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EXPERIENCE OF EUROPEAN CLUSTERS IN TRANSSECTORAL INTERNATIONALIZATION

Formulation of the problem. The development of clusters is one of the main directions of the development of the modern economy in the world. The EU proves great attention to the development of clusters as drivers of economic development, innovation, export and better integration into international chains.

In the modern economy, the innovation cluster is a key element of the national (regional) innovation ecosystem, on which its subsystems are based: generation of knowledge, education and professional training, accumulation of experience, production of finished products, innovation infrastructure, the market of knowledge-intensive products and services [5, p. 194-198].

One of the main Industry 4.0+ projects is the INNO Industry project, the goal of which is to improve innovation development policies through better involvement of clusters in Industry 4.0. The project envisages conducting research in 10 countries of the European Union to identify 30 best practices of clustering and create a model of clusters 4.0-5.0 and action plans aimed at improving policies and tools [3].

In EU countries, the main information tool for business is the European Cluster Collaboration Platform. The European online hub opens wide opportunities for strengthening the European economy through the cooperation of industry cluster ecosystems. With the help of the platform, it is possible to find business partners for each country, region, sector or industrial ecosystem.

Any cluster initiative can be registered on the platform as a cluster organization or its participant, or as a European cluster partnership.

Analysis of recent research and publications. The problems of creating and developing the structure of industrial cluster associations as the most effective form of ensuring competitiveness were dealt with by the following economists: M. Makarenko, O. Papkovska, L. Levkovska, V. Liashenko, O. Mazur, V. Melnychuk, M. Porter, S. Sidak, S. Sokolenko, V. Fedorenko.

The role of cluster coordination in stimulating the transsectoral internationalization of industrial complexes was studied by R. Akoff, M. Voynarenko, T. Donaldson, E. Karapetyan, S. Kolyadenko, E. Renman, R. Freeman.

Setting objectives. The strategic goal of internationalization is to attract active and support "talented newcomers" under the Horizont Europe program in the field of nanotechnology, composite materials and smart manufacturing processes.

The ratification of the agreement between Ukraine and the EU (February 22, 2017) on the participation of clusters in the EU COSME program - "Competitiveness of Small and Medium Enterprises (COSME)" allowed cluster associations of Ukraine to participate in 23 European programs. which are classified in 3 areas:

• Facilitating entry of SMEs to foreign markets – provision of advisory services regarding the foreign economic activities of SMEs on the EU and world markets;

• Improving the conditions for competitiveness – uniting clusters of Ukraine to achieve certain successes in the field of export-internationalization, identifying and eliminating unnecessary regulatory barriers;

• Formation of business culture – educational programs, sectoral trainings, seminars, exchange programs, internships, etc.

• NMP projects stimulate internationalization processes in EU-13 and EU-15 and associated countries that have sufficient potential.

The Ukrainian Cluster Alliance (UCA) is the coordinator of cluster business structures in Ukraine and simultaneously takes care of smart specialization, Industry 5.0, eco-industrial parks, and DIH development. At the conference of cluster development in Kamianets-Podilskyi, the chairman of the board of the UKA Oleg Demchuk presented the results of the activities of the Podilsk fashion cluster (PFC) and Dniester 1362. The heads of the PFC cluster testify to the specific benefits of joining the cluster: increased sales, access to new product lines, creation of new workplaces. The most important thing is that managers change the way of thinking and vision of their business, change business models. All this is the result of painstaking, daily work of the cluster coordinator.

The most revealing in Ukraine are the processes of internationalization of the Zaporizhzhia cluster "Engineering-Automation-Machine Building" (IAM), which, despite the risks of approaching the war zone, according to the results of 2022 showed an increase in the number of its members by 25% (from 20 to 25), among which: "Zaporizhskaya TPP", LLC "UkrstandardCertification", "Energoprom", "Talko", "Triada", LLC "Zaporizhkran", EAM "Zaporizhia",

PJSC "InfocomLTD", LLC "Saturn", "Atico", " Assol", "GreenSystem", "Granik", etc. [1].

We will highlight 4 key directions of internationalization of industrial clusters (Fig. 1):

• Modern materials;
• Manufacturing technologies;
• Cyclical industry;
• Clean industry.

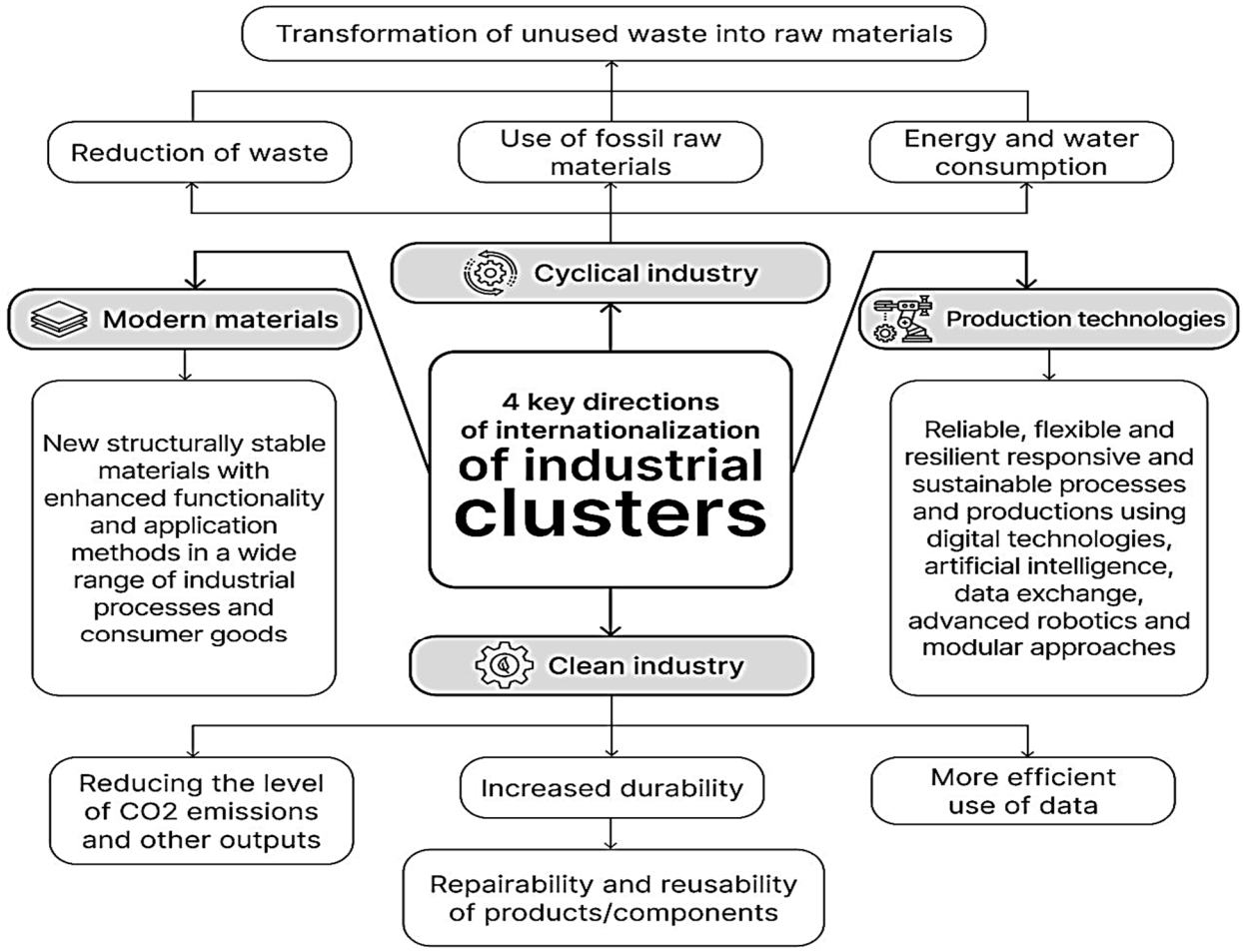

Fig. 1. Key directions of internationalization of industrial clusters

For cluster management, the strategic task is to increase mutual understanding between researchers and manufacturers, which is currently being put forward as a development priority by the Association of European Science and Technology Professionals.

The study of real success stories of leading clusters of European countries, as well as the analysis of the activities of successful Ukrainian clusters, made it possible to identify certain factors for improving the competitiveness of cluster participants.

The most accurate is the general distribution of the set of factors that affect the competitiveness of the cluster into internal and external. Internal factors include [4]:

– the level of material and technical support of production,
– management tactics and strategy,
– innovative activity of participants,
– pricing policy,
– competitiveness of products (services),
– qualification level of labor resources,
- employee motivation system,
- conditions of modern information technologies.

External ones include:

- market conditions,
- level of logistics infrastructure development,
- social, environmental, scientific and technical factors,
- the situation on the labor market.

Such objective factors as geographic concentration, climatic conditions, availability of natural resources, regional and national characteristics are stable or long-term and largely determine the level of competitiveness, but they cannot increase it by themselves.

At the current stage of development of cluster systems, promising competitive advantages created on domestic markets begin to play a key role. These are management tactics and strategies, ways of organizing economic entities and the structure of the economy [2].

The analysis of the European experience shows the emergence of a significant cluster effect in compliance

with the indicators of regional and industry orientation. Practice shows that the agglomeration cluster effect occurs if the cluster members are located in an area with a diameter of approximately 100-150 km. For optimal ongoing cluster interaction, the distance between participants should not exceed 2-3 hours. Even in times of technological transformation, cluster effects mostly arise from network interaction and cross-industry collaboration. At the same time, an important indicator is the critical mass of participants (firms, enterprises, institutions). The results of the analysis indicate that in order to ensure the improvement of competitiveness indicators, there should be at least 10-20 participants in the cluster, but this indicator may vary depending on the industry and other market circumstances.

The level of competitiveness of clusters is affected by additional variable factors. First of all, it is a state policy to promote the creation and development of competitive advantages of the territory, which affects local conditions and shapes the role behavior (active or passive) of regional and municipal bodies in support of territorial cross-sectoral cooperation. Due to global transformations, digitalization and internationalization, such local conditions can be used not only by national enterprises, but also by subjects of foreign economic activity (non-residents). One of the tasks of cluster management is to minimize risks and prevent threats from the activities of non-residents in order to prevent the loss of competitive advantages.

Thus, if the presence of a non-resident threatens the cluster activity of domestic enterprises, the reaction of the cluster management should be aimed at creating territorial barriers together with state authorities. At the same time, authorities at all levels (central, regional, municipal) should create appropriate conditions for removing barriers to cooperation, and lobbying for precautionary measures aimed at protecting the interests of national cluster associations.

Cluster monitoring of 50 clusters in Germany, representing about 5,000 companies, confirms the fact that the performance of enterprises integrated into clusters is better than the industry average. Improvement of economic indicators took place in 61% of companies (2% – significant improvement). 37% of companies did not experience significant changes, and only 2% of companies experienced a deterioration.

The problems of cluster management in Ukraine became the subject of an international expert discussion at the initiative of Dr. Gerd Mayer zu Köker, Dr. Niklas Rüffer, manager of GIZ (Ukraine): how a cluster increases business competitiveness. The success stories of 7 European clusters related to time, marketing, and partnership were considered.

A medium-sized business with the aim of creating valuable memorabilia for the 2019 World Cup. designed the medals for the championship, but the owner did not know how to take the idea forward. The enterprise was integrated into the cluster of natural fibers AFBW (Germany), which already had experience in promoting sports products for international events. As a result of an excellent marketing move, the company became world-famous and received new contracts and positive feedback from various locations around the world. New projects made it possible to conclude new agreements with partners and significantly increase turnover.

Typical functional tasks of the cluster coordination system are:

1. Information and communication.
2. Internationalization.
3. Initiation of cooperation.
4. Training and professional development.
5. Market research and marketing.

Information and communication functions are performed traditionally and remotely. In addition to traditional representative events (tours of the company, presentations), the task of management is to ensure the correct and regular formation of expanded databases (clients, suppliers, contractors, services), regular customer surveys, support of social networks and special bots, Internet pages, information distribution activities.

Internationalization involves the access of members of cluster associations to international events, conferences, congresses, and forums. Support of international cooperation in the process of foreign economic activity. It is advisable to develop a program of network activities between similar or complementary international clusters, as well as the involvement of foreign participants in the cluster.

An example of the internationalization of cluster initiatives on the part of Romanian representatives of SMEs is the founding of the Association of Clusters of Romania, which contributed to the creation of cluster maps (Cluster Mapping) and conducting innovation audits. Active activities on internationalization with a "bottom-up" approach, regular holding of the Conference on National Clusters caused a resonance on the part of state bodies. As a result, there was a very close informal cooperation "Ministry of Economy - CLUSTERO" (CLUSTERO is a founding member of the European Alliance of Clusters).

Creative director, founder and coordinator of the "Situationist" cluster Irakliy Rusadze, emphasizing the importance of the C4D project in cross-sectoral cooperation, noted the following results of the proceedings:

1. Increase in sales of commodity products by 130%.
2. Upgrading the production equipment of the textile line by 60% (automation up to 100%).
3. Wide coverage of products in international specialized publications (Harprr`s Bazar, Eiie, Purple).
4. Presentation of digital production technologies in the fall-winter 2021-2022 collection of products in Paris.
5. Launch of an interactive e-commerce platform for cluster member companies.

Initiating collaboration is important to continue the value chain. Cluster policy should not have a significant impact on the current activity of the cluster. To be successful, clusters must be open to everyone who has the ability to add value.

In Europe, the cluster success formula is practiced, which consists in adding to the cluster system those participants who ensure the continuation of the added value chain (creation of semi-finished products, parts, packaging, etc.).

In order to continue the chain of added value and increase the competitiveness of the final product, the functional scheme of cluster coordination, in addition to internationalization, should include systemic measures in the following directions: public relations, entrepreneurship development, professional development, innovation and digitalization.

The oldest industrial cluster in Croatia was created through triple upward spiral organizations, which included important entrepreneurs from the industry, state regulatory bodies and R&D. Approximately 42 participants are involved in the chain of sequential value creation in the wood industry: forestry, sawmill industry, furniture industry, wood in construction, wood biomass, design, transportation, certification, etc. Initial costs of a nationally funded project. The cluster's budget consisted of state funding – 55% and membership fees - 45%.

Within the framework of transsectoral internationalization, the local level of the woodworking cluster was cut to the national one and united the forestry sector with 2.7 million hectares of forest land (84% non-coniferous, 16% coniferous forests) and the woodworking industry into the core of the cluster (Table 1). Transsectoral interaction covers 49% of the country's territory, 8 sectors of the economy, as well as financial, scientific and social infrastructure.

Table 1

Transsectoral internationalization in the woodworking cluster

No.	Transsectoral interaction	Cluster participants					
		Supply		Production		Consumption	
		Number	million €	Number	million €	Number	million €
1	Forestry	6	7,45	8	24,73		
2	Wood industry	2	3,85	12	31,67	14	7,54
3	Chemical Industry	6	1,45				
4	Engineering	2	6,81				
5	Fuel and energy sector	4	1,74			4	1,42
6	Transport and logistics sector	10	2,38			3	0,45
7	Construction sector	5	5,25			7	3,68
8	Agricultural sector	2	0,47			5	1,33
9	Others sector	5	5,22			5	2,85
	Together:	42	34,62	20	56,4	38	17,27

Cross-sectoral cooperation with the clusters of Slovenia, Finland, Belgium and membership in European associations allowed the gradual creation of new sectors (environmental) to continue the chain of added value.

The creation of networking networks contributed to the involvement of new cluster strategies from different sectors in transsectoral cooperation. Polycentric connections with Croatian innovation clusters in automation, digitization, and artificial intelligence strengthened the competitive advantages of the cluster.

The importance of cross-sectoral cooperation of clusters for the development of the national economy is confirmed by the experience of Romania, whose government did not pay much attention to the processes of clustering industries. In contrast to many European countries, in 2008, Romania observed a lack of funding for clusters, a low level of innovation in SMEs, and a low level of popularization at the international level. A simple bottom-up approach has enabled stakeholders to create sustainable business models in many industries. Regional development agencies began to play an important role in the structure of the model. The representative organization of Romanian clusters covers 47 clusters of various economic sectors at the national and international level: IT, agro-industrial sector, woodworking industry, textile industry, energy, engineering, health care, etc. At the regional level, there are 6 regional consortia of thematic industries (textile industry, organic agricultural production, furniture woodworking and food industry).

The business and scientific circles of Romania used a unique approach of initiating cooperation. In order to overcome crisis phenomena in agriculture and promote cooperation in the agrarian sector and food industry in Romania, the creation of a new association based on the "cluster of clusters" approach (Business Incubator of Sf Gheorghe) was initiated. That is, a cluster that actually functions as a cluster incubator. The mission of the Agro-Food-Ind Napoca cluster association is to form a long chain of added value by business entities, starting from the agro-industrial sector to catering enterprises. In the chain of participants, there are scientific and research educational institutions that

are aimed at innovation, encouraging the process of competitive restructuring of the sector and ensuring participation in many commercial projects, both national and international. In this sense, the members of the "Agro-Food-Ind Napoca Cluster" association decided to join forces to support the development of the agro-industrial sector, with the declared goal of supporting the increase in the competitiveness of the cluster and each of its members, both on the domestic market and on the foreign market.

Conclusions from the conducted research. In order to better coordinate and include the proposals of Ukrainian clusters in the government's anti-crisis action programs, the Ukrainian Cluster Alliance appealed to the Government of Ukraine with the "Export-Internationalization Program". The document was prepared by the Analytical Center of the Ukrainian Cluster Alliance, as part of the proposals for the anti-crisis action program of the Government in 2022, and is a collective appeal of the clusters [5].

1. Facilitating the implementation of the Buy Ukrainian program proposed by the Office for Entrepreneurship Development and Export Support (EERO) [5].

2. Support for transsectoral integration of Ukrainian clusters into global value added chains under the international Integration into GVC program.

3. "Trading Missions" project - support for clusters of critical sectors (Agrifood, Engineering-Mechanical Engineering, Light and Furniture).

4. Accelerating the inclusion of Ukrainian innovation clusters in the relevant European programs of innovative development, dual digital and green transitions under the "Inno-Integration" program (industrial startups, hard & soft developers, scientific research institutes, universities).

5. Support and technical regulation of the accelerated transition of Ukrainian clusters to international technical standards under the "Standardization" program.

6. Development of cross-sectoral target programs for support of scientists and researchers, as well as innovative development of processing sectors in Ukraine with effective processing of the local resource base with the creation of cross-sectoral LDV.

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Уткін В. П. Досвід європейських кластерів у трансгалузевій інтернаціоналізації

У статті обговорюється важливість кластерів у сучасній економіці як драйверів економічного розвитку, інновацій, експорту та кращої інтеграції в міжнародні ланцюги. Інноваційний кластер є ключовим елементом національної (регіональної) інноваційної екосистеми, а проєкт INNO Industry спрямований на вдосконалення політики розвитку інновацій шляхом залучення кластерів до Індустрії 4.0. Європейська платформа кластерної співпраці є основним інформаційним інструментом для бізнесу в країнах ЄС, що пропонує можливості для зміцнення європейської економіки через співпрацю галузевих кластерних екосистем. Ця платформа дозволяє зареєструвати будь-яку кластерну ініціативу як кластерну організацію, учасника або європейське кластерне партнерство, що полегшує пошук ділових партнерів для кожної країни, регіону, сектору чи промислової екосистеми.

Обговорюються фактори, що впливають на конкурентоспроможність кластера, які можна класифікувати як внутрішні та зовнішні. До внутрішніх факторів належать матеріально-технічне забезпечення виробництва, тактика і стратегія управління, інноваційна діяльність, цінова політика, конкурентоспроможність продукції, трудові ресурси, мотивація працівників, сучасні інформаційні технології. З іншого боку, зовнішні фактори включають ринкові умови, розвиток логістичної інфраструктури, соціальні, екологічні, наукові, технічні чинники та ситуацію на ринку праці. Анотація також висвітлює стабільні або довгострокові об'єктивні фактори, такі як географічна концентрація, кліматичні умови, наявність природних ресурсів, регіональні та національні особливості, які можуть впливати на конкурентоспроможність, але не можуть підвищити її самі по собі. Розуміння цих факторів і керування ними може допомогти підвищити конкурентоспроможність кластера.

Ключові слова: кластери, система, конкурентоспроможність, міжгалузева інтернаціоналізація, внутрішні фактори, зовнішні фактори, кластерна політика.

Utkin V. Experience of European Clusters in Transsectoral Internationalization

This article discusses the importance of clusters in the modern economy as drivers of economic development, innovation, export, and better integration into international chains. The innovation cluster is a key element of the national (regional) innovation ecosystem, and the INNO Industry project aims to improve innovation development policies by involving clusters in Industry 4.0. The European Cluster Collaboration Platform is the main information tool for businesses in EU countries, offering opportunities for strengthening the European economy through the cooperation of industry cluster ecosystems. This platform allows any cluster initiative to be registered as a cluster organization, participant, or European cluster partnership, making it easy to find business partners for each country, region, sector or industrial ecosystem.

Discusses the factors that affect the competitiveness of a cluster, which can be categorized as internal and external. The internal factors include material and technical support of production, management tactics and strategy, innovation, pricing policy, competitiveness of products, labor resources, employee motivation, and modern information technologies. On the other hand, external factors include market conditions, logistics infrastructure development, social, environmental, scientific, technical factors, and labor market situations. The abstract also highlights the stable or long-term objective factors such as geographic concentration, climatic conditions, availability of natural resources, regional and national characteristics that can influence the competitiveness but cannot increase it by themselves. Understanding and managing these factors can help improve the competitiveness of a cluster.

Keywords: clusters, system, competitiveness, transsectoral internationalization, internal factors, external factors, cluster policy.

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