015.pdf. Reference date: 21.02.2019.
- [6] Rasporjazhenie Kollegii Administracii Kemerovskoj oblasti ot 13.12.2012 №1105-r «Ob utverzhdenii Programmy razvitiya biomeditsinskogo klastera Kemerovskoj oblasti na period 2012-2020 godov» [Decree of the Collegium of the Administration of the Kemerovo Region dated December 13, 2012 No. 1105-r "On Approval of the Program for the Development of the Biomedical Cluster of the Kemerovo Region for the Period 2012-2020"]. Available at: <http://pravo.gov.ru/proxy/ips/?docview&page=1039>. Reference date: 21.02.2019.
- [7] Rasporjazhenie Kollegii Administracii Kemerovskoj oblasti ot 3.06.2015 goda №301-r «Ob utverzhdenii Strategii razvitiya turistsko-

rekreacionnogo klastera Kuzbassa na period do 2025 goda» [Decree of the Collegium of the Administration of the Kemerovo Region dated June 3, 2015 No. 301-r "On Approval of the Development Strategy of the Kuzbass Tourism and Recreation Cluster for the Period up to 2025"]. Available at: www.ako.ru/PRESS/MESS/TEXT/STR/str_turizm.doc. Reference date: 21.02.2019.

[8] Rasporyazhenie Kollegii Administracii Kemerovskoj oblasti ot 4.06.2015 goda №303-r «Ob utverzhdenii strategii razvitiya

agropromyshlennogo klastera Kemerovskoj oblasti na period do 2020 goda». [Decree of the Collegium of the Administration of the Kemerovo Region dated June 4, 2015 No. 303-r "On the approval of the development strategy of the agro-industrial cluster of the Kemerovo Region for the period up to 2020"]. Available at: <http://www.consultant.ru/regbase/cgi/online.cgi?req=doc&base=RLAW284&n=66220#07367192546624595>. Reference date: 21.02.2019.

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