Clusterization of the Republic of Belarus economy: results and prospects

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Abstract
Clusters are the primary vehicle for smart specialization strategies, as they can make the greatest contribution to economic development by supporting research, development and innovation within the identified areas of specialization. This determines the relevance of the research topic.

The theoretical foundations of clusters as network structures are considered in the article: the definition of the concept of «cluster» is given, the signs of a cluster are indicated, the significance of cluster structures for the economy is substantiated. An analysis of the experience of the Republic of Belarus in the creation and functioning of clusters is carried out. Active, emerging and potential clusters are considered. Their models are built. Conclusions about cluster processes in the Republic of Belarus are made. Clustering directions in the context of digitalization of the economy of the Republic of Belarus are proposed. These are the following directions: education and training for public sector and business representatives; creation of a cluster infrastructure to manage the clustering process; providing cluster initiatives and cooperation through organizational and economic methods; digitalization of training for cluster members; communication support for cooperation; digitalization of communications between the subjects of the cluster; digitalization of production in the subjects of the cluster.

Keywords: clusters, network structure, network cooperation, digital economy.

Introduction

In the context of globalization, clusters have become a consolidating force that directs enterprises to achieve maximum production efficiency and gain significant competitive advantages, which, in turn, leads to an increase in the country's competitiveness. Thanks to the cluster approach, the narrow-branch vision of the enterprise and the regional economy has changed to the integrated use of the potential of a group of interconnected enterprises.

Clusters have demonstrated their capabilities in optimizing limited resources and forming network cooperation with stakeholders in the context of digitalization of economies.

Clusters are the primary vehicle for smart specialization strategies, as they can make the greatest contribution to economic development by supporting research, development and innovation within the identified areas of specialization. This determines the relevance of the research topic.

The purpose of the article is to examine the experience of the Republic of Belarus in the clustering of the economy.

Based on the purpose of the article, the following research objectives are determined:

• to consider the theoretical foundations of clusters as network structures;
• to analyze the experience of the Republic of Belarus in the creation and functioning of clusters;
• to develop the main directions for the development of clusters in the digital economy of the Republic of Belarus.

The following general scientific methods were used: cognition, analysis and synthesis, comparative analysis, analogy method, etc.

Material and methods

The issues of formation and development of cluster structures are reflected in the works of Belarusian researchers (V. F. Baynev, N. I. Bogdan, V. I. Borisevich, L. V. Kozlovskaya, P. G. Nikitenko, I. V. Novikova, N. G. Sinyak, A.V. Tomashevich, V. S. Fateev, T. S. Vertinskaya and others) and foreign researchers (G. B. Kleiner, K. A. Barinovsky, E. V. Dementiev, B. C. Katkalo, B. Z. Milner, M. Porter, V. V. Radaev, O. A. Tretyak, V. A. Tsvetkov, P. Sieber, R. Coase, R. Miles, C. Snow, R. Paturel, M. Reiss, J. Ruegg-Sturm, O. Williamson, A. Chandler, K. Arrow, and others).

The study used modern scientific domestic and foreign literature on the digital ecosystem and clusterization, statistical and analytical materials found on thematic Internet sites and in print media. The main methods of study are empirical and theoretical: observation, comparison, graphical, statistical and econometric analysis.

Results and discussion

Theoretical foundations of clusters as network structures

A cluster is a network structure of complementary, territorially interconnected cooperation relations of enterprises and organizations (including specialized suppliers, including services, as well as manufacturers and buyers), united around a research and educational center, which is linked by partnership relations with local institutions and government bodies in order to increase the competitiveness of enterprises, regions and the national economy (Yasheva, Kunin, 2014). The composition of the cluster is shown in general in Figure 1.

Research and educational organizations that are called upon to create innovations and information for the cluster are assigned an important role in the innovative development of the cluster. Such a research and educational center can be an industry research institute, a higher educational institution or a regional research center and other organizations carrying out research and development, as well as training specialists for the cluster. A cluster of commodity producers should be formed around the scientific and educational center.
Cluster signs:
- localization in one geographic area;
- agglomeration of enterprises, organizations and public institutions united by horizontal and vertical communications;
- complementarity of subjects, creation of a production chain;
- production of a «key» product;
- unified infrastructure and institutional environment;
- unification of enterprises around the scientific and educational center on the basis of the creation of an association (union);
- the presence of relations of competition and cooperation;
- development of relations of network cooperation between the subjects of the cluster, as well as partnerships between the subjects of the cluster and government bodies - public-private partnership (PPP) (Yasheva, 2010).

The importance and significance of cluster structures is confirmed by the following figures:
- about 40 % of jobs in the world are formed in clusters;
- more than 90 % of industry in Denmark, Finland, Norway and Sweden is covered by clustering;
- about 25 % of the total number of jobs are in strong clusters, i.e. regional clusters with significant critical mass;
- almost 38 % of the workforce in the European Union is formed in more than 2.0 thousand clusters and related organizations registered with the European Cluster Observatory;
- more than 60 % of the USA gross domestic product is formed in clusters and more than 50 % of industrial companies in the USA are located in them (Eurasian Economic Commission).

Experience of the Republic of Belarus in the creation and functioning of clusters
Interest in the cluster form of organization of production and management among many countries of the world has increased significantly in connection with the process of globalization of the world economy at the present stage. The world practice of developed countries, members of the Organization for Economic Cooperation and Development shows that the rate of investment in private commercial organizations based on the principles of network and corporate governance is rapidly increasing.

The state program of innovative Development of the Republic of Belarus at 2021-2025 operates in the Republic of Belarus at the moment, the purpose of which is to assess the existing potential and determine the prospects and organizational and economic mechanism for stimulating the cluster development of the national economy for the period until 2025 (Decree of the President of the Republic of Belarus September 15, 2021 № 348).

The Council for the Development of Entrepreneurship in the Republic of Belarus and the Ministry of Economy of the Republic of Belarus jointly prepared and published a guide on the creation and organization of clusters in the Republic of Belarus. The manual contains a description of the algorithm of actions for the formation of a cluster, as well as a complete set of forms of documents necessary for the organization and implementation of its activities (Ministry of Economy of the Republic of Belarus).

In the Republic of Belarus, the organization of clusters has been done: the Concept of the formation and development of innovative and industrial clusters in the Republic of Belarus was adopted, approved by the Resolution of the Council of Ministers of the Republic of Belarus dated January 16, 2014 № 27; The Ministry of Economy of the Republic of Belarus held a seminar on clusters for business entities and authorities (2013); cluster research in the scientific community is underway; the Law of the Republic of Belarus «On Public-Private Partnership» (2015) was adopted; The Ministry of Economy of the Republic of Belarus compiled a map of clusters (2019); website created – CLUSTERLAND: a comprehensive information resource dedicated to the development of clusters in Belarus https://clusterland.by.

The classification of clusters, based on the degree of maturity (the level of interaction based
on the cluster model of development), subdivided into three categories, is used in the Republic of Belarus. The Ministry of Economy of the Republic of Belarus has drawn up a map of clusters of the Republic of Belarus, based on which the following types of clusters are currently distinguished.

1. **Existing clusters** are clusters that have formed as a legal entity, have taken shape organizationally, elected the Cluster Council, implement a formalized cluster development strategy (cluster project), and regularly carry out activities in agreed areas of activity.

   There are 4 active clusters in the Republic of Belarus (the Union of Legal Entities «Medicine and Pharmaceuticals-Innovative Projects», the Association «Innovative Instrumentation», the Association «Infopark», the High-Tech Park, Polesie State University, «Technopark Polesie»).

   For example, the pharmaceutical cluster in the Vitebsk region (active) includes participants:

   - Scientific and educational block: VSMU, VSU named after P.M. Masherova;
   - Production block: Nativita, Aconitfarma, Akademfarm, Sivital, Technopark «Vitebsk Silicon Valley»;
   - Service companies: Vitebsk Regional Marketing Center, Vitvar, Union of Pharmaceutical and Biomedical Clusters of Russia (The first medical and pharmaceutical cluster of the Republic of Belarus).

2. **Emerging clusters** are the localization of legal entities that have initiative groups for their creation, have formed Cluster Councils, and have taken the first steps to cooperate on the basis of the cluster development model.

   There are 4 emerging clusters in the Republic of Belarus (NGO «Minsk Capital Union of Entrepreneurs and Employers»; JSC «Polimir», JSC «Naftan»; JSC «Polotsk-Steklovolokno»; LLC «Technopark «Gorki», Belarusian State Agricultural Academy).

   ![Figure 2 – Petrochemical cluster model in the Vitebsk region (emerging)](source: suggested by (Yasheva, Kostyuchenko, 2016).

3. **Potential clusters** are an agglomeration of legal entities that are localized in one territory, create a production chain, produce a key product, are linked by formal relations, 15 clusters in the Republic of Belarus (Map of clusters of the Republic of Belarus, Ministry of Economy of the Republic of Belarus).

   Following conclusions about cluster processes made in the Republic of Belarus:

   - The clustering process in the Republic of Belarus is slow;
   - State Programs for the creation of clusters are not fully implemented;
   - The Republic of Belarus has the majority of potential and emerging clusters;
   - Many entrepreneurs do not understand
the role of clusters in improving the efficiency of their activities;
− More than half of entrepreneurs agree to cooperate in principle.

*The main directions of cluster development in the digital economy of the Republic of Belarus*

Taking into account the cluster concept developed by the authors (Yasheva, 2010; Vailunova, Yasheva, 2017; Vailunova, Yasheva, 2019), as well as the trend of digitalization of the economy and the features of the digital economy and Industry 4.0, the following clustering directions are proposed in the Republic of Belarus (table 1).

**Table 1 – Recommended clustering directions in the context of digitalization of the Republic of Belarus economy**

| Clustering directions | The essence                                                                                                                                 |
|-----------------------|---------------------------------------------------------------------------------------------------------------------------------------------|
| Education and training for public sector and business representatives | − Conducting seminars and trainings;  
− development of teaching materials for entrepreneurs and officials;  
− selection and training of specialists who are designed to spread the ideas of clusters |
| Creation of a cluster infrastructure to manage the clustering process | − Creature:  
− virtual Cluster Development Centers;  
− Non-profit partnerships;  
− Business incubators;  
− Cluster development institutes;  
− Agencies for Cluster Policy Issues under the Government of the Republic of Belarus;  
− Regional Development Agency;  
− Special institutions for development, building network structures and their internationalization;  
− Grant funds |
| Providing cluster initiatives and cooperation through organizational and economic methods | − Organizational support of cluster initiatives by: providing premises and equipment for joint activities of cluster members; organization of interaction of cluster enterprises with subjects of innovation infrastructure, educational and scientific institutions |
| Digitalization of training for cluster members | − Creation of Knowledge Hubs in the form of virtual organizations on the basis of industry research and / or educational organizations of the cluster;  
− opening of a distance learning business school for cluster entities under the Entrepreneurship Support Center |
| Communication support for cooperation | − Creation of: databases on subjects of clusters, business platforms (technological, procurement, etc.), information systems for searching and classifying clusters; Internet portals and Internet platforms (Internet platforms for training, networking and cooperation; distance education business schools for cluster entities, virtual business incubators, the Cluster social business network) |
| Digitalization of communications between the subjects of the cluster | − Creation of: a database on subjects of clusters within the framework of the regional statistical office; business platforms (technological, procurement, digital, etc.); development of architecture of «living laboratories» for «smart-cooperation» of stakeholders in the production of innovative products. |
− Creation of Internet portals: Internet platforms for training, networking and cooperation; creation of a virtual Subcontracting Center; virtual business incubators; social business network «Cluster»

Digitalization of production in the subjects of the cluster
− Development of the smart-industry based on the principles of «smart-cooperation»; introduction of artificial intelligence technology;
− introduction of block-chain technologies; cloud technologies;
− implementation of: ERP, CRM software to automate strategies of interaction with customers; BPM (business process management) for managing the system’s business processes.

Source: suggested by the author.

Conclusions

Thus, in the context of digitalization, clusters play a significant role in the country’s economy. There are 3 types of clusters in the Republic of Belarus: active, emerging, potential. Cluster processes are slow compared to foreign countries. To accelerate them and use the resource of digitalization of the economy, the following areas are proposed: Education and training for public sector and business representatives; creation of a cluster infrastructure to manage the clustering process; provision of cluster initiatives and cooperation through organizational and economic methods; digitalization of training for cluster members; communication support of cooperation; digitalization of communications between the subjects of the cluster; digitalization of production in the subjects of the cluster. The proposed clustering measures will improve the competitiveness and efficiency of the economy of the Republic of Belarus.

References

Clusterland: a comprehensive information resource dedicated to the development of clusters in Belarus. Available from: <https://clusterland.by.>
Guidelines for the creation and organization of clusters in the Republic of Belarus // Ministry of Economy of the Republic of Belarus, Council for the Development of Entrepreneurship. Available from: <http://www.economy.gov.by/ru/newsru/view/Minekonomiki-podgotovilo-Rukovodstvo-po-sozdaniju-i-organizatsii-dejatelnosti-klasterov-v-Belarusi-3388-2015/>.>
Law of the Republic of Belarus «On public-private partnership» 30.12.2015 г. № 345-З. Available from: <http://www.economy.gov.by/uploads/files/G4P/Zakon-o-gosudarsvenno-chastnom-partnerstve-red.pdf.>
Map of clusters of the Republic of Belarus // Ministry of Economy of the Republic of Belarus. Available from: <http://www.economy.gov.by/uploads/files/Karta-Klasterov/karta-klasterov.pdf.>
Review of the best world practices, international standards and experience in creating advanced (model) national objects of industrial and innovative infrastructure of the EAEU member states / Eurasian Economic Commission. Available from: <http://www.eurasiancommission.org/ru/act/prom_i_agroprom/dep_prom/SiteAssets/Nailu4shie%20praktiki%202018/pdf.>
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 16.01.2014 № 27. Available from: <https://pravo.by/upload/docs/op/C214000_27_1390424400.pdf.>
The first medical and pharmaceutical cluster of the Republic of Belarus. Available from:
The state program of innovative Development of the Republic of Belarus at 2021-2025 (Decree of the President of the Republic of Belarus September 15, 2021 № 348).
Available from: <https://pravo.by/upload/docs/op/P321000348_1632171600.pdf.>

Vailunova, Y.G.; Yasheva, G.A. (2017). «Hybrid» textile holding as a type of cluster structure: identification and directions of creation in Belarus / Y. G. Vailunova, G. A. Yasheva // Belarussian Economic Journal, 2. 144–158.
Vailunova, Y.G.; Yasheva, G.A. (2017). Formation of network structures as a direction of increasing the competitiveness of organizations in the Republic of Belarus. Manager. USUE, 4 (68). 96–105.
Vailunova, Y.G.; Yasheva, G.A. (2019). Methodological aspects of assessing the level and prospects for the development of integration ties of an organization in the context of creating cluster structures. Bulletin of the Vitebsk State Technological University, 1 (36). 187–203.

Yasheva, G.A. (2010). Cluster concept of increasing the competitiveness of enterprises in the context of network cooperation and public-private partnership: monograph. Vitebsk: UO «VSTU», 373.
Yasheva, G.A.; Kostyuchenko, E.A. (2016). Methodological aspects of the cluster approach to innovative development and increasing the competitiveness of the national economy. Bulletin of Vitebsk State Technological University, 1(30). 188-208.
Yasheva, G.A.; Kunin, V.A. (2014). Theoretical and methodological foundations of clusters and their role in increasing the sustainability of national. Regional Economics and Management: electronic scientific journal, 1 (37). Available from: <http://region.mcnip.ru.>