

ОПЫТ ФОРМИРОВАНИЯ КЛАСТЕРОВ В ЭКОНОМИКЕ КИТАЯ И ЕГО АДАПТАЦИЯ ДЛЯ РАЗВИТИЯ КЛАСТЕРИЗАЦИИ В РЕСПУБЛИКЕ БЕЛАРУСЬ

EXPERIENCE IN THE FORMATION OF CLUSTERS IN THE CHINESE ECONOMY AND ITS ADAPTATION FOR THE DEVELOPMENT OF CLUSTERING IN THE REPUBLIC OF BELARUS

УДК 334.764.47(510)

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<https://doi.org/10.24412/2079-7958-2021-2-191-201>

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РЕФЕРАТ

КЛАСТЕР, КЛАСТЕРИЗАЦИЯ, ЦИФРОВИЗАЦИЯ ЭКОНОМИКИ, МЕРЫ КЛАСТЕРИЗАЦИИ

Цифровизация социально-экономического пространства является объективной закономерностью развития научно-технического прогресса и характеризуется новыми методами генерации, обработки, хранения, передачи информации во всех сферах жизнедеятельности человека. Это явление повлияло на процессы кластеризации. Кластеры играют значительную роль в экономике страны. В статье анализируется опыт Китая в организации кластеров. Исследованы процессы кластеризации в Республике Беларусь. Обобщив опыт Китая, сформулированы направления развития кластеризации в Республике Беларусь в условиях цифровизации экономики.

ABSTRACT

CLUSTER, CLUSTERING, DIGITALIZATION OF THE ECONOMY, CLUSTERING MEASURES

The digitalization of the social and economic space is an objective regularity in the development of scientific and technological progress and it is characterized by new methods of generating, processing, storing, transferring information in all spheres of human activity. This phenomenon has affected the clustering processes. Clusters play a significant role in the country's economy. China's experience in the organization of clusters is analyzed in the article. Clustering processes in the Republic of Belarus is investigated. Summarizing the experience of China, the directions for the development of clustering in Belarus in the context of the digitalization of the economy are formulated.

INTRODUCTION

The importance of clusters consists of created economic benefits, advantages that may contain several areas. The benefits of clusters are noted by M. Porter [5]: efficient use of assets and specialized suppliers. Another benefit arises from the increase in potential for innovation. In cooperation, companies and research institutions can achieve higher levels in studies, i.e. innovation stimulated in the innovative continuous communication process with customers and other companies. The constant concern for innovation led to the concept of an innovative cluster [6]. Another advantage of clusters is a decrease in the risk of failure in

the development of the enterprise. An important factor that leads to the economic success of the cluster is the actions of the government through the state policy system together with government agencies and other collaborating institutions [6]. Government organizations contribute to the interaction between cluster participants by creating networks, specialized platforms and collective action support, which makes it easier and faster than ideas to improve the use of assets of companies in a cluster and cluster success.

These practices are carried out to increase cluster efficiency and speed up the growth process and the development of newly created clusters.

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The public sector can also play a central role in the preparation of cluster members and other private sector organizations to cooperate. Communication and cooperation arise not only among the relevant members of clusters, but also between several categories of clusters within the region or between cluster and independent providers. A strong cluster affects not only its sector, but also the relevant industry branches, being a growth factor, due to its numerous connections between the industrial sectors.

The digitalization of the social and economic space is an objective regularity in the development of scientific and technological progress and is characterized by new methods of generating, processing, storing, transferring information in all spheres of human activity. This phenomenon has affected the clustering processes [14].

The role and importance of clusters in increasing innovation and the competitiveness of the economy of the Republic of Belarus are studied in the work of N.I. Bogdan, A.E. Daineko, S.M. Dedkova, M.M. Kovaleva, M.V. Myasnikovich, L.N. Nehhoroshev, V.M. Rudenkova, A. G. Shumilina and others.

In China, the study of clusters was carried out by Wang Jici, Zhang Hong, Liu Shuguang, Yang Hua, Li Jizi and others. The question related to the study and analysis of the positive experience of advanced countries was not considered, despite the fairly complete theoretical development of the cluster and clustering concept. At the same time, such an analysis can be useful from the position of a comprehensive study of issues related to the problem under consideration, as well as a clear representation of the state and the development of the clustering process in the Republic of Belarus. The relevance of the problem and its economic importance for the Republic of Belarus has determined the choice of goals and objectives of the study. The purpose of the study is to analyze clusters in China and the Republic of Belarus, identify positive trends and problems, on the basis of which we formulate areas for the development of clustering in the Republic of Belarus. The purpose of the study determined the formulation and solving the following tasks:

- to analyze China's experience in the organization of clusters;

- to analyze clustering processes in the Republic of Belarus;

- to summarize the experience of China and formulate directions for the development of clustering in the Republic of Belarus in the conditions of digitalization of the economy.

CHINA'S EXPERIENCE IN THE ORGANIZATION OF CLUSTERS

The quantitative growth and rapid development of cluster structures in China is due, among other things, to the features that are inherent in East Asian economies, namely, economic systems are being transformed within local territories into clusters to create conditions for the development of entrepreneurial activity; foreign investment plays a major role in shaping the structure of local networks; freedom in making economic decisions by regional and local authorities and the presence at the regional level of industry associations of firms [15].

Certain regions and industrial cities specialize in the production of certain goods and have become the world centers of production in these areas. Most industrial clusters in China emerged spontaneously, as in many other countries. But the government, especially local authorities, provided all possible support to the process of their development. Chinese clusters operate mainly in labor-intensive manufacturing sectors with low added value.

Chinese clusters are industrial zones where thousands of similar enterprises are located, not just of one industry, but producing one narrow product line. Examples include the following: the world's largest electronics assembly site, Huaqiang Bei, is located near Shenzhen, Guangdong Province, where 10,322 high-tech enterprises operated in 2017. Near the city of Hangzhou (Zhejiang) in the Yangzhou cluster, 80 % of Chinese toothbrushes (22 % of the world market) are produced. The Xingtang denim cluster is located near the city of Zengcheng (Guangdong), where more than 5,000 factories produce 2.5 million units of denim clothing every day, or 60 % of total Chinese production. More than 1,500 factories produce 80 % of Chinese knives in Yangjiang (Guangdong), 70 % of the world's lighters are produced near Wenzhou (Zhejiang), 80 % of Chinese ties (30 % of world production) are produced in Shengzhou

(Zhejiang) and other clusters [4]. Such territorial entities are called production clusters or block economies in Chinese literature.

The speed of implementation and dissemination of innovations in the industry, the advantages of personnel training and exchange of experience, instant information exchange in the industry based on local professional databases, the convenience of holding industry exhibitions and communication with clients, a decrease in transport work throughout the country are noted by Chinese scientists as the advantages of production clusters, except economies of scale.

Currently, the largest leading companies have already formed in all sectors of the Chinese industry. This makes it possible to create clusters from scratch, which, from the very beginning, can immediately provide 20–30 % of the Chinese volume of the industry's output [4].

Local authorities approve plans to create new clusters for a period of 3–5 years. The Made in China 2025 Program emphasizes that the declared production capacity in new industries will also be created by cluster groups with the participation of

small businesses.

According to the Chinese Academy of Social Sciences and the ranking of the 100 largest industrial clusters in China, the clusters can be characterized by:

- uneven geographical distribution, which is typical for industrial clusters throughout China: about 80 % of clusters are located in coastal provinces;
- specializing in a wide range of products – coastal industrial clusters, specializing in manufacturing products – central and western regions;
- professionalism and high-tech industrial clusters;
- a greater share of small enterprises among the representatives of the cluster, which employ up to 60 people, and there are few large enterprises, for example, 70 % of subjects in the garment industry are small enterprises.

Figure 1 below shows the geographical distribution of industrial clusters in China and their industrial specialization. Chinese clusters are mainly localised in the Eastern area of the Country

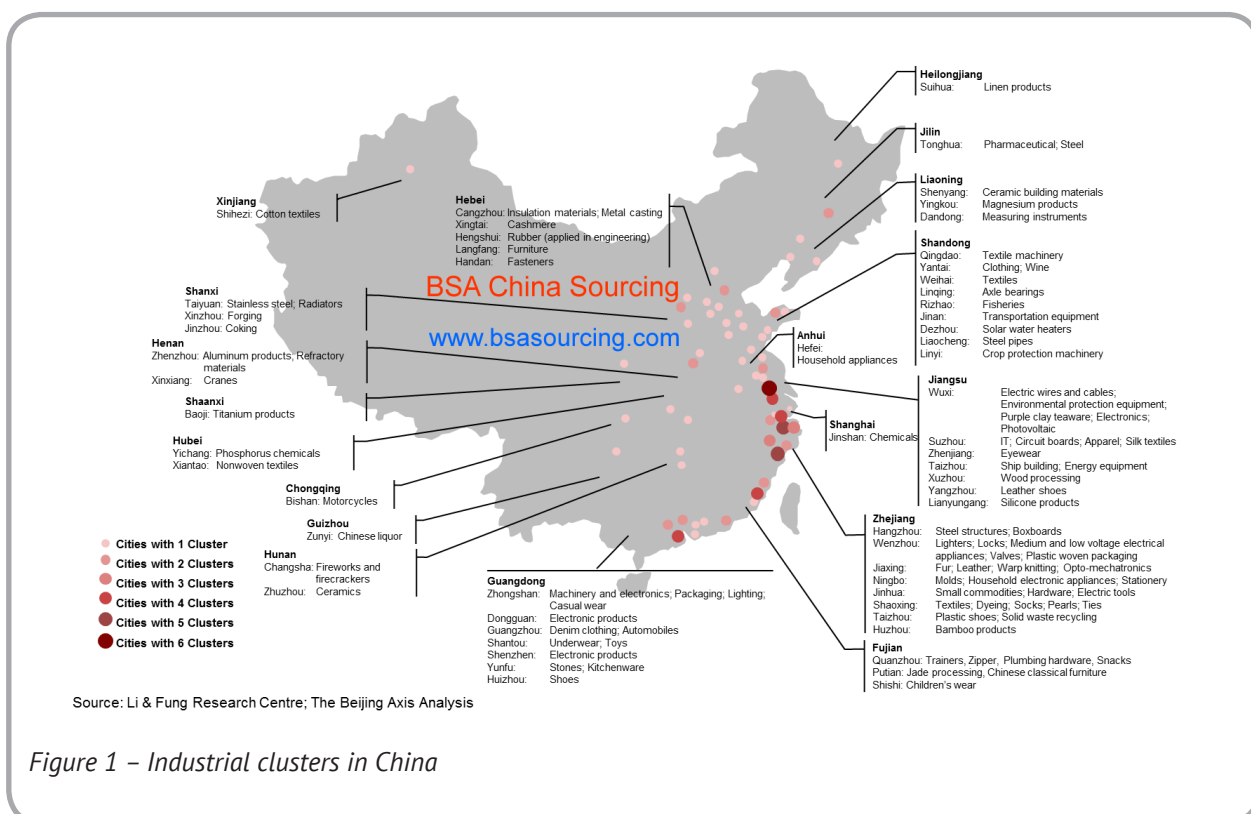


Figure 1 – Industrial clusters in China

Source: [1].

and their concentration grows, moving towards Southeast. The biggest agglomerations of clusters are mainly located in the Provinces of Jiangsu, Shanghai, Zhejiang, Fujian and Guangdong, areas where the GDP per capita is generally higher than the national average.

One study says that in 2014, there were 947,000 enterprises in China in 2,530 clusters. Another study identified more than 500 clusters in Zhejiang province and 240 clusters in 60 specialized cities in Guangdong province, which produce up to 90 % of the province's industrial output [4].

The number of clusters, both large and small, can amount to dozens in China. Here are some examples. Clusters for the production of ties and lighters operate in Zhejiang province, producing respectively 30 and 70 % of the volume of these products in the world. The automotive cluster is located in Guangdong province, formed around Nissan, Honda and Toyota car assembly plants, where suppliers of components, manufacturers of rubber, engines, spare parts, car seats, auto accessories, etc. are concentrated. Three shoe clusters operate in Guangzhou, Chengdu and Wenzhou, formed by a government decision as part of a shoe industry development program. Green technologies are developing in clusters such as Shenzhen, Jiangsu and Sichuan. A software outsourcing cluster has emerged in Dalian, as local professionals speak Korean and Japanese better than others. The clusters of modern agricultural production are Shandong, Beijing and Changshe. High-tech clusters have been formed in Shanghai, Beijing and Shenzhen, for example, for the production of medical equipment [7].

Now there is a shift of manufacturing clusters in China from south to north, where labor and rent are cheaper. The course taken from export to domestic consumption also leads to cluster drift, their smooth shift from coastal regions to inland ones [7].

The main reasons for creating successful clusters in China are as follows.

- The open door policy. Almost all of the clusters were formed after the discovery of China. Reforms and an open door policy provided a macroeconomic environment that allowed the private sector to grow and attract foreign investment to China. Before the reforms, all private

enterprises were officially banned. In addition, the market shortage of goods resulting from the planned economy contributed to the need to fill these gaps, which was the reason for the existence of numerous clusters that have arisen in a short period of time.

- A deep history of manufacturing or commercial activity in a particular sector, which has been the basis for the creation of many Chinese clusters. The transfer of accumulated knowledge and skills to entrepreneurs in the field of production and trade, as well as traditions from generation to generation through family and kinship ties played an important role in the formation of clusters.

- Cheap natural and human resources, which are especially important for clusters that use natural resources.

- Foreign direct investment, concentrated mainly on the eastern side of the Pearl River Delta region, in the Dongguan, Huizhou and Shenzhen regions. The economies of these clusters are driven by overseas Chinese and foreign firms.

- Improving efficiency and reducing barriers to entry. In many Chinese clusters, companies operate in different production segments as well as in related industries, therefore, they form functioning value chains and production networks with an efficient division of labor.

- Proximity to major markets and infrastructure. Most of the clusters are located in the coastal region, close to international markets, or in locations close to major railways, highways and ports. This advantage is especially important for export-oriented clusters.

- Assisting the government in moving industry inland. Many coastal clusters have begun to move inland due to rising costs, limited land resources and stringent environmental requirements in recent years. Government policies have been instrumental in this, but these movements are largely based on market choices, in which government plays a primarily facilitating role.

- Local government support. Chinese clusters receive help and support from the authorities, where government aid is directed to existing clusters that have begun to benefit [2, 3].

The support from the Chinese authorities for the clusters is aimed at:

- infrastructure building (the Chinese

government pays great attention to roads, water supply, electricity and telephone lines and creates specialized markets or industrial parks to facilitate business activity);

- setting quality standards and control (local authorities control product quality and compliance with standards to ensure the competitiveness of manufactured products in these clusters, which improves the business environment, contributes to the normal functioning of clusters and the dynamic growth of attracted investments);

- technologies, skills and support for innovation in the following areas: development of technological innovation and modernization; the dissemination of knowledge, technology and skills through inter-firm linkages (many clusters have benefited from interaction with state-owned enterprises and from attracting foreign investment, which created the basis for cluster development and provided them with important technologies); innovative and technological support from education and science, government agencies (in addition to government actions, universities and research institutes also support innovation and technology modernization in clusters.

- financial support (local governments provide certain incentives, including land, tax cuts or exemptions, and access to credit and loans to attract qualified businesses to clusters) [2, 3].

The developed Chinese clusters are closely connected with free economic zones and technology parks. For example, Zhangjiang was created on the basis of the Zhangjiang Hi-Tech Park, which grew up in the Pudong Economic Development Zone. Enterprises that have emerged in the cluster area and operate in it are distinguished by their full involvement in cooperative interactions. Producers and suppliers are concentrated on one territory; financial organizations that support the production process, and, of course, logistics enterprises. All are closely related to each other, so the Chinese cluster is a well-oiled mechanism with great potential [7].

ANALYSIS OF CLUSTERING PROCESSES IN THE REPUBLIC OF BELARUS

The existing management mechanism in the Republic of Belarus is characterized by the following main features:

- low level of competitive environment;

- high degree of concentration and monopolization of production;

- the presence of a rigid hierarchical system of economic management, the predominance of vertical bonds over horizontal;

- the presence of a significant public sector of the economy, which brings together mainly organizations using technology of the 3rd and 4th technological paradigms;

- insufficient level of development of small and medium-sized businesses.

These main features determine the institutional environment, taking into account the need to reform and the development of which the cluster development of the national economy should be carried out. In this regard, as the main conditions for the cluster development of the economy of the Republic of Belarus, it can be considered:

- consistent reform of property relations, providing for the formation of a significant sector of small and medium-sized businesses, and, as a result, a favorable competitive environment;

- Investment and structural restructuring of the economy, aimed at the gradual replacement of traditional industries, exhausted their life cycle on an existing technological basis, sectors of the high-tech industries using the technology of the 5th and 6th technological paradigms.

In addition to the system-wide restrictions which objectively determine the insufficient use in Belarus of the cluster model of economic development of Belarus, there are a number of problematic issues that impede the formation of innovative industrial clusters, including the absence of:

- sufficient quantity of qualified specialists competent in the development and implementation of cluster initiatives and projects, including civil servants;

- regulatory legal framework governing activities in the field of cluster development of the economy;

- specialized infrastructure of cluster development;

- significant practical experience of targeted preparation and implementation of cluster initiatives and projects, including with the participation of state bodies, business entities of the state-owned ownership.

Insufficient popularization and promotion of the idea of using a cluster development model in a professional community of citizens involved in management and business issues is noted.

In the Republic of Belarus, a cluster approach to the innovative development of the economy was reflected in state program documents, as well as in the interstate program of innovative cooperation of the CIS member states for the period up to 2030. So, in the Republic of Belarus, a cluster approach to economic development of the economy was reflected in the program documents – The program of social and economic development of the Republic of Belarus for 2021–2025 (Decree of the President of the Republic of Belarus July 29, 2021 № 292) [12], The state program of Innovative Development of the Republic of Belarus in 2021–2025 (Decree of the President of the Republic of Belarus September 15 2021 № 348) [13], The National Strategy for Sustainable Social and Economic Development of the Republic of Belarus for the period up to 2030 [11]. Creating clusters protruding as points of growth of the regional and national economy is provided for by all the programs.

The legislative mechanisms of cluster initiatives are defined in the Republic of Belarus, however, the process of their implementation is extremely slow. The main reasons for such a situation include the lack of a clear state policy and the target program indicating the sources and amounts of financing, the significant practical experience of the implementation of cluster initiatives.

The purpose of the state cluster policy in the Republic of Belarus marked in the Concept of Formation and Development of Innovative and Industrial Clusters in the Republic of Belarus and measures for its implementation (Resolution of the Council of Ministers of the Republic of Belarus January 16, 2014, № 27) [9] is to create conditions for increasing the competitiveness of the national economy through the introduction of a cluster development model.

In accordance with this purpose, the following tasks of the state cluster policy are determined:

- formation of a regulatory legal framework governing the activities in the field of cluster development of the economy;
- identification of priority areas for the

formation and development of clusters and monitoring in the field of cluster development of the economy;

- creation of conditions for the training of managers and specialists in cluster development of the economy;
- creating conditions for the development and implementation of cluster initiatives and projects;
- formation and ensuring the functioning of the system of state support for a cluster model of economic development [9].

In recent years, a number of measures in the field of cluster development have been taken in the Republic of Belarus:

1) a regulatory legal framework is formed, including acts:

- The Concept of Formation and Development of Innovative and Industrial Clusters in the Republic of Belarus and measures for its implementation (Resolution of the Council of Ministers of the Republic of Belarus January 16, 2014, № 27) [9];

- The methodical recommendations for the organization and implementation of monitoring cluster development of the economy (Resolution of the Ministry of Economy of the Republic of Belarus December 01, 2014 № 90) [10];

- The State Program Small and Medium Entrepreneurship in 2021–2025 (Resolution of the Council of Ministers of the Republic of Belarus January 29, 2021 № 56) [8];

- The state program of Innovative Development of the Republic of Belarus in 2021–2025 (Decree of the President of the Republic of Belarus September 15, 2021 № 348) [13], which involves the formation of cluster structures that ensure an effective chain of implementing innovative ideas from its development before finding a specific consumer.

2) The cluster development support infrastructure is created:

- the functions of state regulation of cluster development of the economy are entrusted with the Ministry of Economics and Committees of the regional executive committees (Minsk City Executive Committee);

- organized and conducted outreach activities for promoting a cluster development model;
- organized in 2015 monitoring of cluster development of the economies of the regions,

Minsk;

– prepared and published with a circulation of 500 copies of the Guide to the creation and organization of clusters in the Republic of Belarus.

On the basis of the analysis, it is possible to conclude the ineffectiveness of cluster policy, since in the Republic of Belarus the processes of clustering are slower than in neighboring countries: Poland – 161 clusters, in Russia – 115 clusters. There have been and created only 4 clusters in Belarus (IT-cluster in Minsk based on the scientific and technological association Infopark and the High-Tech Park; Innovative and industrial cluster in the field of biotechnology and green economy of Pripyat Polesie on the basis of Polesie State University and Technology Park Polesie; pharmaceutical cluster (medical and pharmaceutical) cluster of the Vitebsk region on the basis of the union of business entities Medicine & Pharmaceuticals and Innovative Projects (unites about 10 organizations); cluster created in the field of instrument making of the city of Minsk and the Minsk region on the basis of the Association Innovative Instrument Making). The mechanism of state support for clusters in the Republic of Belarus does not contribute to the development of clusters, the increase in the number of clusters occurs at a slow pace, the reason for the additional costs of creating a cluster. In the Republic of Belarus, the emphasis was placed on the regional aspect of state clustering, since it is for the regional economy that the clusters protrude growth points.

7 years have already passed since the moment of taking a cluster concept. The external environment has undergone significant changes. Digitalization has become the main trend of the development of the economy and society based on the introduction of elements of Industry 4.0. There appeared premises of the transformation of clusters: the development of ICT and digitalization of society, the development of network forms of relationships between the subjects, democratization of knowledge thanks to the Internet. In the conditions of the digital transformation caused by the Fourth Industrial Revolution (Industry 4.0), there is a need to adapt cluster policies to increase its efficiency.

DIRECTIONS FOR THE DEVELOPMENT OF CLUSTERING IN THE REPUBLIC OF BELARUS IN THE CONDITIONS OF DIGITALIZATION OF THE ECONOMY

The following clusterization measures in the Republic of Belarus (Table 1) are proposed taking into account the experience of clustering in China, as well as the trend of the digitalization of the economy.

The growth factors of the economy as a result of clustering are:

- creating new business models;
- creating high-tech jobs;
- increasing involvement in active economic activity;
- improving labor productivity;
- enhancing innovation;
- expansion of sales markets;
- creating new partnerships;
- improving product quality due to digital value.

CONCLUSIONS

Thus, in the context of digitalization, clusters play a significant role in the country's economy. Clusters have a number of advantages: lower transaction costs, higher labor productivity, increased innovation, effective market promotion, and others. The proposed clustering measures in the Republic of Belarus, taking into account the experience of clustering in China, as well as the trend of digitalization of the economy, will increase the competitiveness and efficiency of the economy of the Republic of Belarus.

Table 1 – Recommended clustering measures in the context of digitalization of the economy of Belarus

| State support measures for clustering | Essence |
|--|--|
| Identification of clusters in the economy | Cluster analysis (drawing up a cluster card) |
| Education and preparation of representatives of the public sector and business circles | <ul style="list-style-type: none"> – Holding seminars and trainings; – development of methodological materials for entrepreneurs and officials; – selection and training of specialists who will distribute the ideas of clusters |
| Creating cluster infrastructure to control the clustering process | <ul style="list-style-type: none"> – centers of cluster development; – non-commercial partnerships; – business incubators; – cluster development institutions; – Agency for cluster policies under the Government of the Republic of Belarus; – regional development agencies; – Special institutions for the development, construction of network structures and their internationalization; – grades-forming funds |
| Ensuring cluster initiatives and cooperation through organizational and economic methods | Organizational support for cluster initiatives by: providing premises and equipment for the joint activities of cluster participants; Organization of interaction of cluster enterprises with subjects of innovative infrastructure, educational institutions and science |
| Communication cooperation | Creating: databases for subjects of clusters, business platforms (technological, purchasing, etc.), information systems for finding and classifying clusters; Internet portals and Internet platforms (Internet platform training, non-managing and cooperation; Distance education business schools for cluster entities, virtual business incubators, Social Business Network Cluster) |
| Economic stimulation and financial support for cooperation of cluster subjects in innovation, education, marketing | <ul style="list-style-type: none"> – Financing on the conditions of PPP Creating Cluster Infrastructure (Centers of Cluster Development, Startup-Schools, Business Angels, Skill Centers, Centers of Cluster Initiatives, etc.); – competitive financing of investment cluster projects, granting grants for the development of new technologies in the cluster; – Providing subjects of clusters: benefits in collaboration in education and research, state guarantees to banks for investment projects of cluster entities |

Source: compiled by the authors.

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Статья поступила в редакцию 02. 11. 2021 г.