

world through Russia's military invasion of Ukraine. The disruption of food exports caused by the military invasion of Ukraine exposes global food markets to increased risks of declining availability, unmet demand for imports and rising international food prices.

Keywords: agri-food markets, food security, system, global economy, political stability.

ІНФОРМАЦІЯ ПРО АВТОРА

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THE ROLE OF THE CLUSTER IN THE ECONOMY OF EASTERN EUROPE

Abstract. In modern conditions of global competition, the cluster approach is more efficient in the organization of international production. The cluster approach is a new technology that allows to increase the competitiveness of the sector, region and country's economy as a whole. Structural and technological changes in the world economy lead to the structuring of the economy, increasing competitiveness and the transition to a cluster system. If the cluster policy of developed Western European countries is used as an experiment, then in Eastern European countries clusters are the basis of the economy. States that set up their own economies based on clusters are distinguished by the production of competitive products that have provided a high level of development. The integration of state, research institutes and specialists creates conditions for efficient use of the potential of the economies of the countries. Some states support the development of clusters by stimulating economic policy tools and investments, shaping the business environment. In Belarus, Ukraine, Hungary, Romania and Georgia, clusters are emerging in the fields of higher education, healthcare, as well as ICT, microbiology, virology, chemistry and pharmaceuticals.

Keywords: clusters, model, business, technopark, developing countries, ICT.

INTRODUCTION

The cluster model is currently being considered as one of the most effective forms of activity and development of the region's economy, ensuring the optimization of production and its efficient allocation. The use of cluster models has several important advantages:

1. It is the most modern and sufficiently effective tool of industrial policy;
2. It is a convenient platform for business interaction;
3. The cluster model can work to increase the competitiveness of the economy;

4. Creates conditions for complex solutions of large-scale tasks.

The use and formation of clusters in Europe is an effective tool for achieving key objectives: increasing the profitability and employment of countries. Important features of the cluster development program in Europe are:

- clusters used for the development of technological products (biotechnology, information and computer technology, etc.);
- selection of support programs that are provided after receiving information about clusters;

- there is a principle of competition, according to which only the best projects receive state support;
- main recipients of funds — small and medium enterprises;
- cluster policy is implemented by several institutions (in particular no more than 3) [6].

At the same time, pay close attention to the strengthening of interdepartmental coordination of cluster programs at the EU level. With this goal in the early 2000s, a network of companies providing educational, information and consulting support to the emerging clusters was created. For instance:

- European Cluster Observatory; search and mapping of clusters in the regions of Europe;
- European Cluster Alliance; development of cooperation and exchange of experience between entities implementing a cluster policy;
- Cluster Innovation Platform; promotion of cross-border cooperation between clusters (increase of support of small and medium enterprises in the field of eco-innovation and biotechnology);
- European Cluster Policy Group; develop recommendations for the European Commission and EU member states on the development of world class clusters in Europe [1].

MATERIALS AND METHODS OF RESEARCH

In Ukraine. Over the last few years, development of the clusters is one of the priorities of **Ukraine**. At the present time it is possible to distinguish the following industrial clusters:

- *E. O. Paton Electric Welding Institute* — energy-efficient and resource-saving technologies, equipment and design; electrometallurgy, metallurgical processing technologies, enrichment of metallurgical raw materials, increase of quality of metallurgical products. It specializes in the production of new equipment, modern machines, mechanisms and tools in rocket and space, aviation, shipbuilding, railway and marine industries.
- *The scientific and technological complex “The Institute of Single Crystals”* — functional materials, medicine and biotechnology, mechanical engineering and instrumentation; materials, devices, consumables, technologies for monitoring and protection of the environment specialize in the production of technical means of combat.
- *Technopark “Institute of Technical Thermophysics”* — specializes in thermal energy, non-traditional energy, energy-saving and resource-saving heating technologies, industrial ecology [8].

Mariupol locomotive “Innovation cluster with the participation of the Prague State Technical University” — a new organizational form of innovative activity, aimed at the development of traditional resources of the Donetsk region, diversification of the economy, diversification and diversification of the economy. One of the most important issues that needs to be addressed is the creation of “a zone of innovative enterprises” around the university.

Innovation cluster “Velvet Way” forms a targeted system for the development and implementation of new knowledge and technology, also accelerates the process of transforming inventions into specific innovations. Creation of such a cluster is a legal process in the implementation of the general purpose, provided by scientific and technical developments, production base and financial support of the main customer. Actual creators of the cluster are the State Administration of Railways of Ukraine, the National Academy of Sciences of Ukraine, the Main Department of Roads of Ukraine.

The research block of the cluster includes the Research Center of the State Economic and Technological University of Transport. The basis of the production block of the cluster are OJSC “Dnipropetrovsk Turning Plant”, OJSC “Kakhovsky Electric Welding Equipment Plant”, Experimental Welding Equipment Plant OJSC “E.O. Paton Electric Welding Institute”.

On the development of clusters in the Republic of Belarus, the State Program for the Development of Innovative Activity for 2011–2015. The program noted that one of the most important tasks in the formation of the institutional environment is the creation of a multidisciplinary cluster structure. The main goal of Belarus’ cluster policy is to improve relations between suppliers and manufacturers and thus strengthen the relationship between participants to ensure a successful exit to the common product market. High Technologies Park (HTP), one of the most successful innovative projects in Belarus, is considered by some local economists as an example of cluster activity in the field of ICT. HTP was established in 2005 by a special law to support the programming industry. The first residents were registered in 2006. For 10 years, 164 companies from different corners of the country have been registered as PVT residents. According to investment sources, 41 % of residents of housing and communal services are Belarusian investors, 24 % are joint ventures, and the remaining 35 % are 100 % foreign companies. The share of exports in total production exceeds 91,5 %. Resident companies are succeeding in high-tech markets in North America and Europe. Today he has clients in 61 countries of the world. Peugeot, Mitsubishi, British Petroleum, Gazprom,

Reuters, British Telecom, London Stock Exchange, World Bank and others. A number of leading world companies are the main consumers of Belarusian software provided in HTP. Since 2015, resident HTP companies have been allowed to engage in new scientific activities. [2] and data processing, can submit an application (micro, optical and nanoelectronics, mechatronics, telecommunications, radar range, radio navigation and wireless communication) for residency in the framework of HTP and tax benefits, taking advantage.

However, there are several features that officially distinguish HTP from the typical Belarusian cluster:

- Ignoring the administration of HTP and a large number of residents in Minsk, HTP as a whole has a distributed structure;
- Researchers and universities are not considered residents. At the same time, there is close cooperation with leading research universities (Belarusian State University of Informatics and Radio Electronics, etc.).

The LED cluster was created in 2015 to facilitate the modernization of the lighting industry, increase the energy efficiency of lighting equipment and protect consumers. The main participants are: Institute of Digital Television (enters the holding HORIZON, one of the largest manufacturers of household and industrial electronics, Minsk), OJSC “Brest Electric Lamp Factory” and “Brest Electric Lamp Factory” (Brest) and LEDs and the Institute of Optoelectronic Technologies of the National Academy of Sciences of Belarus (Minsk). Two of the three main participants in the formation of the cluster belong to the National Academy of Sciences of Belarus.

The pharmaceutical cluster of the Union of Pharmaceutical, Medical, Scientific and Educational Organizations was created in August 2015 in the Vitebsk region. It was created with the aim of popularizing the scientific, technological and industrial potential of the pharmaceutical industry of the Vitebsk region. The pharmaceutical industry and imports of the region contribute to the development of modern infrastructure for the production of new drugs. Participants: Rubicon, Nativita, Aconitpharma, Beldbnunifarm, Medelkombel, Vit-Var, Pharmarketinggroup, Vitebsk State Medical University and NGO “Regional Marketing Center”. Organizational support of the cluster is expressed by regional authorities [7].

The scientific and technological association “Infopark” is also considered an example of the ICT cluster. Infopark, registered in 2001, currently unites 57 enterprises and organizations of 57 different forms of ownership, in which more than 12,000 people work [2].

Clusters at the National Academy of Sciences of Belarus (NAS)

An important trend in the general activity of NAS in recent times is the commercialization of the results of R&D. Thus, R&D created for commercial purposes within the framework of NAS, constantly increase the volume and capacity of production capacity. Many NAS research institutes have traditionally opened their own business with the participation of partner companies. According to the presidium of NAS, in 2016 with the participation of research organizations NAS created about 72 “clusters”. For example. Republican scientific-practical biotechnological cluster NAS Ukraine (Institute of Microbiology, Institute of Genetics and Cytology, Institute of Meat and Dairy Industry) and industrial enterprises — Bobrui Biotechnology Plant, LLC “Brandoka” LLC.

According to the Concept for the Development of Innovative Industrial Clusters (2014) and local experts, the most promising areas for creating innovative industrial clusters in Belarus are: biotechnologies and biomaterials, pharmaceutical industry, medical equipment and devices, resource and energy saving, nanotechnologies and nanomaterials, optical devices, robotics and ICT.

There are cluster initiatives with different models in the capital and regions of **Georgia** [8]. Although clusters in Georgia face some development challenges, they are increasing day by day. In Georgia, the clusters were created in accordance with the requirements of the local market without the participation of the government. Some Georgian economists believe that the “dirigiste» policy is more effective in the current period. Modern clusters and structures in the cluster in Georgia began to develop mainly in 2004 and 2005. The clustering of enterprises in Georgia began with tourism. This includes companies that contribute to the facilitation of the visa regime for foreigners and the optimization of logistics systems. Then new clusters emerged in the wine, nuts, tea, dairy and poultry sectors. Currently, clustering initiatives are being implemented in the field of higher education, healthcare, as well as ICT, microbiology, etc.

The Eliava Institute is recognized as a world leader in applied microbiology, virology and bacteriophage research. Since its inception in the early 1920s, the institute has focused on research on bacteriophages and phage therapy. To support the sustainable development of the Eliava Institute, the Institute and its staff established the Eliava Foundation in 2008. The Foundation of the Institute has set up separate companies to research and commercialize its products. There are currently 5 separate companies: Eliava Bio Training; Eliava Analytical Diagnostic Center; Eliava Media

Production; Eliava Defect Therapy Center and Eliava Management Group. The profits of these separated companies are pooled in the Fund [5].

In 2015, the total expenditure on research and development amounted to about 2,2 million lari. There is no special source of funding for spin-off companies, it depends on income. The Eliava Institute team has a very fruitful collaboration with scientists and partners from different countries. Scientists from the USA, Belgium, France, Germany, Switzerland, Greece, Ireland, Great Britain, Canada, Turkey, Denmark, South Korea, Chile and Singapore are working on joint projects with scientists from the Institute.

The Business Council ICT Cluster was created by 14 leading ICT companies and IT professionals from the government, non-government and business sectors. ICT has considerable experience in the development of new technologies in the country. The current budget of the cluster is 120,000 GEL. The cluster is governed by a president and vice president. The ICT cluster is aimed at promoting the development of information and communication technologies in the country through the following goals: increasing e-literacy in the country; strengthening the processes of standardization, certification and quality control in the ICT industry; initiating and maintaining cooperation between the public, employment and education sectors for the development of ICT. The cluster has international cooperation with clusters in the Balkans and the Black Sea countries.

The ICT Technopark Cluster was built by the Georgian Innovation and Technology Agency (GITA) of the Ministry of Economy. The park offers resources for small start-ups. The park is focused on the development of small and medium-sized businesses. Currently there are 2 centers in Tbilisi and 8 in the regions. These centers can be considered as a cluster of companies [6].

ICT-Technopark is a public organization that will become a public-private partnership in the future. Research activities in the park are presented in the form of a prototype. ICT Technopark has joint projects with Microsoft, Intel, HP, Samsung and other IT companies. Technopark signed an agreement with the Patent Agency of Georgia. International cooperation with Estonian and Polish companies is also developing.

The Information Technology and Entrepreneurship Education Cluster consists of partnerships with private sector higher education partners and vocational centers/organizations located in the capital and some regions of Georgia. The main goal of the cluster is to study the market and search for sources of education in the country. The initial budget was \$ 400,000 [7].

The creation of clusters in the Republic of **Moldova** is at an early stage. Here clusters support the efficiency of application of research results in production, delivery of competitive industrial products to consumers.

Members of the scientific and technical cluster Academia signed an association agreement in 2007. At the same time, two innovative infrastructures were created: STP Academia and Innovator II. The cluster unites 19 partners. The cluster of universities of education and science, created in 2011 on the basis of an agreement signed between 20 partners, continues to provide training for scientific personnel in various fields. Moldova Lithuanian Innovation Technology Cluster — in 2014, with the participation of 1 foreign and 5 national partners of the Moldovan-Lithuanian Innovation Incubator, played a key role in the creation of Media-Garage. “Inagro” Science and technology park, specializing in ecology and intensive agriculture, was created in 2008 as a result of the merger of 4 partners [3].

Scientific and technical cluster in the IT industry. In 2012, two innovation incubators were created: II Itech of the Moldovan Academy of Economic Research and II Inventica-USM of the Moldovan State University.

Micronanotech Science and Technology Park, specializing in microelectronics and nanotechnologies, was established in 2009. The Micronanotech Science and Technology Cluster in Microelectronics and Nanotechnology was created by the merger of two partners.

The most successful cluster, demonstrating progress in the development of relations between the participants, is the Elhim-Moldova Science and Technology Park. The main goal of the cluster is to create innovative high-tech equipment and technologies for electrophysical and electrochemical methods of material processing and concentration of scientific, intellectual and material resources in this area, to solve the problems of training workers, engineers and scientists in this area. Another goal of the cluster is innovation and education. InnoCluster was created in 2012 in the Autonomous Territorial Union (AMU) of Gagauzia (Union of entrepreneurs, commercial educational institutions, technical NGOs, II InnoCenter) and joined the unified information platform of Comrat State University [1].

The purpose of the cluster is to transfer knowledge from an enterprise that is a resident of an innovation incubator of research laboratories and universities, which transforms scientific results into products and services in the market, or applies knowledge in the working environment.

The main reasons for the underdevelopment of industrial clusters in Moldova are:

- Low level of participation in these processes of both large companies and companies from the SME sector, lack of a leader to protect the interests of the cluster;
- Lack of cooperation between the commercial community and local authorities and research organizations;
- Limited access to business information due to lack of trust between local and foreign partners;
- Insufficient external support and lack of self-financing of enterprises for modern infrastructure projects.

CONCLUSIONS

Clusters play an important role in the economies of developing countries. These countries influence the development of the business environment by supporting clusters, stimulating economic policy and investment. These countries, which prefer a cluster approach in their economy, have a high level of economic development, and their products are competitive. In recent years, much attention has been paid to the use of cluster approaches in the economy: it is believed that clusters can become a factor in economic development, reduce dependence on the export of raw materials, increase labor productivity and create new poles of competitiveness. A wide variety of models for the formation and development of clusters with national characteristics, peculiarities of business culture, organization of production and

vocational education, different levels of infrastructure development and institutional relations of economic agents, the unevenness of the tools used, the uniqueness of directions and formats of state support in different countries and regions are determined differently.

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РОЛЬ КЛАСТЕРА В ЕКОНОМІЦІ СХІДНОЇ ЄВРОПИ

Резюме. У сучасних умовах глобальної конкуренції кластерний підхід є більш ефективним у створенні міжнародного виробництва. Кластерний підхід — це нова технологія, що дає змогу підвищити конкурентоспроможність галузі, регіону й економіки країни загалом. Структурно-технологічні зміни у світовій економіці сприяють структуризації економіки, підвищенню конкурентоспроможності та переходу до кластерної системи. Якщо в розвинених країнах Західної Європи кластерна політика використовується як експеримент, то в країнах Східної Європи кластери є основою економіки. Держави, створюючи власну економіку з урахуванням кластерів, відрізняються виробництвом конкурентоспроможної продукції, що забезпечила високий рівень розвитку. Інтеграція держави, науково-дослідних інститутів і спеціалістів створює умови для ефективного використання потенціалу економік країн. Деякі держави підтримують розвиток кластерів, стимулюючи інструменти економічної політики й інвестиції, формуючи бізнес-середовище. У Білорусі, Україні, Угорщині, Румунії та Грузії формуються кластери у сферах вищої освіти, охорони здоров'я, а також ІКТ, мікробіології, вірусології, хімії та фармацевтики.

Ключові слова: кластери; модель; бізнес; технопарк; країни, що розвиваються; ІКТ.

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