

JEL Classification:
C38

UDC 330.8

DOI: 10.30857/2415-
3206.2023.1.1

**SYSTEMATIZATION OF SCIENTIFIC
CONCEPTS AND THEORIES OF THE
FORMATION OF CLUSTER-UNITED
ENTERPRISES**

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The purpose of the article is research and systematization of scientific concepts and theories regarding the formation of cluster-united enterprises.

Research methods. In this study, when carrying out the systematization of scientific concepts and theories, the authors used general scientific research methods, in particular, to reveal the evolutionary foundations of the development of cluster theory, comparative analysis of scientific concepts of both foreign and domestic scientists regarding the development of cluster formations, the formation of cluster-united enterprises, the following empirical methods were used as a method of historical analysis, methods of logical and comparative analysis.

Presentation of the main research material. In the course of research and systematization of scientific concepts and theories regarding the formation of cluster-united enterprises, analyzing scientific concepts and theories regarding the formation of cluster-united enterprises, it was highlighted that within the limits of these theories, the concept of a cluster is complemented by such

characteristics as systems of generation and dissemination of innovative ideas and experience, which in turn generally affects the modernization of the national economy. The article substantiates that cluster forms of organization of research subjects and organization of production make it possible to facilitate the commercialization of innovations and make it possible to create favorable conditions for the development of new highly specialized innovative and active areas of activity.

Conclusions from the conducted research. The article outlines that modern science still lacks a generally accepted understanding of when the first clusters appeared. The evolutionary study of the development of cluster formations and their global connections indisputably points to the growing relationship of cluster-united enterprises, where resources and competences are combined, access to target markets and know-how becomes open, information and experience are exchanged between clusters.

Keywords: cluster theory; cluster; cluster formations; clusterization.

NUMBER OF REFERENCES	NUMBER OF FIGURES	NUMBER OF TABLES
24	0	0

JEL Classification:
C38

УДК 330.8

DOI: 10.30857/2415-
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СИСТЕМАТИЗАЦІЯ НАУКОВИХ КОНЦЕПЦІЙ ТА ТЕОРІЙ ФОРМУВАННЯ КЛАСТЕРОБ`ЄДНАНИХ ПІДПРИЄМСТВ

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Метою даної статті є дослідження та систематизація наукових концепцій та теорій щодо формування кластероб`єднаних підприємств.

Методи дослідження. У даному дослідженні при здійсненні систематизації наукових концепцій та теорій автори використали загальнонаукові методи дослідження, зокрема, для розкриття еволюційних засад розвитку кластерної теорії, порівняльного аналізу наукових концепцій як зарубіжних так і вітчизняних науковців щодо розвитку кластерних формувань, формування кластероб`єднаних підприємств застосовувались емпіричні методи такі як метод історичного аналізу, методи логічного та порівняльного аналізу.

Виклад основного матеріалу дослідження. У ході дослідження та систематизація наукових концепцій та теорій щодо формування кластероб`єднаних підприємств, аналізуючи наукові концепції та теорії щодо формування кластероб`єднаних підприємств, виділено, що у межах зазначених теорій, поняття кластеру доповнюється такими характеристиками як системи генерації та

поширення інноваційних ідей і досвіду, що в свою чергу загалом впливає на модернізацію національної економіки. В статті обґрунтовано, що кластерні форми організації науково-дослідних суб`єктів та організації виробництва дають можливість полегшити комерціалізацію нововведень та дають змогу створити сприятливі умови для розвитку нових вузькоспеціалізованих інноваційно-активних напрямів діяльності.

Висновки з проведеного дослідження. В статті окреслено, що сучасній науці дотепер відсутнє загальноприйняте розуміння щодо того, коли з'явилися перші кластери. Еволюційне дослідження розвитку кластерних утворень та їх глобальних зв'язків беззаперечно вказує на зростаючий взаємозв'язок кластероб`єднаних підприємств, де поєднуються ресурси та компетентності, стає відкритим доступ до цільових ринків та ноу-хау, відбувається обмін інформацією та досвідом між кластерами.

Ключові слова: кластерна теорія; кластер; кластерні утворення; кластеризація.

Statement of the problem and its relation to important scientific and practical tasks. In the modern economy, despite the presence of numerous jobs foreign and domestic specialists in the formation of clusters, no there are complex studies on the clustering of the economy. In connection with these, we are trying to systematize scientific views cluster formation within the framework of various economic theories and concepts.

Analysis of recent publications on the problem. Theoretical issues of the functioning of cluster formations in the economy were the object of research by scientists from many countries around the world: L. de Ablas, A. Banyaska, J. Becattini, T. Bryan, S. Brusko, A. Weber, O. Williamson, P. Drucker, M. Enright, K. Ketels, V. Laundhart, J. Lindqvist, M. Meskon, S. Rosenfeld, O. Solvell, A. Thompson, E. Feather, M. Friedman, and others. Among Ukrainian researchers, it is worth noting the achievements of such scientists as: M. Voynarenko, S. Golubka, L. Hanushchak-Efimenko, V. Gotra, V. Gerasymchuk, M. Yermoshenko, Zh. Zhygalkevych, and others. However, it should be emphasized that until now there is no consensus among Ukrainian and foreign scientists in understanding and unity regarding the interrelationship of economic categories and concepts that constitute the methodological toolkit for the analysis of the process of formation of cluster-united enterprises, which determined the purpose of this study as the systematization of scientific concepts and theories regarding the development of cluster formations.

Statement of the main results and rationale. The study of the issues among the scientific treatises of foreign and domestic scientists on the development of cluster-united enterprises and their global connections shows the growth of the relationship between cluster formations, in which the resources of clusters are combined, both information and experience are exchanged between clusters, access is opened to target markets and innovative discoveries, there are opportunities to use sources of knowledge from around the world and at the same time the development of a new field of knowledge is taking place.

Having considered the development evolution and formation of the cluster theory, it is worth noting that in modern science there is still no generally accepted understanding of when the first clusters appeared. For the first time, the phenomenon of a cluster, as an object of economic agglomeration of interconnected enterprises on a limited territory, has been known since the beginning of the 18th century, from the time of craft production (Pottier, 1963). The first processes of industrial clustering were observed from the middle to the second half of the 19th century, and the first scientific studies of these processes appeared already at the end of the 19th to the beginning of the 20th century.

According to M. Porter, the process of clustering during the formation of the first technological system was characterized by a significant degree of stochasticity and was carried out between organizations of the same industry or

related industries that functioned within the same territory, which contributes to the expansion and establishment of business contacts, allows the use common elements of infrastructure, lobbying professional and commercial interests. As a typical example of a cluster, M. Porter (2005) described a group of enterprises of the Italian shoe industry and noted its similarity to a medieval craft guild – its business rules, rules of interaction and professional ethics.

The next stage of the implementation of cluster-united enterprises, which coincides with the beginning of the second industrial revolution, was the spatial localization of enterprises of similar industries. The characteristic of this stage is described by the English neoclassical economist Alfred Marshall in his main study "Principles of Economic Science" in the section "Concentrations of specialized industries in certain localities" (1890): "Once an industry has chosen its location, it is likely to remain there for a long time ..." (Marshall, 1920). In this scientific work, A. Marshall uses the term "industrial districts" for the first time. However, according to V.N. Ukrainsky, the concept of a cluster appeared much earlier, in the joint work of A. Marshall and his wife Mary Marshall "Economic theories of industry", where the thesis on the localization of economic activity is discussed for the first time, and later in the work "Principles of economic science" this term acquired a more broad content (Marshall, 1920).

The further development of the agglomeration approach was determined by the works of the classic of economic thought J. Schumpeter. Justifying the leading role of technological changes in industrial development, he introduced the concept of innovation in relation to the product (service), its production and management technology. According to J. Schumpeter, innovations are the main tool of economic growth, while two factors – the size of the organization and entrepreneurship – contribute to the development of innovations (Schumpeter, 1934).

Therefore, we would like to emphasize that in the historical foundations of clustering, on the one hand, are the "industrial district" and the economy of agglomerations by A. Marshall, and on the other hand, J. Schumpeter's innovations that cause economic growth within regional agglomerations.

An interesting approach to the development of cluster formations is observed in the development of the classics of the Italian school of economics (Bagnasco, 1977, 1999; Becattini, 1991; Becattini and Giovannetti, 2006). Their cluster theory is mainly based on the structure of the national economy, and more precisely, on the study of the industrial development of regions ("industrial districts"), which A. Bagnasco calls "Third Italy" (Becattini, 1991). At this stage, a cluster was understood as an agglomeration localized in a certain territory (or "Industrial district" by Giacomo Becattini), which includes the joint activity of an interdependent and concentrated group of enterprises of the same industry based on vertical and horizontal connections (Becattini, 1991).

The research interest in the works of J. Beccatini lies in the fact that the Italian scientist is one of the first who tried to consider the processes of formation of industrial districts from different positions: both economic and socio-cultural.

A thorough analysis of a significant number of scientific literary sources made it possible to establish that the conceptual ideas of specialized industrial localization were established at the beginning of the 20th century within the framework of economic geography, which at that time was part of the system of economic sciences and the theory of regional economy. Therefore, the emergence and development of the theory of clusters was influenced by the theory of regional development (the classic representatives of which are German economists: A. Weber, A. Loesch, J. Tyunen), the theory of regional specialization (A. Smith, D. Ricardo, P. Samuelson and V. Nordhaus), the doctrine of the "Autarky of large spaces" by Friedrich List, the concept of polycentrism (geopolitical regions) and the balance of geostrategic forces by S. Cohen, the concept of urban development by the American economics professor Gertler Merik and the theory of spatial analysis by the American economist Walter Isard. These theories explain the unification of different branches of the economy into separate branches, the interrelationships between geographical ones associations and economies of scale, and the specialization of territories. As the most important factor in the formation of clusters, they determine external effects related to the scale of production.

In more detail, it is worth considering "The Theory of the Location of Industry" (1929), a classic of the German economic school by Alfred Weber. This theory considers a conceptual study of the interconnected development of enterprises and industries that complement each other in a certain territory. A German economist and sociologist identified the agglomerate factors of production location. A. Weber defines a higher degree of agglomeration as "spatial convergence of homogeneous industries (without merging them into one production unit)", which allows to increase the benefit due to the increase in the number of enterprises.

It can also be noted that the birth of the future theory of clusters is clearly expressed in the scientific works of the German economist A. Loesch and the American representative of economic regionalism V. Izard. For almost 50 years after the publication of A. Marshall's work, economists did not pay much attention to space in their research on cluster theory. However, as early as 1950, Izard Walter and other scientists (Blaug, 1997) organized the field of regional science, based on the scientific research of German economists (A. Loesch and F. Tyunen).

Within the framework of the neoclassical "standard" theory of A. Losh ("Spatial organization of production", 1940), the theoretical problems of farm

placement were studied. His merit lies in considering the economic space not at the level of individual enterprises and settlements, but at the level of economic regions. He considered the regional economic space as a market with boundaries determined by interregional competition (Blaug, 1997). V. Izard devoted his further research, in particular, "Location and economy of space" to solving the problems of location of industrial complexes by preventing regional conflicts based on the coordination of existing interests (Blaug, 1997). The research of A. Losh and V. Izard (Blaug, 1997) made it possible to explain the importance of the formation of clusters, these scientific works later became the basis of the cluster concepts of M. Porter (2005) and M. Enright (1992).

Further study of industrial areas flows into the field of building multifactorial models, in which, in addition to production facilities, facilities of financial, transport, engineering, scientific and innovative infrastructure are investigated. A systematic approach to considering the concentration and cooperation of firms from the standpoint of various factors forms the methodological basis within which the modern definition of the concept of "cluster" arose.

For the first time about clusters as organizational forms of economic activity were mentioned by American researchers from the University of Cornwall Stan Czamanski and Luis de Ablas in the 70s of the XX century. in the framework of scientific articles devoted to the study of industrial complexes of the USA. In their opinion, "clusters are groups of industries connected by flows of goods and services, provided they are geographically close" (Czamanski and de Ablas, 2011). As a consequence of the influence of such trends, despite the lack of cluster support programs in Europe, starting from the 1970s, territorial programs quite similar in form and content were implemented: in Italy, Germany, and Austria. In the 70s – 80s of the 20th century, the concepts of spatial location and concentration of subjects of economic activity were actively discussed within the framework of regionalism and geoeconomics. French economist Pierre Pottier (1963) was the first to introduce the concept of "corridor (axis) of development", and English economists Peter Buckley and Mark Casson (1976) – the concept of "internationalization" (Blaug, 1997). The main directions of clustering research were the study of the impact of scientific and technological progress and wave fluctuations of the economy on the effectiveness of the functioning of cluster formations, which served as an impetus for the development of neoclassical theories of economic growth, including taking into account the territorial organization of economic systems.

Since 1990, the American economist Michael Porter, is considered a classic and the founder of the cluster theory, who in his treatise "Competitive Strategy. Methodology for the analysis of industries and competitors" for the first time introduces the term "cluster" into the scientific circle as "a geographically

concentrated group of interdependent companies, specialized suppliers, service providers, firms in the relevant fields, as well as organizations related to their activities (for example, universities, standardization agencies, trade associations) in certain areas, competing, but at the same time conducting joint work" (Porter, 2005). In his studies, M. Porter examines the problems and trends of development, reasons and opportunities for the development of clusters. So, in his opinion, "it is necessary to support the development of all clusters without exception, because it is impossible to predict which cluster will develop faster and which will be slower" (Porter, 2005). He does not propose the artificial creation of clusters "from above", but in real life their identification and support from state structures and research institutes.

The next stage in the development of the cluster theory was the incorporation of the innovative component into the concept of a cluster. At the end of the 20 century and at the beginning of the 21 century the category of "innovation cluster" appears in world economic practice, which is due to the development of the theory of the national innovation system by K. Freeman and B. Lundvall. The analysis of the factors of ensuring the industrial development of the territory based on the concept of technological development and methods of diffusion of innovations became the key direction of research within the framework of the development of theories of territorial concentration of economic activity (Lundvall et al., 2002).

Within the framework of these theories, clusters began to be considered as systems of generation and dissemination of innovative ideas and experience, which affects the modernization of the regional economy in general. It was substantiated that cluster forms of organization of production and research subjects facilitate the commercialization of innovations and create proper conditions for the development of new high specialized innovative and active areas of activity (including the use of outsourcing) and ensuring the production of new goods (Hanushachak-Yefimanko et al., 2022).

Given that the most important role for the development of clusters in the specified period began to be played by innovation processes, including those based on open innovations, as well as information and communication systems, the concept of "distance" between cluster participants underwent a transformation. The modern American economist D. Anderson in his scientific works describes the importance of global markets, which expand the opportunities of business entities to use available labor resources and capital to stimulate the development of clusters (Anderson et al., 2004). He also interprets the concept of "cluster" as "spatial agglomeration of similar and related forms of economic activity, which forms the core of the local environment, which promotes the transfer of knowledge and stimulates various forms of learning and adaptation" (Andresen et al., 1989). In view of this, factors of localization and

geographical proximity of cluster participants cease to play a decisive role in the decision on its formation. The definition of "concentration" of cluster participants was expanded by definitions of cross-border and transnational ties, as well as the formulation of new types of methods of rapprochement, such as: organizational, social, cognitive, informational, institutional, etc.

Increasing the development of the knowledge economy prompted a change in approaches to forming the composition of cluster participants, since the importance of the process of interaction between industrial enterprises and innovative infrastructure enterprises has increased significantly. It is also worth noting that the "triple spiral" model proposed by Stanford University professor G. Itzkovits and Amsterdam University professor L. Leidesdorff involves the active involvement of state structures formed in the cluster in the innovation process (Frangsmir et al., 1989). The relevance of the idea of the innovation process in this way is determined by the fact that a new method of achieving coordination of the interests and goals of the elements of complex network socio-economic systems is proposed, which is especially relevant for the functioning of clusters in the conditions transformation to a full-fledged unification between clusters regarding the processes of production and commercialization of innovations.

Conclusions and prospects for further research. Having thoroughly researched the scientific achievements of foreign and national scientists in recent years in the study of the conceptual and categorical apparatus regarding the development of cluster-united enterprises, we can observe that this concept does not have a generally accepted theoretical basis, which becomes the object of future research.

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HOW TO CITE THIS ARTICLE

Shkoda, M., Onofriichuk, Ya. (2023). Systematization of scientific concepts and theories of the formation of cluster-united enterprises. *Management*, 1(37): 9–18. <https://doi.org/10.30857/2415-3206.2023.1.1>.