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CONCEPTUAL COMPARISON OF CLUSTERS, NETWORKS AND BUSINESS ECOSYSTEMS

КОНЦЕПТУАЛЬНЕ ПОРІВНЯННЯ КЛАСТЕРІВ, МЕРЕЖ ТА БІЗНЕС-ЕКОСИСТЕМ

The aim of this study is to systematize and comparatively analyze three models of interorganizational interaction – clusters, networks, and business ecosystems – by identifying their essential characteristics, similarities, and differences. The research methodology is based on a conceptual analysis of approximately 40 scientific sources, focusing on classical and modern definitions of these models to determine their distinctive features. The results reveal both commonalities (such as interdependence, diversity of participants, cooperation, and value co-creation) and significant differences in geographical concentration, industry scope, interaction mechanisms, and governance structures. The practical significance of the findings lies in providing a clearer conceptual framework for businesses to select appropriate development strategies, cooperation models, and transformation approaches, thus supporting more informed managerial decision-making.

Keywords: *clusters, value networks, business ecosystems, inter-organizational cooperation, conceptual differentiation, nonlinear models, innovation environment.*

У статті проведено ґрунтовне концептуальне порівняння трьох ключових моделей міжорганізаційної взаємодії – кластерів, мереж та бізнес-екосистем – із метою систематизації їхніх визначень, ознак та підходів до функціонування в умовах сучасної економіки знань. Актуальність дослідження зумовлена необхідністю чіткого розмежування цих понять у сучасних умовах глобалізації, цифровізації та відкритості інформаційного простору, коли підприємства шукають нові моделі співпраці для формування стійких конкурентних переваг. Методика дослідження базується на системному аналізі близько 40 наукових джерел, що зробили значний внесок у розвиток концепцій кластерів, мереж та бізнес-екосистем. Проведено концептуальний аналіз визначень, запропонованих різними авторами, для виявлення притаманних кожній моделі характеристик, їхньої сутності, спільних та відмінних рис, а також особливостей, що спричиняють термінологічні непорозуміння. Це дозволило сформувати чіткі критерії для розмежування зазначених понять. Встановлено, що для кластерів характерною є територіальна концентрація підприємств зі спорідненою спеціалізацією, наявність спільної інфраструктури, тісних горизонтальних та вертикальних зв'язків, що поєднують конкуренцію і кооперацію. У мережах пріоритетом є динамічна багатостороння взаємодія між самостійними учасниками на основі довіри, спільних інтересів і довгострокових партнерств, що дозволяє забезпечувати гнучкість, адаптивність і колективне створення цінності. Бізнес-екосистеми вирізняються максимальною різноманітністю суб'єктів – від виробників і споживачів до фінансових, державних та освітніх інституцій – та базуються на принципах самоорганізації, спільної еволюції, синхронізації зусиль для формування інтегрованих ціннісних пропозицій. Окрему увагу приділено співвідношенню конкурентних і кооперативних відносин у кожній з моделей, особливостям управління, наявності або відсутності централізованої координації, ступеню формалізації зв'язків. Практичне значення дослідження полягає у можливості використання отриманих результатів для обґрунтованого вибору підприємствами оптимальних стратегічних моделей розвитку, взаємодії з партнерами, впровадження інноваційних підходів до організації бізнесу, а також удосконалення управлінських рішень у сфері міжорганізаційної кооперації. Запропоновано напрями подальших досліджень, зокрема емпіричну перевірку

теоретичних висновків на прикладі реальних економічних систем, що дозволить підвищити практичну цінність напрацьованої концептуальної моделі.

Ключові слова: *кластери, мережі, бізнес-екосистеми, міжорганізаційна співпраця, концептуальна диференціація, нелінійні моделі, інноваційне середовище.*

Problem statement. In today's economy, businesses tend to operate as participants in complex, interconnected market structures rather than as isolated entities. In the context of globalization, digitalization and an open information space, where competitiveness depends on innovation, businesses are looking beyond traditional value chains for development opportunities, exploring other models of cooperation. These models include the well-established and widely researched cluster and value network models, as well as the business ecosystem model, all of which have become increasingly common in recent decades.

The widespread use of business ecosystem analogies in the modern economy, coupled with the significant heterogeneity of business ecosystem types (each of which shares additional features with clusters and network models), can cause confusion for both researchers and practitioners. For businesses seeking to develop a sustainable competitive advantage, understanding the differences between these approaches allows them to make more informed choices regarding their development approach, transformation model, cooperation with partners, scaling innovations and creation of platform solutions. Distinguishing between these models has practical implications for updating company strategy, adapting management approaches and assessing the risks of such a transformation.

Analyzing the classical definitions and characteristics of clusters, networks, and business ecosystems as defined by different authors can help to identify the common and distinctive features of these types of enterprise interaction, as well as the main analogies in related contexts. This study focuses solely on the theoretical and conceptual framework; empirical research to confirm the findings is excluded. The study focuses on the comparison of the three nonlinear models of enterprise interaction, but does not address supply chains, franchise networks, and strategic alliances.

Analysis of recent research and publications. Agglomerations of enterprises in the same industry within a given territory have existed since the late nineteenth century. Michael Porter defined a cluster as a geographical concentration of interrelated companies and institutions within a specific industry. According to Porter, a cluster includes not only competitors but also suppliers, consumers, educational institutions, and other organizations, making a cluster similar to a business ecosystem in terms of its composition. Modern variations of clusters and cluster-related terminology, such as "innovation clusters", "technology parks", "regional innovation systems", and "knowledge clusters", need to be distinguished from types of business ecosystem such as "industrial ecosystems", "innovation ecosystems", "knowledge ecosystems", etc. These are forms of cooperation characterized by stable, multilateral ties between independent organizations that interact based on long-term agreements, trust, and common interests rather than one-off market transactions or orders from a centralized management structure [21]. Features of network models include interdependence of participants, exchange of knowledge and resources, and self-organization [23]. The term "network organization" describes a structure where the boundaries between individual firms are blurred and value is created jointly by several participants, bringing the term "network model" closer to the concept of business ecosystems.

Formulating the purposes of the article. The purpose of this article is to systematize and comparatively analyze three models of interorganizational interaction – clusters, networks, and business ecosystems – with a focus on their key characteristics, common and distinctive features. To achieve this goal, the following objectives have been set:

– to analyze classical and modern definitions of each model;

– to identify the typical features and principles of functioning of clusters, networks and business ecosystems;

– to identify criteria that allow to conceptually distinguish between these models.

Methodology. In order to differentiate between the terms "cluster", "value chain", and "business ecosystem", a systematic analysis of around 40 scientific papers by leading researchers who significantly influenced the development of these concepts was conducted. A conceptual analysis of the definitions proposed by these authors was completed to identify the key characteristics of each term. These characteristics were analyzed in terms of their inherence and significance for each term, enabling both common and distinctive features to be identified, as well as features that cause confusion in terminology. This approach enabled clear criteria to be defined for distinguishing between the concepts under study.

Presentation of the main research material. ***Clusters.*** The cluster, a phenomenon derived from the "industrial district" characterized by close proximity of related industries which facilitates supplier specialization, knowledge sharing, and formation of a common labor market, has become widely used in practice and in research, so the concept of a cluster is considered largely established. While the definitions of different authors are generally similar, some nuances are emphasized, overlapping with features of network models and business ecosystems. A selection of frequently cited definitions of clusters is presented in Table 1.

The authors identify the following characteristics of clusters:

– *Geographical concentration,* or *geographical* proximity of participants [22; 29; 30; 5];

– *Interconnectedness, or interdependence of participants* [22; 27; 24; 26];

– *Belonging to a particular industry* [29; 22], or *belonging to related industries* [29], or *belonging to similar types of business* [8], or *common specialization* [5];

– *Participation of diverse actors* [5], or *participation of companies and institutions* [22]; *participation of industrial and service companies* [27];

– *Large number of participants* [29; 27];

– *Cooperation of participants* [27; 7; 5], in addition to *participation in the production value chain* [27; 24], or t*he interconnectedness of production processes* [32] and t*he ability to synergize* [26];

– *Competition between participants* [7; 5].

Value Networks. The network form of organizing business interaction is characterized by stable multilateral ties between independent companies that cooperate on the basis

Table 1

Definitions of clusters

Author	Definition
Porter (1998)	Clusters are geographic concentrations of interconnected companies and institutions in a particular field
Swann & Prevezer (1996)	Clusters are here defined as groups of firms within one industry based in one geographical area
Simmie & Seneth (2002)	We define (innovative clusters) as geographic concentrations of interconnected companies, specialised suppliers, services providers, firms in related industries and associated institutions, in particular, that compete but also cooperate
Roelandt & den Hertog (1999)	Clusters can be characterised as networks of producers of strongly interdependent firms (including specialised suppliers) linked each other in a value-adding production chain
Tallman, S. et. al. (2004)	A geographically proximate group of interconnected companies and associated institutions in a particular field, linked by commonalities and complementarities
Crouch et al. (2001)	The more general concept of "cluster" suggests something looser: a tendency for firms in similar types of business to locate close together, though without having a particularly important presence in an area
Cooke (2001)	(Cluster is) geographically proximate firms in vertical and horizontal relationships, involving a localised enterprise support infrastructure with a shared developmental vision for business growth, based on competition and co-operation in a specific market field
Rosenfeld (1997)	A cluster is very simply used to represent concentrations of firms that are able to produce synergy because of their geographical proximity and interdependence, even though their scale of employment may not be pronounced or prominent
Van den Berg et al. (2001)	The popular term cluster is most closely related to this local or regional dimension of networks... Most definitions share the notion of clusters as localised networks of specialised organisations, whose production processes are closely linked through the exchange of goods, services and/or knowledge
Andersson et al. (2004)	Clustering is generally defined as a process of firms and other actors co-locating within a concentrated geographical area, cooperating around a certain functional niche, and establishing close linkages and working alliances to improve their collective competitiveness. (The role of cluster facilitators, "The Competitiveness Institute preparatory course", Gothenburg 16 September 2003, Ifor Ffowcs-Williams, CEO, Cluster Navigators Ltd, New Zealand)

Source: [22, p. 199; 29, p. 139; 27, p. 161; 24, p. 9; 30, p. 258; 8, p. 163; 7, p. 24; 26, p. 4; 32, p. 187; 5, p. 7]

of trust, common interests and formal long-term agreements, forming partnerships, strategic alliances, joint ventures, etc. This model contrasts with market and hierarchical interaction between companies. In other words, interaction within a value network is neither reduced to one-off transactions that are advantageous in a particular situation, nor driven by centralized management. Participants act voluntarily and are guided by shared long-term interests. Value networks are coordinated through negotiations, in which trust and reputation play a key role. Value networks can be viewed as an evolution of the traditional linear value chain, representing a more dynamic approach to value creation through the collaboration of various actors. A selection of frequently cited definitions of value networks is presented in Table 2.

The authors name the following characteristics of networks:

– *Interconnectedness of the participants* [19; 28; 2; 25; 11];

– *Dynamic interaction* [19; 28; 2; 25];

– E*xchange of tangible and intangible values*, including *knowledge* [2; 3; 4; 25; 15; 9; 21];

– *Common goal* [19; 25; 11];

– *Network effects* [28; 9];

– *Value co-creation* [3; 19; 25; 15];

– *Interdependence* [19; 25; 15];

– *Diversity of participants,* which can include c*ompanies, consumers, partners, suppliers, competitors* [19; 28; 2; 4; 25; 11; 9].

Business ecosystems. The term business ecosystem is derived from the analogy between certain features of the interaction of participants and the characteristics of ecological ecosystems and similar interactions of actors in business, which was first described by Moore in the late 20th century. As information technology has developed, the concept of a business ecosystem as an interaction of various participants has become widespread among researchers and practitioners, taking on various forms and branches. However, the terminology is not universally accepted, leading to considerable heterogeneity and frequent interchangeability of the concepts used by different authors. Types of business ecosystem, such as the urban ecosystems, industrial ecosystems, entrepreneurial ecosystems, knowledge ecosystems, and innovation ecosystems, have rather blurred boundaries. The term "ecosystem" is now widely used to refer to a variety of phenomena, objects, and actors that are connected to a central element to some extent. However, the main features that define business ecosystems can be identified by examining the definitions of business ecosystems and some of their types, as well as features that are common to clusters and networks, and features that differentiate them. A selection of frequently cited definitions of business ecosystems is presented in Table 3.

The authors identify the following characteristics of business ecosystems:

– *Cross-industrial* [16];

– *Co-evolution* [16; 17], also *cooperation and evolution* [31];

– *Innovation* [16];

– *Collaboration and competition* [16; 17], also *mutual support* [18], also *participants act as competitors, collaborators and complementors* [14];

– *Value co-creation, also interacting to produce goods and services* [18] or also i*nfluencing and being influenced by each other to create and implement their own value propositions* [12], as well as *synchronizing investments to create value and increase efficiency* [31];

– *Diversity of participants: organizations and individuals, which can include suppliers, producers, competitors, consumers, and other stakeholders* [17]; *financial institutions, trade associations, standardization bodies, trade unions,*

Table 2

Definitions of value networks

Author	Definition
Stabell & Fjeldstad (1998)	Value network (is a configuration model where firms) rely on a mediating technology to link clients or customers who are or wish to be interdependent. The mediating technology facilitates exchange relationships among customers distributed in space and time. The firm itself provides a networking service (rather than being the network)
Allee (2000)	A value network generates economic value through complex dynamic exchanges between one or more enterprises, customers, suppliers, strategic partners and the community. These networks engage in more than just transactions around goods, services, and revenue. The two other currencies are knowledge value and intangible value or benefits
Allee (2002)	(Value Network is) a virtual web of relationships between two or more organisations that work together to co-create different forms of value such as goods, services, knowledge and revenue
Allee (2008)	A value network is any set of roles and interactions in which people engage in both tangible and intangible exchanges to achieve economic or social good. External-facing value networks include those between the organization and its suppliers, its investors (including venture capitalists); its strategic business partners (e.g. a business with a complementary product); and its customers
Fjeldstad & Haanæs (2018)	Value network links nodes – customers, things, and places – and provides services that allow various kinds of exchanges among them. Operationally, they organize around the platforms that enable those connections and their associated exchanges. They explore new technologies and the relationships that can be serviced by them
Podolny & Page (1998)	Network form of organization as any collection of actors that pursue repeated, enduring exchange relations with one another and, at the same time, lack a legitimate organizational authority to arbitrate and resolve disputes that may arise during the exchange
Pyka (2002)	Innovation networks (is) a self-organising property of a dynamic economic landscape in which the co-ordination and production of new knowledge is itself a complex interactive process

Source: [28, p. 427; 2, p. 1; 3; 4, p. 5; 9, p. 89; 21, p. 59; 23, p. 2]

Table 3

Definitions of business ecosystems

Author	Definition
Moore (1993)	In a business ecosystem, companies co-evolve capabilities around a new innovation: they work cooperatively and competitively to support new products, satisfy customer needs, and eventually incorporate the next round of innovations
Moore (1996)	An economic community supported by a foundation of interacting organizations and individuals […] produces goods and services of value to customers, who are themselves members of the ecosystem. The member organisms also include suppliers, lead producers, competitors, and other stakeholders. Over time, they coevolve their capabilities and roles, and tend to align themselves with the directions set by one or more central companies
Moore (1998)	Business ecosystems – extended systems of mutually supportive organizations. Business ecosystems are communities of customers, suppliers, lead producers, and other stakeholders — interacting with one another to produce goods and services. We should also include in the business ecosystem those who provide financing, as well as relevant trade associations, standards bodies, labor unions, governmental and quasi-governmental institutions, and other interested parties
Iansiti & Levien (2004)	Loose networks—of suppliers, distributors, outsourcing firms, makers of related products or services, technology providers, and a host of other organizations—affect, and are affected by, the creation and delivery of a company's own offerings. Like an individual species in a biological ecosystem, each member of a business ecosystem ultimately shares the fate of the network as a whole, regardless of that member's apparent strength
Lewin & Regine (1999)	Business ecosystem [is] a network of companies, each occupying a place in its own landscape of possibilities, and each landscape being coupled to many others: those of competitors, collaborators, and complementors
Peltoniemi & Vuori (2004)	business ecosystem [is] a dynamic structure which consists of an interconnected population of organizations. These organizations can be small firms, large corporations, universities, research centers, public sector organizations, and other parties which influence the system
Urmetzer & Gill & Reed (2018)	A business ecosystem is defined as a network of organizations and individuals that collaborate and evolve roles and capabilities, as well as synchronizing their investments to build value and increase efficiency
Gómez-Uranga & Miguel & Zabala-Iturriagagoitia (2014)	Business Ecosystem refers to intentional communities of economic actors whose individual business activities share in some large measure the fate of the whole community
Adner (2006)	Innovation Ecosystem: The collaborative arrangements through which firms combine their individual offerings into a coherent, customer-facing solution. Enabled by information technologies that have drastically reduced the costs of coordination, innovation ecosystems have become a core element in the growth strategies of firms in a wide range of industries
Clarysse et al. (2014)	Knowledge Ecosystem: The flow of tacit knowledge between companies and the mobility of personnel have been advanced as the main advantages of geographic colocation which characterize these hotspots. Such hotspots have been characterized as knowledge ecosystems where local universities and public research organizations play a central role in advancing technological innovation within the system
Korhonen et al. (2001)	Industrial Ecosystem: The effort in the concept of IE is to build an industrial system in which the actors involved co-operate by using each other's waste material and waste energy flows as resources

Source: [16, p. 76; 17, p. 26; 18, p. 168; 12, p. 2; 14; 20; 31; 10; 1, p. 1; 6, p. 1; 13, p. 1]

governmental and quasi-governmental institutions [18]; *suppliers, distributors, outsourcing companies, producers of related goods or services, technology providers, and many other organizations* [12]; or also *small firms, large corporations, universities, research centers, and public sector organization*s [20].

– *Interconnectedness* [20];
– *Leadership of central firms* [17];
– *Shared fate* [12; 10].

In innovation ecosystems, companies combine their individual offerings into a coherent, customer-oriented solution thanks to information technology that has made coordination easier and cheaper [1].

In industrial ecosystems, producers' efforts are aimed at creating an industrial system in which one producer uses each other's waste products as resources.

In knowledge ecosystems, universities and public research organizations play a central role in promoting technological innovation among all stakeholders, including start-ups, small and medium-sized companies, and the R&D departments of large enterprises.

The creation of an entrepreneurial ecosystem is usually initiated by the government to stimulate entrepreneurship in a particular region. Such ecosystems involve investors, entrepreneurs and customers, sometimes also established companies and even universities.

Urban ecosystems represent the interaction of various actors within a single city to improve environmental performance.

The main characteristics found in the reviewed works and definitions of clusters, networks, and business ecosystems may be grouped into the following general features: localization or geographical concentration; belonging to a particular industry; diversity of participants; the presence of competition, cooperation, and co-creation of value; the degree of formalization of relations between participants; specifics of management within the associated group; the presence of network effects; and dynamics of group development or co-evolution. The results of the analysis of the inherent characteristics of the compared associations of actors are presented in Table 4.

The results of the study revealed that, although clusters, networks and business ecosystems as models of the non-linear interaction of enterprises have a number of similar or even common features, such as interdependence, diversity of participants, cooperation and, to some extent, co-creation of value, they also have quite distinct differences in a number of other features. These differences are especially apparent in terms of geographical concentration of participants, industry sector, the presence of formalized relationships and management approaches, and allow for a conceptual distinction between the models.

The study supported the assumption that despite some apparent external similarities, an analysis of the defining characteristics identified on the basis of the work of leading scholars, as presented in Tables 1–3, would allow for a fairly clear distinction to be made between the three models of interaction.

In almost all of the analyzed papers on clusters (see Table 1), the authors stress the geographical concentration of enterprises within the cluster. This is the only feature present in almost every definition [16; 29; 7; 5]. Some authors discuss the interconnectedness of organizations, with some works emphasizing the intensity of ties and the interdependence of participants [24; 27; 32]. More extensive definitions also highlight the importance of complementarity and a shared functional domain [30; 5]. Another important feature is the combination

Table 4

Analysis of characteristics

Characteristics	Clusters	Value Networks	Business Ecosystems
Geographical concentration	One of the defining characteristics	Not determinative	Inherent in certain types of BEs (urban, industrial entrepreneurial, and knowledge ecosystems)
Belonging to a particular industry	Industry or technology specialization	Can be both within an industry and cross-industrial	Cross-industrial is one of the defining characteristics
Multi-actor composition	Most participants are manufacturers from the same industry, but can also include educational organizations, service companies, etc.	Suppliers, consumers, partners, technology providers, intermediaries	Maximum heterogeneity of participants from different industries
Competition	Direct competition between participants	Not inherent	In connection with cooperation
Cooperation and co-creation of value	Cooperation is significant, but mostly localized	Key feature – participants jointly create tangible and intangible value	High, co-creation of value propositions or novelty
Formalization of connections between participants	Presence of both formal and informal relationships (due to cultural peculiarities)	There are both informal elements – trust, reputation, and long-term contracts	Mostly informal relationships
Governance	Local, partially formalized governance through associations and local institutions	Distributed governance, dynamic and informal, based on partnership arrangements	Self-organization with a coordinating role of key companies or organizations, usually no clear hierarchy
Network effects	Localized network effects due to geographical proximity and specialization	Highly distinct; interaction and interdependence of participants create strong network effects	Participants share a common destiny with the entire business ecosystem
Co-evolution and dynamics of development	Cluster development is driven by local competition	High dynamics and co-evolution of participants within the framework of value creation and exchange	Co-evolution is a key characteristic – participants develop interconnectedly

Source: compiled by the author

of competition and cooperation between participants. Clusters not only bring together players in the same industry, but also stimulate a special form of interaction between them where competition for the market can coexist with joint initiatives in innovation, training, and marketing [27; 7; 5].

It is also notable how the emphasis in the definitions has evolved: while early works [29] focused mainly on the quantitative and sectoral aspect (i.e. a large number of firms in one sector in one location), more recent interpretations [5] have tended to focus on processes of coordination, strategic partnerships and collective competitiveness.

Unlike clusters, networks are not strictly localized to a particular geographical area and can be interregional or international. Networks can be within the same industry or cross-industrial. Based on the definitions in Table 2, a value network is a dynamic system of interconnected participants who repeatedly exchange tangible and intangible values. Unlike a linear supply chain, a value network encompasses extensive interactions that may include customers, suppliers, partners, investors and wider communities [2; 4]. A key component of such networks is mediating technology or infrastructure, which enables communication between participants that are distributed in space and time [28; 9]. This allows organizations to act not just as market participants, but also to provide a network service – a platform or mechanism that facilitates these exchanges. The concept of a value network pays special attention to intangible flows, such as knowledge, trust, reputation and experience, which Allee [2; 3] argues are no less important for value creation than goods or money. In this sense, a network is not only a structural unit, but also an interactive environment for the co-evolution of knowledge and innovation [23]. Another important feature of value networks is the absence of a centralized power hierarchy. Interaction within the network is based on trust, recurring ties, and mutual benefit rather than formal governance [21]. Although this makes value networks more flexible, it can also make them more sensitive to the balance of interests and norms of cooperation.

The definitions in Table 3 allow us to consider a business ecosystem as a dynamic network of various actors – including companies, institutions, and individuals – that operates through a combination of competition and cooperation, and evolves through the mutual development of roles and competencies [16; 20]. The key "glue" holding such a network together is a platform or other mediation infrastructure that reduces transaction costs and enables individual offerings to be integrated into comprehensive solutions for consumers [1; 9]. Unlike traditional supply chains, ecosystems encompass a wide range of stakeholders, including financial institutions, regulators and user communities, who "share the fate" of the entire community [12; 10]. Internal self-organization and embryonic coordination mechanisms [31] ensure adaptability; participants constantly rebuild connections using both tangible and intangible resources (e.g. knowledge, reputation and culture) to generate new value. Various types of business ecosystems, such as innovation, entrepreneurial, industrial and knowledge ecosystems, have their own characteristics and differ in terms of their specific focus, the nature of their participants and the purpose of their interactions. However, they all adhere to the fundamental principles of the parent concept: interdependent participants co-create value or novelty in the absence of a centralized hierarchy [6; 13]. Thus, rather than being a static "environment", the business ecosystem is a process of joint adaptation and innovation, in which the success of each participant is tied to the overall viability of the entire ecosystem.

The comparative analysis presented in Table 4 illustrates the evolution of logic in inter-organizational interaction, shifting from geographically localized, industry-specific clusters to open, dynamic, cross-sectoral business ecosystems. While geographical concentration and industry affiliation are crucial for clusters, these features are no longer characteristic of value networks. In business ecosystems, functional and strategic cooperation between participants from different sectors takes precedence. This shift in focus is also evident in terms of competition and cooperation: clusters are characterized by competition between local players, whereas value networks and business ecosystems prioritize the joint generation of value, including intangible assets such as knowledge, reputation and innovation. Another significant difference lies in the nature of governance. Clusters are partially formalized and localized through associations. Value networks tend to be decentralized and equally regulated on the basis of common partner interests. Business ecosystems function mostly as self-organizing systems, with a central company or platform playing a coordinating role and setting the direction of development, but not strictly controlling other participants. Network effects are also important: while they are limited to local specialization in clusters, they are expansive in nature in value networks and business ecosystems – each new participant strengthens the interconnections, increasing the system's value for everyone. Finally, all three models of interaction share a common trend: the importance of joint dynamics and co-evolution. While clusters develop under the positive influence of competition between similar players, value networks and business ecosystems develop through mutual adaptation of various actors, sharing of resources, and evolution of roles in response to new challenges.

The practical implications of distinguishing between these concepts include the ability to make more informed choices about enterprise development strategies in the modern business environment, as well as approaches to cooperation with partners, and the most appropriate models for transformation and risk management.

A notable aspect of this study is its exclusive focus on the theoretical and conceptual foundations. However, despite the systematic nature of the literature review, the absence of empirical analysis to corroborate the theoretical conclusions using real-world examples is a significant limitation. Further research could aim to empirically validate the proposed differentiating features in real conditions, for example through case study analyses of clusters, networks and business ecosystems.

Conclusions. This study enabled addressing the question of the conceptual differences between cluster, value network and business ecosystem models. The analysis confirmed the hypothesis that, despite sharing features such as interdependence, cooperation and co-creation of value, these models differ in terms of geographical location, industry, the nature of interaction between participants, and governance.

The findings may be important for academics and practitioners as they eliminate ambiguity in the literature by clearly distinguishing between the models, leading to more effective strategic decision-making. The main contribution is the development of a systematic, comparative framework that simplifies the selection of organizational strategies and forms of interaction. At the same time, the limitations of the study relate to the lack of empirical confirmation of the theoretical findings. Traditional supply chains, franchising and strategic alliances were also not considered. Further research should focus on testing differences in the proposed model using real case studies.

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