CLUSTERING OF THE NATIONAL ECONOMY AS AN EFFECTIVE TOOL FOR THE SUSTAINABLE DEVELOPMENT OF EUROPEAN COUNTRIES

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Abstract. The cluster model is an effective tool for ensuring the effective development of national economies and the transformation of the innovative ecosystems of European countries. This is determined by the goals of the cluster approach. In most European countries, cluster structures are recognized as the most effective means of implementing regional policies that promote balanced sustainable development of regions based on the use of local conditions, resources and competitive advantages. World practice testifies to the intensification of the processes of formation of cluster associations of organizations in recent decades. Currently, about 50% of the economies of developed countries are covered by the processes of creation and functioning of clusters. *The purpose of the article* is the analysis and synthesis of the European experience in the development of cluster structures to develop recommendations for the possible use of clustering the national economy as an effective tool for sustainable development of European countries in Ukraine. *Methodology.* The theoretical and methodological basis of the study are the provisions of institutional theory, in particular the paradigm of evolutionary development, clustering theory, the concept of strategic and logistical management, enterprise development management. In the process of research the following general scientific methods were used: analysis and synthesis (for the analysis of scientific schools of development of cluster theories, generalization of existing theoretical approaches and provisions, scientific developments on the problems of managing the development of cluster structures, clarification of terminological apparatus); classification and systematic approach (to systematize the conceptual approaches to defining the concepts of "cluster", "clustering", to identify industry-specific development of cluster structures in Europe); comparison and structural-logical generalization (to determine the features of the European practice of clusters and the possibility of its use in Ukraine). *Results.* The study revealed the sectoral focus of cluster structures in European countries. The features of the implementation of cluster policy and the key objectives of support for the development of cluster structures in a number of EU countries were identified. It is proved that the clusterization of the national economy, cluster policies and initiatives in the last decade have become important elements of strategies and concepts of innovative and sustainable development of European countries. Based on the analysis and synthesis of sectoral trends in the creation of cluster structures in European countries, it was found that the national characteristics of existing cluster policy determine the direction of cluster initiatives; strategic cluster alternatives are determined by national characteristics and the adopted cluster concept; to assess the feasibility of the cluster strategy of development of the territory it is necessary to correlate the level of investment potential and investment activity; methodological principles of formation of a national cluster strategy need to be refined and clarified, taking into account the current challenges. *Practical implications.* On the basis of summarizing the best European experience, it was found that to increase the competitiveness of the national and regional economy it is necessary to create cluster structures as effective forms of partnership. But as a result of the study, it was found that the current legislation of Ukraine does not pay proper attention to the formation and functioning of clusters. This requires changes and additions to the Concept of creating clusters in Ukraine, the Regional Development Strategy until 2027 and action plans for their implementation in 2021-2023 years to create cluster structures as a business entity. It is advisable to develop and approve the Concept of cluster policy and the Target Program "The formation and development of cluster formations in the regions of Ukraine for 2021-2023 years", which should

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provide for the creation of clusters as a special type of associations of enterprises in different fields of activity and taking into account regional characteristics. *Value/originality*. The author's approach to improving the regulatory support for the development of cluster associations in Ukraine, taking into account the best European practices was formulated.

Key words: national economy, clustering, cluster initiative, cluster policy, cluster approach, cluster structure, form of partnership, model of cooperation, stakeholders, globalization, European practice, sustainable development.

JEL Classification: F15, F20, L22, P51, R40

1. Introduction

Currently, cluster formations are recognized as one of the most effective production systems and forms of network partnerships in the era of globalization, digitalization and knowledge economy. At the same time globalization processes strengthen the role of clusters in the economy of different countries and contribute to their further formation and functioning. These structures have become a kind of "new wave" that sets the modern vector of development of the global ecosystem and logistics networks.

It should be noted that globalization opens up real opportunities for most international companies to move capital freely and quickly, facilitates access to the necessary knowledge, provides a choice of location depending on the convenient geographical location, availability of transport and logistics infrastructure, availability of raw materials, proximity to markets, etc.

International practice shows that one-third of companies operating within clusters tend to increase employment consistently. In regions with developed clusters, innovative sectors also emerge more quickly. The successful experience of Austria, Germany, France, Finland, the Netherlands and other countries shows the prospects of automation and digitalization of industry through the creation of digital regional and interregional clusters (Yurchak O. et al., 2020).

It should be emphasized that regions with more developed clusters demonstrate a high level of profitability. Thus, clustering is a powerful tool and opportunity for structural institutional change in national and regional economies of European countries, which is a strategic priority for the implementation of smart specialization strategies and the concept of sustainable development in modern conditions.

2. Literature review and problem statement

The problems of cluster development are actively considered by economists. Cluster as an economic category reflecting new trends in the formation of competitive structures in the world economy was introduced into scientific turnover by M. Porter (1998). He conducted a study of spatial competitiveness in the context of the world economy and substantiated the historical and intellectual premises of cluster theory.

In modern conditions, the application of the cluster approach is seen as one of the most effective mechanisms of structural development of the economy. Among the characteristic features of the cluster model of economic structure are the presence of competitive enterprises; the presence of competitive advantages in the region for the development of the cluster; geographical concentration; a wide range of participants and the presence of "critical mass"; interaction between cluster participants (Pyatinkin & Bykova, 2008).

The strategic task of implementing the cluster model of economic structure at the meso-level is to change the psychology of entrepreneurs, their understanding of the possibility of mutually profitable cooperation of all members of the cluster association for a common economic benefit (Gasanov & Kanov, 2013).

The cluster approach is based on the concept of "cluster", which is a network structure of geographically adjacent interconnected companies (suppliers, producers and buyers) and related organizations (educational institutions, state and regional authorities, infrastructure companies) that work in a particular area and complement each other (Yasheva, 2009).

Cluster as a conceptual apparatus and market organizational and structural institution has a broader meaning because in addition to production and technological features, it concentrates social, economic, institutional and cultural-mental parameters that give this formation high potential for mobility, stability and competitiveness. Clusters are groups of interconnected companies in a certain territory, their vertical and horizontal connections strengthen social relations and create stable integrated networks (Egorov & Chigarkina, 2006).

Some foreign scholars (Devlin & Bleackley, 1988; Marshall, 1993; Swann & Preveser, 1996; Feser, 1998; Bergman & Fese, 1999; Feldman & Audretsch, 1999; Dussauge, Garrette & Mitchell, 2000; Pentikäinen & Luukkainen, 2000; Sölvell, Lindqvist & Ketels, 2003) argue that clustering is a process that consolidates the diverse elements of the social system at the local level and unlocks the internal regional potential for vertical and horizontal integration. Thus, the regional cluster is recognized as a spatial economic form that emerged as part of the informal association of several organizations, which achieves the necessary concentration of production, management, information infrastructure

to ensure a high level of competitiveness in the regional product (Prokopenko, 2016). The cluster model of national economic development is a conceptual approach that involves the use of clusters as strategic elements of the modern market economy, allowing to realize the country's competitive advantages within the international economic space (Pankova & Potapenko, 2018).

S. Sokolenko (2004) and M. Voynarenko (2018) made a significant contribution to the development of the clustering system in Ukraine. They considered the cluster approach from the perspective of institutionalism, justified and implemented cluster models in the regional economy. L. Ryneyska (2016) investigated the role of clusters in the development of national and regional economies (for example, the EU economies), which are components of the modern global economic space.

In recent decades, a number of leading domestic scientists (Heyets, 2008; Zahorskyi, Kyzym & Khaustova, 2010; Tishchenko, 2010; Kyzym, 2011; Mamonova, Kuts & Makarenko et al., 2013; Komar, 2014; Oskolskyy, 2014; Nochvina, 2016; Voynarenko & Dubnytskyi et al., 2019; Bilyk, 2019; Shashyna, 2020; Tsyplitska, 2021) have conducted research on cluster issues, considering clusters as fundamentally new institutions of the economic system, which appear under the influence of factors of the institutional environment and the development of global competition.

Despite the wide range of research on this topic, at present the methodological issues of improving the management of cluster structures in European countries in accordance with the modern challenges associated with smart specialization, modernization of production and digitalization of organizational and managerial processes remain underdeveloped both scientifically and practically.

3. Research methodology and purpose of the article

The theoretical and methodological basis of the study are the provisions of institutional theory, in particular the paradigm of evolutionary development, clustering theory, the concept of strategic and logistic management, enterprise development management.

In the process of research the following general scientific methods were used: analysis and synthesis (for the analysis of scientific schools of development of cluster theories, generalization of existing theoretical approaches and provisions, scientific developments on the problems of managing the development of cluster structures, clarification of terminological apparatus); classification and systematic approach (to systematize the conceptual approaches to defining the concepts of "cluster", "clustering", to identify industry-specific development of cluster structures in Europe); comparison and structural-logical generalization (to determine the features of the European practice of clusters and the possibility of its use in Ukraine).

In this regard, the purpose of the article is the analysis and synthesis of the European experience of the development of cluster structures to develop recommendations for the possible use of clustering the national economy as an effective tool for sustainable development of European countries in Ukraine.

4. Presentation of the main material of the study

The key driver for stimulating the formation and functioning of cluster structures should be measures aimed at deepening network ties between territorially concentrated enterprises and institutions. This will save financial resources, expand opportunities for the implementation and use of innovative technologies, and through cooperation and mutually beneficial cooperation gain competitive advantages in various areas of economic activity and achieve a balanced sustainable regional development. This is confirmed by the experience of many European countries that use the cluster approach to implement the national and regional economy. In European countries, cluster associations are recognized as an effective tool for sustainable development.

According to the European Observatory for Clusters and Industrial Change report on cluster support in 29 European countries, including an in-depth analysis of 30 national and 55 regional programs, individual policies and strategies to support clusters are widespread in Europe and around the world (Yurchak O. et al., 2020). Interstate, regional, national and public organizations are united in the European Cluster Alliance. This corresponds to the EU Cluster Manifesto (Brussels, 2007) and the European Cluster Memorandum (Stockholm, 2008), which currently define the development strategy of the European and global community and are based on the principles of cluster regional policy through the effective activities of the economic entities of the respective regions.

Thus, in most EU countries clusters are recognized as an effective institution for socio-economic development at various levels. This is because cluster structures concentrate economic activity; expand market segments; intensify inter-firm and network cooperation; increase competitive advantage through joint research and development; generate new value chains based on cross-linkages between firms, which strengthen the sustainability of the entire network system; and create systemic synergy.

An online survey conducted in 2018 by the European Observatory on Clusters and Industrial Change identified tools and areas of support for

cluster formations in national and regional programs. These include: support for SME participation; support for international cluster cooperation in one sector; support for cross-industry cooperation; funding for meetings and networking (i.e., events aimed at exchanging information between people with common professional or personal interests; building long-term trust relationships based on social networking); support for access to other markets; promotion of environmental efficiency; creating quality new cluster infrastructure, etc.

It turned out that the range of stakeholders and annual budgets vary in a number of European countries (for example, funding in France is 144 million euros). The main sources of funding for cluster development are state budgets, company membership fees, local government funds, alternative private funds (crowdfunding, venture capital), trust funds, NGOs.

However, despite the widespread use of the cluster approach in foreign economies, there is a serious differentiation in the principles, forms and methods of cluster policy, the degree of state regulation of cluster formations, sectoral advantages in the organization of clusters (Table 1). Thus, the greatest influence on the implementation of cluster initiatives in the EU countries has a supranational regional and industrial policy, as well as the differentiation of member countries by the level of development of the national innovation system.

It should be noted that within the European Union, cluster policy in the vast majority of countries is not an independent policy, because there are no documents regulating it. Instead, it is implemented as part of innovation, industrial or regional policy. Approximately 70% of countries consider cluster policy to be an innovation policy, 25% – to the regional one.

The analysis shows that a number of countries are developing clusters through mechanisms of support for internationalization, best practices of cluster members, strengthening structures of cooperation between companies or between industry and science (Table 2). Where national cluster strategies exist, public authorities pay special attention to the conditions and organizational process of clustering; coordinate the activities of governing bodies at the regional and local levels for the effective development of clusters.

Thus, in many foreign countries the development of clusters of different sectoral affiliation is purposefully stimulated on the basis of a special cluster policy. The European Commission, the Asian Development Bank, the World Bank, and the Organization for Economic Cooperation and Development also develop recommendations for the implementation of cluster policy.

The national cluster policy uses a wide range of instruments and mechanisms to stimulate clusters (creation of special advisory and coordinating bodies, provision of expert and organizational support, direct state co-financing of cluster development programs, etc.). For example, the European Commission initiated the creation of a number of organizations that should provide various support to clusters (the European Cluster Observatory, the European Cluster Policy

Table 1
Industry-specific features of cluster structures in European countries

Country	The main types of economic activity												
	1	2	3	4	5	6	7	8	9	10	11	12	13
Czech Republic	■	■	■	■	■	■	■	■	■	■	■	■	■
Lithuania	■	■		■	■	■	■	■		■	■	■	■
Poland	■		■	■	■	■	■		■	■	■	■	■
Hungary	■	■	■		■		■	■	■	■	■	■	■
Romania	■	■	■	■	■	■	■		■	■	■	■	■
Slovakia	■		■		■		■			■	■		■
Latvia	■						■			■		■	
Finland	■		■		■			■		■			
Netherlands			■				■		■		■		
Switzerland	■			■						■			
Estonia				■					■				■
Germany					■		■			■			
Norway					■								
France			■							■			
Denmark									■				
Italy			■				■						
Great Britain										■			

Notes: IT sector and cybersecurity (1); smart specializations (2); agricultural sector (3); chemical industry (4); energy and eco-energy efficiency (5); metalworking (6); mechanical engineering and engineering (7); construction (8); transport (usually aviation and maritime industry) and logistics (9); biotechnology and medicine (10); tourism and recreation (11); woodworking (12); creative industry (13).

Source: (Yurchak O. et al., 2020)

Table 2

Priorities for supporting the development of clusters in EU countries

Countries	Task
Poland, Hungary, Romania, Slovakia, Czech Republic, Lithuania, Latvia	Support for internationalization
Poland, Estonia, Hungary, Romania, Czech Republic, Lithuania	Promotion of research and development and implementation of new technologies
Hungary, Romania, Slovakia, Czech Republic, Lithuania, Latvia	Strengthening cooperative structures between companies or between industry and science
Poland, Hungary, Romania, Czech Republic, Latvia	Support for the best practices of cluster participants
Poland, Romania, Czech Republic, Lithuania	Strengthening innovation ecosystems and regional innovation potential
Hungary, Czech Republic, Lithuania, Latvia	Enhancing the development of SMEs

Source: (Yurchak O. et al., 2020)

Group, the European Cluster Alliance, the Cluster Innovation Platform).

In most developed countries the state provides direct funding for cluster development programs. Thus, in Germany there are programs BioRegio, InnoRegio, "Better Clusters"; in France – the program Competitive Poles. These programs are highly effective. For example, as a result of the BioRegio program, the number of biotech companies tripled, creating more than 9,000 jobs. This led to a narrowing of the gap between Germany and Great Britain in the field of biotechnology, which allowed Germany to become the European leader in this sector.

However, it should be noted that European countries have developed different approaches to clustering strategies. This is due, firstly, to different levels of socio-economic development and the business environment, institutional and cultural features, and systems of state regulation. Secondly, EU countries use different approaches to identify clusters. For example, Sweden, Portugal, the Netherlands, France and Denmark initially supported clusters at the regional and national levels, while Belgium and Spain – only at the regional level. Other countries (Austria, Germany, Italy, Norway, and Finland) used cluster development measures as tools for implementing regional and innovation policies.

Thus, the phenomenon of clustering as an economic agglomeration of interrelated enterprises in a particular territory has been known since the times of craft production, and in the classical sense the cluster is considered as a permanent territorial and sectoral partnership of enterprises and organizations of one or more interrelated industries. Global trends in clustering testify to the relevance and success of this concept in the practical experience of many foreign countries. At the same time, a single concept for the formation of clustering mechanisms has not yet been developed, but each country has its own set of successful practices for the implementation of elements of cluster policy, taking into account their national characteristics.

The clustering of national economies, cluster policies and initiatives in the last decade have become important elements of strategies and concepts of innovative and sustainable development of European countries (Shiposha, 2020; Trushkina, Dzwigol & Kwilinski, 2021; Liashenko, Ivanov & Trushkina, 2021). The analysis of the main industry trends in the creation of cluster structures in European countries allows to draw the following conclusions:
– national features of existing cluster policy determine the direction of cluster initiatives;
– strategic cluster alternatives are determined by national characteristics and the accepted cluster concept;
– to assess the feasibility of the cluster development strategy of the territory it is necessary to correlate the level of investment potential and investment activity;
– methodological principles of forming a national cluster strategy need to be refined and clarified in the light of current challenges.

5. Conclusions

As a result of the study it was found that the need to study the vectors of development of the national and regional economy of Ukraine from the perspective of the cluster approach is due to the following problems: low level of socio-economic development of the region due to the decline in industrial production, deterioration of the environmental situation, lack of opportunities to find a decent job and a stable income, which, in turn, negatively affects the purchasing power and leads to dissatisfaction and a sense of despair. These problems can be solved by uniting stakeholders in a cluster structure to achieve the strategic goals of industrial development, taking into account international best practices. Relevant institutional conditions for the creation of clusters include the following: appropriate opportunities in the territory; diversified structure of the national economy; availability of related and interdependent industries, scientific and human resources; interest of potential participants in the association, supported by material, moral and power motivation; consequences of cluster formation for the regional economy, etc. It has been established that the principles of logistics management

are a system of scientifically sound principles for managing the financial-economic and production and sales activities of industrial enterprises in the region in modern conditions.

Clusters are created mainly in those regions where there are already objective conditions for their functioning. It is impossible to initiate the creation of a cluster by a "state directive" for reasons related to regional specifics, the presence of transport corridors, and the socio-political situation. The participants of cluster structures complement each other and simultaneously strengthen their competitive position at the regional, national and international levels. Such a cluster model is able to respond quickly to radical changes in management principles, transformational changes in the institutional environment, and adapt to modern realities, which makes its application more flexible and efficient compared to other forms of business combinations.

In addition, all participants of cluster formation independently, without the help of state grants or bank loans, receive local, regional benefits, i.e., the so-called local, "passive" and "active" benefits. The state, through local legislative and executive bodies, can initiate the formation and development of cluster structures both at the regional and national level.

Cluster policy (cluster support activities) in the region should be a key element of a balanced regional development strategy in order to maximize the benefits and risks of clustering the regional economy and be based on a triune goal: economic growth and economic efficiency; security (economic, social, environmental); socio-cultural identity of the region. Necessary for the development of the cluster is the environment formed by the developed infrastructure of business support (logistics and innovation) and the potential of the education system and science, sufficient social capital, based on socio-cultural identity and trust.

However, it was found that the current legislation of Ukraine does not pay proper attention to the creation and functioning of cluster structures. Therefore, the definition of the terms "cluster" and "clustering" at the legislative level remains an urgent issue. General provisions on clusters as a territorial association of enterprises should be included in Chapter 12 of the Commercial Code of Ukraine, and the specification of their legal status should be set out in a special Law of Ukraine "On Cluster Associations of Enterprises".

At the same time, the content of the legislation on clusters should be formed taking into account the fact that the cluster relations have a specific organizational and legal nature and can operate both with and without the rights of a legal entity, using other organizational and legal forms of associations, and without them.

It is necessary to make changes and additions to the Concept of creating clusters in Ukraine, the Regional Development Strategy until 2027 and action plans for their implementation in 2021-2023 years to create cluster structures as a business entity. It is advisable to develop and approve the Concept of cluster policy and the Target Program "The formation and development of clusters in the regions of Ukraine for 2021-2023 years", which should provide for the creation of clusters as a special type of associations of businesses in different fields of activity and taking into account regional characteristics.

The transformation of regional innovation ecosystems in Ukraine requires a conceptual approach to the formation of a cluster formation as a specific type of partnership of business structures, research, banking, financial, investment institutions, higher education institutions, institutions of transport and innovation infrastructure, regional and local authorities on a circular basis, application of methodology to develop a smart specialization strategy, introduction of digital technologies and logistic concepts, use of modern financial instruments (venture investments, crowdsourcing, public-private partnerships by attracting private investments, credit organizations, pension funds, foreign investment resources, grants from international financial organizations).

The expediency of creating cluster formations to intensify the development of the machine-building and ceramic industry, as well as the modernization of transport infrastructure has been established. It is proposed a structural scheme of interaction between the cluster and the innovation ecosystem to achieve the strategic goal "Innovative development of the region on the basis of smart specialization" in the implementation of strategic documents for the period up to 2027.

The organizational and economic mechanism of regulation of regional development based on the creation of cluster structures of individual regions is proposed. It was revealed that the main feature of this mechanism is the establishment of systematic motivated interaction between all participants of the regional economy, aimed at achieving a common goal of functioning, which is to improve the management of industrial regions of Ukraine and improve their competitiveness. It is proved that the development and implementation of the proposed algorithm for implementing the organizational and economic mechanism of cluster structures will create appropriate conditions for increasing the volume and improving the quality of transport services, enhance innovative development, as well as the implementation of a qualitatively new regional model of sustainable development of modern management requirements.

The implementation of the developed recommendations to improve the mechanism of formation and management of the development of cluster structures in the regions of Ukraine will allow to obtain a synergistic effect, the components of which are: – economic effect – increase in the level of investment attractiveness of territories; increase in revenues

to budgets (regional, local) through the formation of a qualitatively new model of regional economy, strengthening the competitive advantages of the territory and increasing the economic potential of territorial communities in the context of decentralization; increase in freight traffic and freight turnover of various modes of transport; reducing the cost of organizing logistics activities by reducing the transport component in the cost of services and time for customs procedures for the clearance of goods; ensuring favourable institutional conditions for the functioning of the transport services market;

– social – creation of new jobs and employment growth;

– environmental – reducing greenhouse gas emissions from transport by optimizing traffic flowsm, improving environmental safety.

The prospects for further research in this area lie in the generalization of European experience in the formation and operation of transport and logistics clusters.

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