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ОБРАЗОВАТЕЛЬНОЕ УЧРЕЖДЕНИЕ ВЫСШЕГО ОБРАЗОВАНИЯ
«ИЖЕВСКАЯ ГОСУДАРСТВЕННАЯ СЕЛЬСКОХОЗЯЙСТВЕННАЯ АКАДЕМИЯ»

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Материалы Международной научно-практической конференции, посвященной 70-летию заслуженного работника сельского хозяйства РФ, почетного работника ВПО РФ, лауреата государственной премии УР, ректора ФГБОУ ВО Ижевская ГСХА, доктора сельскохозяйственных наук, профессора Любимова Александра Ивановича

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3. Гусев, А. Ю. О некоторых тенденциях и пропорциях показателей производительности труда в аграрном секторе экономики региона / А. Ю. Гусев, Б. Н. Хосиев, К. Э. Гурциев // Известия Горского ГАУ. – 2015. – Т. 52–№ 4. – С. 271–274.

4. Гусев, А. Ю. Современные тенденции и перспективы развития молочного животноводства Рязанской области / А. Ю. Гусев // Вестник Рязанского ГАУ им. П. А. Костычева. –2013. – № 3 (19). – С. 86–92.

5. Информационные аспекты и эффективность производства при исчислении себестоимости продукции / Р. А. Алборов, К. А. Джикия, Б. Н. Хосиев, И. А. Селезнева, Т. А. Ильина // Проблемы учета и аудита в аграрном секторе России. Материалы Всероссийской науч.-практ. конф. Бухгалтерский учет и аудит в организациях АПК. – Московская СХА им. К. А. Тимирязева; Институт профессиональных бухгалтеров Московского региона. – 2001. – С. 46–55.

6. Основные показатели сельского хозяйства Рязанской области: статистический сборник. – Рязань, 2019. – 162 с.

7. Сельское хозяйство, охота и лесоводство Рязанской области: статистический сборник // Рязаньстат. – Рязань, 2018 –149 с.

8. Сычева, Т. А. Приоритетные направления инвестиционной деятельности региона / Т. А. Сычева, А. Ю. Гусев // Экономика сельского хозяйства России. – 2018. – № 4.– С. 27–31.

9. Сычева, Т. А. Инновационная деятельность регионального АПК и ключевые направления ее совершенствования / Т. А. Сычева, А. Ю. Гусев // Экономика сельского хозяйства России, 2018. – № 7. – С. 21–26.

10. EMetelkova, GDemishkevich and AGusev Statesupportfortheproductiono fcattlemeat: theexperienceofcountries with high levels of self-sufficiency/ International Scientific and Practical Conference on Agrarian Economy in the Era of Globalization and Integration 24–25 October 2018, Moscow, Russian Federation, 274 p. IOP Conf. Series: Earth and Environmental Science 274 (2019).

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CLUSTERING AS A DRIVER OF REGIONAL ECONOMIC COMPLEXES INNOVATIVE DEVELOPMENT IN CONDITIONS OF KNOWLEDGE ECONOMY FORMATION

The article substantiates that clustering is a driver of innovative development of regional economic complexes in conditions of formation of knowledge economy and network economy. In this regard, traditional approaches to innovative development and increase of competitiveness in the Republic of Belarus should be supplemented by cluster approach. Clusters are self-organizing systems where strategic competitive advantages are created through the synergistic effect of network cooperation and public-private

partnership. Innovation-industrial cluster is a set of geographically localized in a certain area, complementary, competing businesses (including suppliers, producers and consumers) linked by relations of cooperation to each other and with state and local authorities, united around the research or scientific-educational centre on an informal basis, with a purpose of creating a favourable environment for the dissemination of innovation, and enhancing innovative activity and competitiveness of organizations-actors of the cluster, regional and national economy. The growth of innovation activity in clusters is the result of positive externalities: exchange of knowledge, technologies, high innovative activity of firms due to high competition. There is no generally accepted method for identifying clusters. All methods of identifying clusters are divided into quantitative and qualitative ones. In order to identify clusters the localization coefficient, the coefficient of per capita production and the coefficient of specialization of industries were calculated. It is concluded that there is a sufficient degree of localization of the organizations of relevant economic activities for identifying potential petrochemical, leather, footwear and textile clusters in the territory of Vitebsk region. The innovative development of regional economic complexes is considered in the framework of clustering regional industrial complexes on the example of Novopolotsk petrochemical cluster. The goal, objectives and promising results of the cluster are formulated. The directions of activating the mechanisms of cooperation in the cluster are identified.

Introduction. The priority areas for the development of the Belarusian economy are to accelerate economic growth and increase competitiveness, both of the economy as a whole and of its individual sectors. In the context of globalization and increasing competition, the stability of the Belarusian economy largely depends on the effective development of the economy of regions and sectors. One of the main priorities of the state policy of the Republic of Belarus is the transfer of the economy to an innovative path of development, since the intensification of innovative activity allows us to raise the level of competitiveness of the national economy and ensure stable progressive development of the country. In the Republic of Belarus, the use of a sectoral approach prevails in the management of innovative activities, which does not fully contribute to the innovative renewal of the national economy. The level of research intensity of the country's GDP is not high enough. In this regard, the search for new approaches to organizing and managing innovative activities at the country level, as well as creating an enabling environment for the development, dissemination and commercialization of innovations, becomes relevant. For the economic development of the country's regions, it is necessary to build continuous and regular interaction of science and production, as well as the full-scale application of competitive scientific and technical solutions and achievements. Organizational, legal and economic conditions are needed that will accelerate the development of production and the launch of competitive and high-tech products on the market. In regions of the country there are necessary prerequisites for it, namely a significant number of organizations and the developed potential of research and educational institutions of the same profile.

In the modern economy, the cluster approach is one of the most effective tools for developing regional economies and increasing the competitiveness and innovative activity of organizations, as evidenced by the vast experience of clustering of economically developed countries [6].

In the context of the formation of innovative economy of the Republic of Belarus, there is a need to develop new and effective mechanisms for the development of regional and sectoral complexes that operate in conditions of fierce competition and dynamically changing external environment. In recent decades, cluster theory has become increasingly popular not only among foreign researchers, but also among domestic economists.

Ensuring a steady pace of development of the territory, achieving the strategic goals of the regions is impossible without an interested partnership of the authorities with business representatives. Cluster approach to managing regional development is an alternative to traditional sectoral industrial policy [4]. Clusters can become the basis for effective economic development of regions, being innovative systems. The cluster approach is a promising basis for creating new forms of combining knowledge, stimulating the emergence of innovative scientific and technical areas and their commercial applications, as well as indirectly supporting the field of education, science and business [10]. In addition, this approach to organizing effective interaction between business entities can be successfully applied in the transition to a knowledge economy and digital economy.

A unified theory of clusters is not yet formed in the international practice. There is a set of definitions of a cluster, there is no universally accepted classification of clusters and a unified approach to the study and identification of cluster structures. Conducting systemic research on the formation of conceptual structure and basic conceptual positions of cluster concept gains a particular relevance in this context. Thus, the purpose of research in this article is to investigate theoretical foundations of clusters and to assess clustering potential of manufacturing sector of Vitebsk region. The novelty of this research lies in the fact that the theoretical and practical foundations of clustering regional industrial complexes of the Republic of Belarus have been studied and scientifically grounded for Novopolotsk petrochemical cluster.

The impact of clusters to the competitiveness and innovative activity of organizations. Successful economic development is a process of successive economic upgrading, in which the business environment in a nation evolves to support and encourage increasingly sophisticated ways of competing. Interdependence between productivity, innovation, and the business environment can be represented by the diamond model (see figure 1) [5, p. 5].

A country's or region's future competitiveness depends on progress in two dimensions: cross-cluster issues affecting the whole economy and clusters [5, p. 23].

Clusters provide the opportunity to move to a new level of private-public partnership. They can also be a test-ground for developing solutions to economy wide problems. However, cluster initiatives alone are less effective, if they are not part of an overarching approach to improve competitiveness on the national and/or regional level [5, p. 23].

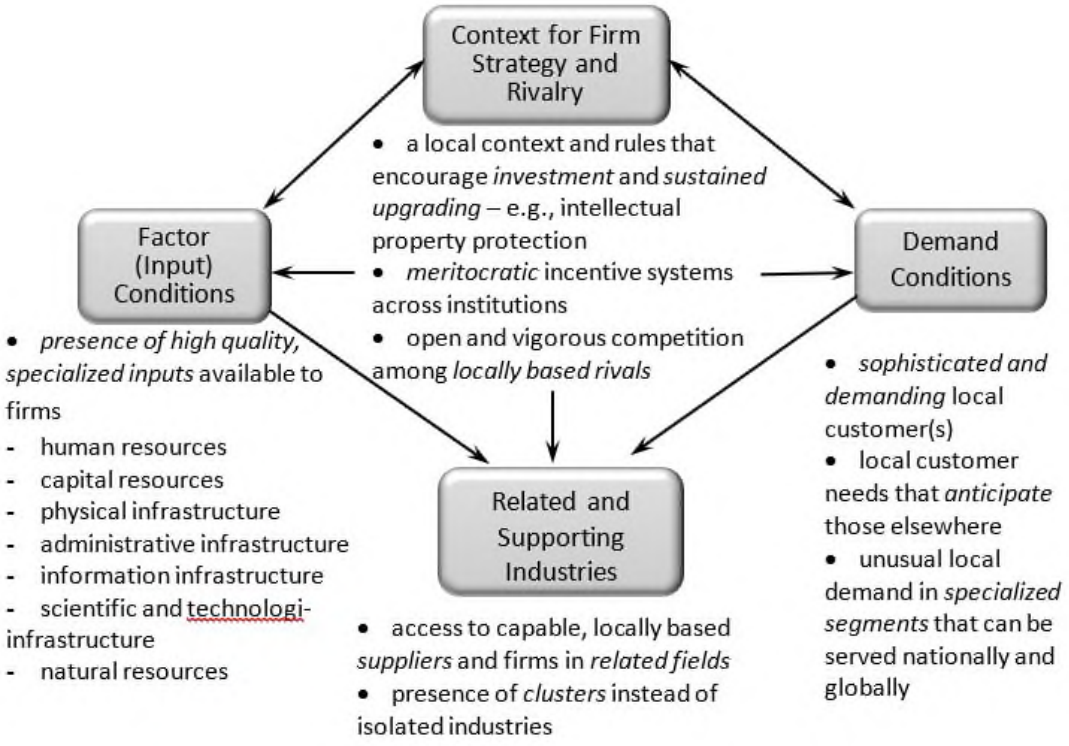

Figure 1 – **Interdependence between productivity, innovation, and the business environment (Source: [5, p. 5])**

The impact of clusters to the competitiveness [5, p. 7]:

1. Clusters increase productivity and efficiency:

– efficient access to specialized inputs, services, employees, information, institutions, and "public goods";

– ease of coordination and transactions across firms;

– rapid diffusion of best practices;

– ongoing, visible performance comparisons and strong incentives to improve vs. local rivals.

2. Clusters stimulate and enable innovations:

– enhanced ability to perceive innovation opportunities;

– presence of multiple suppliers and institutions to assist in knowledge creation;

– ease of experimentation given locally available resources.

3. Clusters facilitate commercialization:

– opportunities for new companies and new lines of established business are more apparent;

– commercializing new products and starting new companies is easier because of available skills, suppliers, etc.

So, clusters reflect the fundamental influence of externalities / linkages across firms and associated institutions in competition clusters and competitiveness.

Cluster definitions. Structure of clusters. On the one hand, cluster definitions need to be broad enough to include all relevant industries and institutions that have material linkages with the core activities of the cluster; on the other hand, cluster definitions need to be narrow enough to cover companies that face a common set of barriers to upgrade productivity and performance [5, p. 25]. Clustering could be called coopetiton – cooperating in order to be more competitive and successful [3, p. 6].

Clusters have been well described by Professor Michael Porter, the OECD, and many others.

Cluster is a geographically proximate group of interconnected companies and associated institutions in a particular field, linked by commonalities and complementarities (external economies) [8, p. 6]. Clusters encompass an array of linked industries and other entities important to competition … including governmental and other institutions – such as universities, standard setting agencies, think tanks, vocational training providers and trade associations [1, p. 17].

Clusters consist of co-located and linked industries, government, academia, finance and institutions for collaboration (see figure 2).

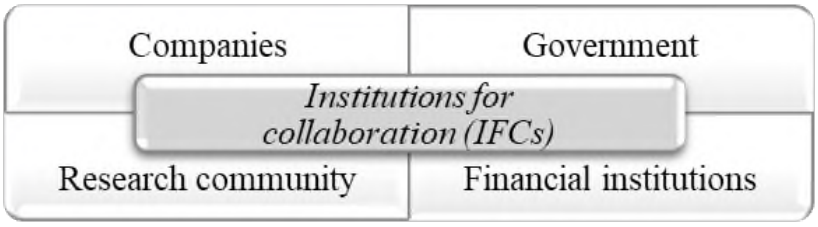

Figure 2 – **Cluster structure (Source: [11, p. 18])**

Summarizing the approaches to the interpretation of the concept of "cluster", in the purpose of our research we offer the following definition of concept "innovation-industrial cluster": a set of geographically localized in a certain area, complementary, competing businesses (including suppliers, producers and consumers) linked by relations of cooperation to each other and with state and local authorities, united on an informal basis around the research or scientific-educational centre, with a purpose of creating a favourable environment for the dissemination of innovation, and enhancing innovative activity and competitiveness of organizations-actors of the cluster, regional and national economy.

Identification of clusters in Vitebsk region. At present, there is no generally accepted method for identifying clusters. The uniformity of composition is noted

only in countries implementing one cluster project, for example, the project "INCLUDE" [2]). The experience of clustering shows that most countries in their analysis use the analysis of M. Porter's value chain (qualitative analysis of the production chain) and "cost-output" analysis as methods of cluster research [9]. In general, all methods of identifying clusters can be divided into quantitative and qualitative ones. The first group includes, for example, method of calculating the localization coefficient, complex methodology using the localization coefficient (M. Porter), analysis of "cost-output" tables, methodologies for identifying clusters based on indicators of overflows of knowledge, labor, (Ripley's K-function, Markon's M-function, G. Lindkvist's Q-function), method of structural shifts (Shift-Share method), etc. The group of qualitative methods includes the method of interviewing experts, the snowball method, compiling the genealogical tree of the cluster, case study, etc. Some authors suggest using the localization coefficient, the coefficient of per capita production and the coefficient of specialization of industries to identify cluster subjects [16]. If the calculated coefficients are greater than one and tend to grow, therefore, it is possible to create clusters for these types of economic activity. We approve the proposed methodological approach on the example of the economy of the Vitebsk region calculating coefficients by types of economic activity of section C "Manufacturing" in 2000–2018. The corresponding coefficients are shown in Table 1.

Analysing the values of the coefficients of localization by types of economic activity, per capita production by types of economic activity and specialization of the region on the given type of economic activity in aggregate, it can be concluded that there are prerequisites for clustering in Vitebsk region by such type of economic activity as "Manufacture of textiles, wearing apparel, leather and related products" (sub-section CB), "Manufacture of wood and paper products; printing and reproduction of recorded media" (sub-section CC), "Manufacture of basic pharmaceutical products and pharmaceutical preparations" (sub-section CF) and for aggregation of types of economic activity of sub-sections CF-CI.

When analysing the values of the coefficients of per capita production by types of economic activity and specialization of the region on the given type of economic activity in aggregate, it can be concluded that there are some prerequisites for clustering in Vitebsk region by such type of economic activity as "Manufacture of food products, beverages and tobacco products" (sub-section CA) and "Manufacture of rubber and plastics products, and other non-metallic mineral products" (sub-section CG).

Analysing only the values of the coefficients of specialization of the region on the given type of economic activity, it can also be noted that there are some prerequisites for clustering in Vitebsk region by such type of economic activity as "Manufacture of coke and refined petroleum products" (sub-section CD) and "Manufacture of transport equipment" (sub-section CL).

Table 1 – **The localization coefficient, the coefficient of per capita production and the coefficient of specialization of industries for Vitebsk region by types of economic activity in 2000–2018** (Source: calculated by the author on the basis of [7, 12–15])

Indicator	Year	Coefficient value (by sub-sections of section C "Manufacturing")														
		CA	CB	CC	CD	CE	CF	CG	CH	CI	CJ	CK	CL	CM	CN	CF-CI
Localization coefficient by types of economic activity (in terms of "volume of production")	2000	0,7	0,9	2,0	0,4	0,3	3,0	0,7	0,2	0,4	0,2	0,2	0,6	0,0	0,2	1,8
	2005	0,6	1,3	1,8	0,6	0,2	2,8	0,8	0,2	0,5	0,2	0,2	0,7	0,0	0,2	1,8
	2010	0,7	1,1	2,5	0,7	0,2	2,5	1,1	0,4	0,5	0,2	0,2	0,6	0,1	0,3	1,6
	2015	0,7	1,1	3,0	0,7	0,2	2,7	0,7	0,5	0,5	0,2	0,2	0,6	0,1	0,3	1,6
	2017	0,7	1,2	2,9	0,6	0,3	2,6	0,9	0,6	0,6	0,3	0,2	0,5	0,1	0,2	1,7
	2018	0,6	1,1	3,0	0,7	0,3	2,7	0,8	0,5	0,5	0,3	0,3	0,5	0,1	0,2	1,7
Localization coefficient by types of economic activity (in terms of "volume of produced innovative products")	2000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	2005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	2010	0,2	1,0	-	-	-	3,6	0,1	0,2	0,1	0,0	0,1	0,4	0,0	0,0	2,4
	2015	1,0	1,8	2,0	0,1	0,5	1,9	0,4	0,2	0,1	0,0	0,1	0,4	0,1	0,5	1,5
	2017	1,1	1,7	2,1	0,2	0,4	2,1	0,3	0,3	0,1	0,1	0,2	0,4	0,1	0,6	1,6
	2018	1,1	1,8	2,2	0,2	0,4	2,0	0,4	0,3	0,1	0,1	0,2	0,3	0,1	0,5	1,5
Localization coefficient by types of economic activity (in terms of "employment")	2000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	2005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	2010	1,2	1,6	2,7	1,1	0,4	4,6	0,9	0,6	1,1	0,6	0,5	1,1	0,1	0,5	1,1
	2015	1,1	1,6	3,2	1,1	0,5	4,5	0,9	0,6	1,2	0,5	0,5	0,9	0,2	0,5	1,2
	2017	1,2	1,5	3,3	1,0	0,6	4,7	0,8	0,5	1,2	0,6	0,5	0,9	0,3	0,6	1,3
	2018	1,1	1,6	3,2	1,1	0,6	4,6	0,9	0,6	1,3	0,6	0,5	0,8	0,3	0,6	1,4
Coefficient of per capita production by types of economic activity	2000	1,0	1,3	2,8	0,6	0,4	4,3	1,0	0,3	0,6	0,3	0,3	0,9	0,0	0,3	2,5
	2005	0,8	1,8	2,5	0,8	0,2	3,8	1,0	0,3	0,7	0,3	0,3	1,0	0,0	0,3	2,5
	2010	0,9	1,5	3,4	0,9	0,2	3,4	1,4	0,5	0,6	0,3	0,3	0,7	0,1	0,4	2,2
	2015	0,8	1,4	3,7	0,9	0,2	3,4	0,9	0,6	0,6	0,3	0,3	0,7	0,2	0,4	2,0
	2017	0,9	1,7	3,6	0,8	0,3	3,5	0,8	0,6	0,7	0,4	0,3	0,8	0,2	0,5	2,1
	2018	0,9	1,6	3,7	0,9	0,3	3,4	0,9	0,6	0,7	0,4	0,3	0,8	0,2	0,5	2,2
Coefficient of specialization of the region on the given type of economic activity	2000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	2005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	2010	1,4	2,2	5,0	1,4	0,3	4,9	2,1	0,7	0,9	0,4	0,4	1,1	0,1	0,5	3,2
	2015	1,2	2,2	5,6	1,3	0,4	5,2	1,4	0,9	0,9	0,4	0,4	1,1	0,3	0,5	3,0
	2017	1,1	2,3	5,4	1,2	0,4	5,3	1,5	0,8	0,9	0,5	0,3	1,2	0,2	0,6	3,1
	2018	1,2	2,3	5,5	1,2	0,4	5,2	1,3	0,9	0,8	0,5	0,4	1,2	0,2	0,6	3,2

In general, we can conclude that in Vitebsk region the most significant prerequisites for clustering exist precisely for the types of economic activity "Manufacture of textiles, wearing apparel, leather and related products" (sub-section CB), "Manufacture of wood and paper products; printing and reproduction of recorded media" (sub-section CC), "Manufacture of basic pharmaceutical products and pharmaceutical preparations" (sub-section CF) and for aggregation of types of economic activity of sub-sections CF-CI. In other words, we can say that there is a sufficient degree of localization of the organizations of relevant economic activities for identifying potential petrochemical, leather, footwear and textile clusters in the territory of Vitebsk region.

Novopolotsk petrochemical cluster. Nowadays, environmental problems are acute in the Novopolotsk region, there is a threat to the sustainability of the region's development due to trends in de-carbonization of industries and the transition to a low-carbon economy, green economy, circular economy (this is due to the region's specialization (city-forming industries) in chemistry, petrochemicals and oil refining).

In this regard, the region needs a reorientation to new technologies, new types of industries, and the use of new resources. The region needs to intensify innovation processes, to develop small and medium-sized businesses, and to intensify digital transformation. To implement the transformations, a comprehensive approach is needed, joint efforts of business (large, medium and small), science (research and development, education), government, infrastructure are needed to build a new development strategy and implement it. The tool (organizational form) of such interaction is the cluster.

The effective functioning of the cluster should become the foundation for achieving the key goals of sustainable development of the region.

Novopolotsk innovation-industrial petrochemical cluster is a combination of legal entities and individual entrepreneurs, geographically localized, complementary, competing, linked by cooperative relationships, as well as interacting with the organization of cluster development on a contractual basis, aimed at creating an enabling environment for the spread of innovations, development and production of innovative and high-tech products.

The cluster as one of the "drivers" of economic growth is primarily oriented (in the long-run) to improving the quality of life of the population based on the growth of the economy's competitiveness, attracting investments and innovative development.

The purpose of Novopolotsk petrochemical cluster is to increase the competitiveness of the territory through the growth of innovative activity of cluster entities and improvement of mechanisms for their interaction.

The main sub-goals (tasks) of functioning of Novopolotsk petrochemical cluster are:

– consolidation of production, scientific, educational, innovative, organizational, administrative potential, aimed at improving the competitiveness of products and the regional economy;

– promoting the development of scientific, industrial, organizational cooperation within the framework of the cluster, including the commercialization of scientific research;

– introduction of technological innovation by ensuring the effective interaction of science, business and government;

– increasing the competitiveness of cluster entities at the regional, national and global levels;

– transfer of innovation according to the "science-production" scheme;

– preparation of proposals for public authorities and local authorities in the field of industrial, innovative, scientific, educational, cluster policy;

– promoting the development of industries related and complementary types of economic activity;

– promoting the growth of employment in the region through the development of small and medium-sized enterprises;

– increasing the investment attractiveness of the region and ensuring high rates of economic growth.

The results of functioning of the cluster should be:

– growth of innovative activity and economic potential of the region;

– increase in the number of employed citizens for newly created jobs, including through the creation of new enterprises and industries;

– increase in competitiveness, quality, production volumes and sales of products (works, services);

– increase in labour productivity;

– increase in the volume of research and development carried out to create new and modernize existing technologies and industries, the commercialization of scientific and technological developments;

– growth in real investment;

– ensuring social stability and economic development of the region, increasing its economic potential, economic attractiveness and competitiveness;

– development of small and medium-sized businesses.

The following cluster projects were identified as the most promising areas of interaction (possible cooperation of cluster participants in the long term):

– production of small tonnage chemical and petrochemical products;

– production of sulfur concrete.

To increase the cluster's effectiveness and competitiveness, it is necessary to fully utilize the mechanisms of network cooperation and public-private partnership (PPP) by all cluster participants.

The set of measures to enhance network cooperation and PPP during clustering includes the following areas:

– creation of a favourable macroeconomic and legal environment for the implementation of mechanisms for network cooperation and PPP;

– development of program documents for enhancing network cooperation and PPP in individual sectors of the economy both at national and regional level;

– promoting the dissemination of knowledge about networking and PPP;

– training of specialists in the field of PPP and network cooperation, as well as increasing the potential of the public sector, which will directly or indirectly relate to the implementation of PPP projects;

– identifying the most significant prerequisites and launching pilot projects for the implementation of network cooperation and PPP;

– preparing and conducting activities aimed at developing a culture of cooperation (both between private partners and / or competitors, and between them and their state partners), with the aim of increasing the level of mutual trust;

– development of forms and mechanisms for effective interaction between all subjects of network cooperation and PPP;

– development of optimal mechanisms for interaction with elements of innovative infrastructure and research organizations in the framework of network cooperation and PPP;

– assistance and partnership in the implementation of projects for the formation of a scientific and innovative infrastructure in the framework of network cooperation and PPP (technology centres, technology parks, equipment sharing centres, industry technology transfer centres, industry laboratories, free economic zones, etc.);

– improving tax and customs policies, including tax and customs benefits;

– promotion of preferential financial policies;

– more active formation of elements of the institutional environment of PPP in the country: financial and economic institutions providing investment and guaranteeing private investment, independent organizations conducting project reviews and consulting, management companies, associations, foundations, etc.;

– support for the implementation of cluster programs on the basis of network cooperation and PPP;

– development of a set of measures to stimulate and support regional cluster initiatives and cooperation;

– establishment of competitions and grants aimed at selecting and financing the implementation of promising cluster projects;

– development of forms and mechanisms for effective communication interaction within the framework of network cooperation and PPP (B2B, B2A and C2A portals).

The last of the above area is becoming increasingly relevant within the framework of modern trends in the digital transformation of the economy and international integration processes.

Conclusion. In the conditions of formation of knowledge economy and network economy, traditional approaches to innovative development and increase of competitiveness should be supplemented by a new cluster approach in the formation of factors of competitive advantages. Clusters are self-organizing systems in which strategic competitive advantages are created through the synergistic effect of network cooperation and public-private partnership. The growth of innovation activity in clusters is the result of positive externalities: the exchange of knowledge, technologies, high innovative activity of firms due to high competition.

In general, the theoretical study allows to assert that for the Republic of Belarus cluster approach may become a very promising way to increase the competitiveness of products and a mechanism for enhancing innovation processes in regions. On the territory of Vitebsk region, there are prerequisites for the establishment of petrochemical cluster, leather, footwear and textile clusters. These clusters may become the basis of enhancing the competitiveness of firms participating the clusters, which may increase the competitiveness of Vitebsk region and country economy as a whole. The effective functioning of Novopolotsk petrochemical cluster should become the foundation for achieving the key goals of sustainable development of the region.

Literature

1. Andersson, T., Schwaagserger, S., Sörvik, J., Hansson, E. W. (2004). The Cluster Policies Whitebook. Malmö: IKED. Retrieved 10.12.2019 from http://led.co.za/ sites/led.co.za/files/ documents/155.pdf.

2. Central Hungary regional report (2016). INCLUDE: Industrial cluster development. Retrieved 15.02.2015 from http://www.include.net.

3. Cluster Building: A Toolkit. A Manual for starting and developing local clusters in New Zealand (2001). Cluster Navigators Ltd. Retrieved 26.02.2019 from http://www. vaxtarsamningur.is/ Files/Skra_0023777.pdf.

4. Karpova, D.P. (2007). Ispol'zovanie klasternogo podhoda v upravlenii regional'noj ekonomikoj. Regional'naya ekonomika i upravlenie, 2007 (4). Retrieved 15.02.2020 from https://eee-region.ru/article/1205/.

5. Ketels, C. (2003). Cluster-Based Economic Development. EDA Annual Conference Washington, D.C., 2003 (May 9). Retrieved 22.07.2015 from http://www.caps. am/data.php/ 859.pdf.

6. Kostuchenko, E.A. (2013). Analiz zarubezhnogo opyta formirovaniya i ispol'zovaniya klasternyh struktur v regional'nom razvitii. Vestnik Polockogo gosudarstvennogo universiteta. Seriya D. Ekonomicheskie i yuridicheskie nauki, 2013 (14), 32–41.

7. Kostuchenko, E.A. (2015). Ocenka potenciala klasterizacii neftekhimicheskogo kompleksa Vitebskoj oblasti. Potrebitel'skaya kooperaciya, 2015 (1), 80–84.

8. Porter, M. E. (2008). Clusters, Innovation, and Competitiveness: New Findings and Implications for Policy. EU Conference on Innovation and Clusters, Stockholm, 2008 (January 22). Retrieved 20.02.2012 from http://www.isc.hbs.edu/pdf/20080122_European Cluster Policy.pdf.

9. Roelandt, T. J. A., Pim Den Hertog (2015). Cluster Analysis & Cluster-based policy in OECD-countries various approaches, earl results & policy implications. Report by the Focus Group on: Industrial clusters. Retrieved 18.02.2019 from http://www.oecd.org / daf/ corporate.

10. Shepelev, I.G., Markova, U.A. (2012). Turistsko-rekreacionnye klastery – mekhanizm innovacionnogo sovershenstvovaniya sistemy strategicheskogo upravleniya razvitiem regionov. Sovremennye issledovaniya social'nyh problem (elektronnyj nauchnyj zhurnal), 2012 (3). Retrieved 17.08.2019 from http://cyberleninka.ru/article/n/turistsko-rekreatsionnye-klastery-mehanizm-innovatsionnogo-sovershenstvovaniya-sistemy -strategicheskogo-upravleniya-razvitiem.

11. Solvell, O. Lindqvist, G., Ketels, C. (2003). The Cluster Initiative Greenbook. Stockholm: Bromma tryck AB. Retrieved 19.03.2019 from http://www.cluster-research.org/ dldocs/ GreenbookSep03.pdf.

12. Statistical Yearbook of the Republic of Belarus: Statistical Digest (2016). Minsk: Information and Computing Centre of National Statistical Committee of the Republic of Belarus. Retrieved 02.04.2019 from http://www.belstat.gov.by/ofitsialnaya-statistika/publications/ izdania/public _compilation/index_6316.

13. Statistical Yearbook of the Republic of Belarus: Statistical Digest (2019). Minsk: Information and Computing Centre of National Statistical Committee of the Republic of Belarus. Retrieved 05.02.2020 from https://www.belstat.gov.by/ofitsialnaya-statistika/ publications/ izdania/ public_ compilation/index_14636.

14. Statistical Yearbook of Vitebsk Region: Statistical Digest (2016), Vitebsk: Information and Computing Centre of National Statistical Committee of the Republic of Belarus. Retrieved 03.04.2019 from http://vitebsk.belstat.gov.by/ofitsialnaya-statistika/ publications/public_ com pilation/ index_6409.

15. Statistical Yearbook of Vitebsk Region: Statistical Digest (2019). – Vitebsk: Information and Computing Centre of National Statistical Committee of the Republic of Belarus. Retrieved 05.02.2020 from https://vitebsk.belstat.gov.by/ofitsialnaya-statistika/ publications/ public_ compilation/index_14669.

16. Vinokurova, M.V. (2006). Konkurentosposobnost' i potencial klasterizacii otraslej Irkutskoj oblasti. Eko, 2006 (12), 73–91.