

TYPOLGY OF BUSINESS NETWORK MODELS: A PROPOSAL BASED ON A SYSTEMATIC LITERATURE REVIEW

Beata BARCZAK

Cracow University of Economics; barczakb@uek.krakow.pl, ORCID: 0000-0003-0345-2267

Purpose: to develop a proprietary typology of a business network based on a systematic literature review.

Design/methodology/approach: the typology method facilitates the analysis and understanding of the essence of business networks by identifying and characterizing their different types. The systematic literature review (SLR) methodology was used to develop the typology, enriched with the snowball method.

Findings: analysis of the content of publications selected during the SLR procedure made it possible to indicate various criteria for the division and types of business networks from widely quoted literature. On this basis, a typology of business networks was proposed, divided into four main types: networks originating from industrial districts, strategic networks, cooperation networks, and global business networks.

Practical implications: the possibility of using the proposed concept in assessing various business network models will enable the formulation of diagnostic findings and comparative and dynamic research.

Originality/value: at the current stage of scientific reflection, the developed typology enriches the theory of organizational networks by systematizing and comprehensively addressing business network models, which may lead to identifying trends in their development. It is addressed to both researchers dealing with network issues and practitioners.

Keywords: business networks, typology, systematic literature review (SRL), typology method.

Category of the paper: literature review, viewpoint.

1. Introduction

In recent years, many studies have focused on describing and conceptualizing phenomena related to the formation and development of the network paradigm in management sciences and on the characteristics of significant implications resulting from the adopted views and research methodologies around this organizational phenomenon.

In line with the ongoing discussion, the article discusses the issue of business network models. Business networks are a challenging and complex subject of study. In the study of

business networks, there are some problems, the most important of which are related to the following features: the infinity of connections, no clear boundaries, the presence of strong and weak relationships, crossing the boundaries of the company, network, and environment, constant interaction, and interdependence.

Business networks are consolidating their importance in the global economy. Nowadays, they are one of the most exciting solutions with several advantages, expanding the number of available strategic options for the company, which may enable easier migration towards profit to more developed industries.

In modern times, business networking has become a widespread practice, both in social and economic life. Organizations create multiple forms of connections or cooperation to obtain both individual benefits and the effect of synergy. There is no doubt that the concept of business networks, which has gained tremendous popularity in recent years and is used in various research areas in management, was created thanks to the development of computer networks, especially the global network, which is the Internet.

Many researchers emphasize that business networks are currently one solution to meet the growing competition (Hannachi et al., 2021; Leitner et al. 2011). They influence the growth of innovativeness of enterprises included in the network, as well as the sectors in which the network operates in general (Camarinha-Matos, Afsarmanesh, 2005).

Numerous studies refer to the benefits for the company of using the network approach and belonging to a business network (Child, Faulkner, 1998; Ricciardi et al., 2022; Barczak, 2020):

- cooperation and integration of domestic, foreign, and global entities,
- cooperation potential among related entities and the possibility of achieving measurable benefits (development potential) from links in the form of, among others: access to resources, cost reduction, use of market opportunities, specialization, risk reduction, and foreign expansion (Cruijssen et al., 2007),
- obtaining better financial results compared to traditional solutions, which is the result of eliminating the costs of the existence of the organizational hierarchy, increasing the flexibility of operation, eliminating the costs of competition about current partners, better allocation of investment funds, reducing the costs of control and bureaucracy, the costs of negotiations, specialization activities, better binding customers to the network through the possibility of comprehensive services, etc. (Forsgren, Johanson, 1994; Leitner et al., 2011),
- the complementarity of resources and competencies within the network (Badraoui et al., 2022),
- rapid exchange of information through network-linking horizontal information and communication channels is conducive to increasing the speed and accuracy of decision-making, increasing competitiveness and mutual learning (Alee, 2000; Camarinha-Matos, Afsarmanesh, 2005)
- an opportunity to acquire new knowledge and increase development skills,

- broad autonomy of individual partners, conducive to innovation, experimentation, and learning,
- increasing the flexibility of action results from eliminating hierarchical dependencies (or their significant weakening), multilateral information and communication links, better use of the ability to act and competencies, and increasing innovation.

It is worth noting that the extraordinary wealth of various forms of cooperation (business network models) causes incredible difficulties in classification. Many forms of functioning in the economy have not been thoroughly recognized. A particular research gap can be noticed in this regard - a need for more studies presenting analyses and systematization of various models of business networks. In addition, some forms of network cooperation are so complicated that it is difficult to classify and mark them as a given type of cooperation. However, the research challenge is not only to classify or distinguish business networks but also to indicate the benefits of such solutions¹. This issue still has inspiring research potential. Although there are many typologies of network types in the literature, a methodological gap could be noticed related to the ordering and systematization of business network models.

The article's primary goal is to present a proposal for a typology of business networks. This was preceded by a thorough literature review (SLR) in the scope of the described typologies and criteria for the division of business network models.

The issue of business network models taken up in the study is described as its complexity, multithreading, and interdisciplinarity. The indicated features imply the diversity of research and the network models used, which become the specificity of the network approach in management. An original proposal of a multi-level typology of business network models is presented in the article. The starting point was the division based on the criterion of the nature and complexity of the relations occurring in them, as a consequence of which four internally differentiated categories of models were indicated: networks originating from industrial districts, strategic networks, cooperation networks, and global business networks.

The presented concept of the division of business network models is a proposal at the current stage of scientific reflection, considering the lack of comprehensive research in this area.

2. Methodology

The systematic literature review (SLR) methodology was used to achieve the set goals: a thorough and systematic search, selection, and analysis of existing scientific literature on a specific topic. Systematic literature reviews are an essential tool for scientists and researchers, as they can obtain a complete and comprehensive picture of the current knowledge on a given topic, which is necessary to conduct a proper and practical analysis. SLR was carried out in the

¹ In recent years, the dark side trend has been strongly marked, which focuses on the limitations and weaknesses of business networks.

following stages: (1) defining the research question, (2) selecting databases and keywords, (3) searching selected databases, (4) selecting publications, (5) analyzing data, (6) synthesizing literature, and (7) presenting the results: developing a typology of business networks.

The main question is: *What is the typology of business networks?* In addition to the main question, the following auxiliary questions were asked:

- 1) what criteria for the division of business networks are indicated by researchers in the literature?
- 2) what typologies of business networks are proposed by various researchers in the literature on the subject?
- 3) what are the main problems in developing a typology of business networks? (discussion)
- 4) what are the directions (trends) in developing business networks?

The author chose the Web of Science and Scopus databases for research. These databases contain full texts and links to the most famous journals and are the most comprehensive and reliable scientific databases that systematically increase their potential. Next, the research sequence had to be defined (according to Boolean operators): *"business network*" AND typology OR taxonomy OR "criteria for the division of business network*"*

In further proceedings, it limited the scope of articles to 3 areas in the Scopus database and 3 in the WoS database. I also used the reduction of articles by keywords. As a result, WoS returned 109 articles, and Scopus returned 105 articles for 204 documents. The course of the test procedure is summarized in Table 1.

Table 1.
Conducted procedure in the SLR

	Search string	Limited to:				Total
		Language	Document Type	Subject area/Categories	Keywords/Search within all field	
Scopus	„business network*"AND typology OR taxonomy OR "criteria for the division of business network*"	English (4652)	Article (3218)	Business Management and Accounting (2483), Economics, Econometrics and Finance (546), Environmental Science (237)	Business Networks (48), (21) Business Relationship (18) Typology (26)	109
WoS		English (142,905)	Article (120,206)	Management (1,424) Environmental Science (64), (29) Business (875)	Typology	105
Total						204

Source: own work.

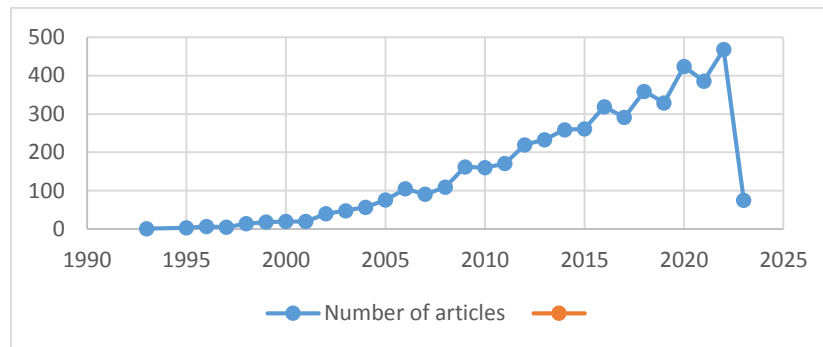


Figure 1. Number of articles since 1993.

Source: own work based on data from Scopus.

Table 1 and Fig. 1 presents the number of publications published from 1993 to 2023. The last access to search in Scopus and WoS occurred on January 15, 2023. It means that some publications of 2023 could still be in the publication procedure. It should be assumed that the number of articles will increase until the end of 2023.

In addition, I used the "snowball" method, i.e., I conducted additional research in which some scientific sources were analyzed that were not included in the selected database.

The second method is typological analysis, which involves identifying and classifying objects or phenomena based on their features and properties necessary for a given study. Typologies can help uncover hidden patterns and trends, making comparing cases and revealing differences between them easier. The typology of business networks developed in this article is to perform both a theoretical function - it can help identify trends in the development of business network models, and a practical one, indicating directions for further research.

Typologies serve a distinct purpose in constructing theories. They enable the creation of a structured and concise representation of the subject of inquiry while facilitating subsequent analyses and comparisons to identify the relationships between the typological variable and other variables included in the research. Additionally, typologies allow for the generation of descriptive and prescriptive statements. Thus, their significance extends beyond a purely theoretical function and is crucial for developing principles that inform social and economic practices.

3. Results

3.1. Business network concept

According to the representatives of the mainstream research of the IMP group, a network is a set of long-term connections (relations), formal and informal (direct and indirect), that occurs between two or more entities (Håkansson, Snehota, 1989). The analysis of achievements in the field of shaping the concept of a business network allows defining business networks as systems

created voluntarily by a group of economic actors of enterprises dealing with a similar field of activity, public and private sphere institutions that support their activity - related by relations, interacting with the environment and established to achieve common goals.

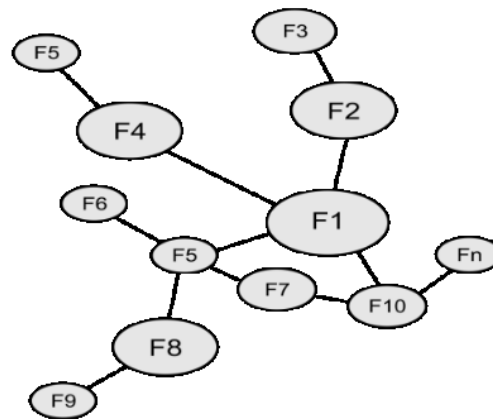
M. Rosińska-Bukowska (2012) defines a business network by referring to the ARA model (actors - resources - activities) built by the IMP Group, in which three issues are emphasized as particularly important: continuity of interactions between participants, resource dependencies of system members and the existence of relationships between them resulting from joint activity (Håkansson, Snehota, 1995). On this basis, he considers a business network a coherent system of horizontal, vertical, and diagonal ties - its inherent feature is coherence. The structure of the network is built by consciously interdependent entities. However, the network is neither a loose bundle of relationships nor a hierarchical structure of a dominated nature. It is a regulatory structure rather than an organizational one. It has an incorporative character, i.e., its entities strive to internalize the offers of their members, although not necessarily based on ownership relations. The bond of the network is the common goal of the participating entities - the strategic context of the established relationships. The role of the network is to integrate the critical areas of competence of individual members and create intra-network knowledge diffusion structures to achieve the synergy effect.

The characteristic of the functioning of business networks is the combination of competition and cooperation while maintaining both individual (competitive) and expected (convergent) goals of the entities (Hirvensalo et al., 2021).

The analysis of achievements in the field of shaping the concept of a business network allows us to present a model approach (Prekert, Halle'n, 2006; Ricciardi et al., 2022):

- elements (actors) of the network of connections may include companies, business environment institutions, R&D units, and representatives of local government,
- relations can be formal (based on contracts and agreements) or informal (result from interpersonal contacts),
- the relations between the elements of the network are, firstly, of a cooperative nature - mutual dependencies between the elements, and especially the division of activities and cooperation within a specific collective behavior, not always formalized; secondly, apart from cooperation, there may be competition between actors in the network,
- actors in the network share a sense of separateness from entities outside this network,
- it is possible to identify similarities in the field of activity on which the activity of the network elements is focused,
- elements in the network have a defined common goal, which they want to achieve through the operation of the network.

The diagram of connections in a business network is shown in Figure 2.



F5-Fn – entities (business network participants).
 ——— network connections.

Figure 2. Diagram of connections in a business network.

Source: own work. based (Ratajczak-Mrozek, 2009).

To sum up, based on previous considerations, it can be assumed that business networks are systems created voluntarily by a group of economic actors of enterprises dealing with a similar field of activity, public and private sphere institutions, which support their activity-related by relations, interacting with the environment and established to achieve common goals.

3.2. Review of research on business networks

In the further steps of the procedure, according to the SLR criteria presented in Table 1, content analysis was carried out.

Analyzing the publication’s content made it possible to indicate various criteria for the division and types of business networks from the widely quoted literature. Table 2 presents a list of business network typologies according to the adopted criteria from a literature review.

Table 2.
Review of business network typologies

References	Typology	Division criteria
Cruijssen et al. (2007); Pomponi et al. (2013)	Typology of the collaboration network	collaboration structure, integration level, collaboration scope
Knop, Olko (2008)	Typology of network collaboration	level of formalization
Prekert, Halle’n (2006)	Typology of business networks	types of resources in the exchange system: conglomerate resources, transformation output, composite resources, assortments, congenial resources
Culpan (2009)	Typology of strategic alliances	equity commitment
Martin et al. (2018); Cruijssen (2020)	Typology of collaboration LSPs	collaboration scope, nature, combined assets, and objectives collaboration scope and integration level collaboration nature, scope, objectives, and assets
Leitner et al. (2011)	Typology of collaboration in the automotive industry	collaboration intensity and flow consolidation

Cont. table 2.

Hannachi, Coleno (2012)	Typology of horizontal coepetition	coordination mechanism based on relationship, "mediation arena"
Franco, Haase (2015)	Typology of alliances between small and medium-size firms	collaboration objectives and strategy ascertainment
Chiambaretto, Le Roy (2016)	Typology of competitive branding	the nature of the agreement (hybrid vs symbolical), the type of partners (direct vs. indirect competitors)
Ahola (2018)	Typology of inter-organizational projects	marked-based network, dyad-driven network, integrated core network
Zardini et al. (2020)	An operationalizable typology of business networking logic	views, rules, roles, beliefs, and behavioral expectations on business networking
Yrjölä (2021)	Typology of second-hand business models: connector, supporter, and controller	company's role in mediating between consumers, breadth and depth of the product offerings, company's level of control, seller selection and support mechanisms, revenue streams
Ricciardi et al. (2022)	Typology of business networks	basic relationship configurations - from full cooperation (fairness, sharing, and commitment) to full competition (opportunism, control and rivalry)
Badraoui et al.(2022)	Typology of horizontal logistics collaboration (HLC)	structure, nature, activities, intensity

Source: own work.

The conducted analysis showed the diversity of business networks. Many of the presented typologies refer to cooperation and its various forms, alliances, and logistic networks. Some typologies concern narrowed areas, e.g., sectors such as small and medium-sized firms (Franco, Haase, 2015) or the automotive industry (Leitner et al., 2011).

3.3. Typology of business network models

Then, based on the literature analysis, I proposed my typology of business networks, which is presented in Fig. 3. Four main groups of business networks can be identified: networks originating from industrial districts, strategic networks, cooperation networks, and business networks.

We can talk about different types of business networks within each distinguished group. However, the adopted distinction is not mutually exclusive. For example, clusters are a network model derived from industrial districts, but some are long-term and strategic. Therefore, they were qualified for both groups.

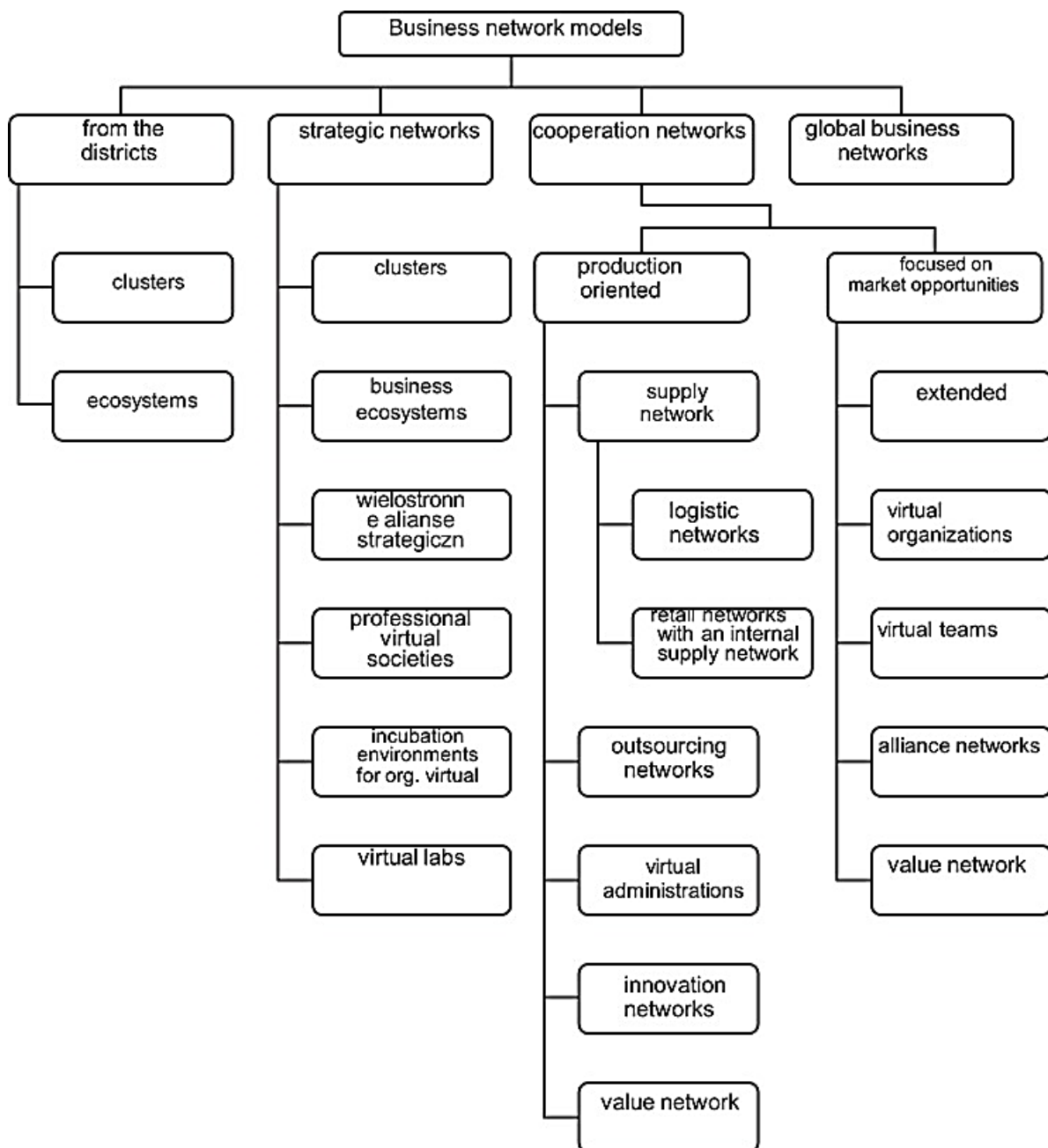


Figure 3. Typology of business network models.

Source: own work.

The first category of business networks is networks from industrial districts: clusters and ecosystems. These are forms of cooperation of organizations of a dual nature, combining competition with collaboration, which arise in all sectors of the economy. They are complex networks of connections between various companies, organizations, institutions, technologies, and other elements that mutually influence each other and the way the market functions. Today, they are often based on digital technologies and innovative solutions.

The second category is strategic (centralized) networks, which are based mainly on vertical integration, are characterized by solid structuring, and have a strategic center that determines the members' typical strategy and areas of activity. Inter-organizational links are of strategic

importance for centralized network partners, regardless of the form of the relationship. In recent years, the creation of so-called alliance networks.

The third category consists of cooperation networks based on cooperation links (horizontal and vertical). This category is the simplest form of inter-organizational network cooperation of enterprises, which gives them relatively large opportunities for the flexible shaping of mutual relationships and joint value building. I mentioned supply, logistics, and outsourcing networks in this category of network models.

The last category is made up of global business networks. The global network is the highest stage of the evolution of network-type solutions, i.e., a form of network thinking adapted to the requirements of corporate globalization. It is a regulatory model rather than just a typical organizational structure. It usually has a hybrid design, meaning that the internal structures of global business networks differ due to combining many types of organizations into one regulatory system.

4. Discussion and research directions

The analysis of the publication's content showed many differences in interpreting the concept of a business network. Many researchers (Kilduff, Tsai, 2003; Hakansson, Snehota; Cook, Emerson, 1978) define business networks as interconnected business relationships. According to the social exchange theory, they constitute exchange networks, i.e., corresponding exchange relations. In the wake of many market researchers, I have adopted the business network interpretation in this study (Easton, Araujo, 1994; Blankenburg, Johanson, 1992; Prenkert, Hallén, 2006), which mainly refers to the theory of market exchange. Business relationships in such networks are interdependent. In addition, some studies also point to the fact that the theoretical conceptualization of a business network derived from social and market exchange contradicts its empirical identification (Prenkert, Hallén, 2006). Theoretically, the network extends in all directions without borders and center, while empirically, it has a clear center and clear boundaries that can be identified.

The above interpretation of the business network leads to the conclusion that it is a comprehensive concept, covering many different network structures that can be described (or distinguished) as models of business networks. The study of network models is one of the current research in network science. In the ongoing discussion on network theory in the literature, there is a solid reference to using various network models in management sciences (Ricciardi et al., 2022; Zardini et al., 2020). Network models constitute representations of a given phenomenon (phenomenon) within the network concept using network data and observations that are not independent. Abstracting the network into a model and its representation requires essential elements, which include:

- nodes (vertices),
- a relationship between at least a pair of nodes (dyad),
- recognition of the network structure.

The analysis of the content of publications resulting from the SLR showed that numerous issues are combined or even identified with the case of business networks (Rosińska-Bukowska, 2012; Knop, Olko, 2008; Franco, Haase, 2015). The study of standard forms of cooperation between enterprises must be deeply rooted in research and literature on the subject. However, there needs to be a systematization of the relationships between the issues mentioned above. Sometimes the topic of network connections needs to be identified with the problem of strategic alliances (Culpan, 2009), a business network is identified with a network organization or a virtual organization (Camarinha-Matos, Afsarmanesh, 2005). In addition, the literature on the subject lacks an answer to whether the term "business network" is not only a general, collective term for various formal forms of cooperation. M. Ratajczak-Mrozek (2009) analyzed the network against various forms and concepts of cooperation. One can agree with the approach presented by her that after meeting additional assumptions that narrow down various forms: standard forms of cooperation, strategic alliances, virtual organizations, networks in logistics, and clusters can be part of a business network according to the network approach. Therefore, including them in the typology proposed in this article seems reasonable.

A literature review shows that business networks are a challenging and complex subject. There are some problems in the analysis of business networks, the most important of which are related to their following characteristics (Barczak, 2020):

- the infinity of connections,
- no clear boundaries,
- strong and weak relationships,
- crossing the boundaries of the company, network, and environment,
- continuous interaction and interdependence.

Researchers indicate that as a consequence of infinite network connections and numerous relationships with the environment, a business network is characterized by a total area of operation, both territorial (network relations go beyond the borders of one country) and objective (Håkansson, Snehota, 1989; Forsgren et al., 1995; Zardini et al., 2020). The network does not have clear boundaries, and they can only be determined by arbitrary judgment. Each participant in the network can set its limits, but in reality, they remain relative (Forsgren, Johanson, 1994). It should be noted that the infinity of network connections implies some additional research problems (Prenekert, Hallén, 2006):

- relationships are far more complex than direct links between the closest links in the supply chain because their functioning is also affected by relations with other market entities,

- due to the lack of clear boundaries, it is difficult to determine their spatial scope fully. There is a risk of adopting a perspective according to which "everything is a network" raises the critical question of how to analyze a permanent structure.

In this regard, it is also worth referring to the concept of strong and weak ties by Granovetter (1973), which is often developed in the literature and the context of business networks. Many authors (Anderson et al., 1994; Jung et al., 2008) transfer this concept also to the area of functioning of business networks, defining first-order relations, i.e., positive and negative effects exerted on two partner companies by their interaction in the primary bilateral relationship and relations second order, which represent as the positive or negative effects exercised on this relationship due to direct or indirect relationships with other relationships.

The company's perception of the external influence exerted on its activities refers to the concept of network context, which is created by the total number of related (directly and indirectly) network links constituted by entities consciously mentioned by a given company as affecting its situation and activities (Blankenburg, 1995). Outside the network context, some entities cannot be identified. Due to the ongoing interactions that constantly lead to the emergence of new relationships, the context of a given company's network (as well as its position in the network) is a variable known only at a given moment. However, regularly visualizing the context of the network is necessary as it allows the enterprise to understand both the conditions affecting it and the far-reaching consequences of its actions.

The conducted analysis also concludes that business networks, being the next (higher) stage of development, contain solutions used earlier, developed within these "lower forms," and then only refined. The analysis of only "sections" of the business network may lead to the erroneous identification of the network with another form of cooperation, which is exposed when viewed from a given perspective. The network model can be established based on the diagnosis of the entire business network, determining the types of internal connections occurring in it, and indicating the dominant organizational forms and the principles of their mutual relations.

The typology of business network models presented in the study plays an important theoretical role. Still, it can also be essential in formulating social and economic practice functioning rules. In this regard, the following theoretical and practical tasks of the developed typology can be indicated:

- systematization, including grouping, ordering, and division of specific categories according to specific criteria,
- analysis of development trends,
- the possibility of making further analyzes and comparisons.

Summing up, the following conclusions can be drawn:

- there is a great diversity in the interpretation of the concept of a business network; in most definitions, researchers refer to the theory of social exchange and the theory of market exchange,

- there is a solid reference to using various network models in management sciences,
- in the literature, there are many approaches to creating typologies (by applying various criteria), as well as many divisions (business network typologies,
- in the study of business networks (and creating their typologies), there are some problems, such as the infinity of connections, the lack of clear boundaries and their penetration, the presence of strong and weak relationships, or continuous interaction and interdependence.
- in the discussion showed that creating a typology of business network models plays an important theoretical role (develops network theories).

The complexity of the issues indicates the need to define directions for further research. Note the following:

Firstly, we are currently observing business integration processes carried out by transnational corporations, i.e., the creation of global business networks (GSB) to implement a competitive strategy adapted to the requirements of a knowledge-based economy.

Secondly, as a consequence of the changes in the global economy, there is a development of multi-level organizational structures in the global space as an expression of the network's adaptation to new challenges. The requirement to benefit from their functioning is to ensure the strategic synergy of resources, structures, and organizational cultures.

Thirdly, business network models will be rapidly developed in the coming years, combined with models based on knowledge and ICT technology. These models are characteristic of the era of the knowledge-based economy, which will gain importance, and information and knowledge will continue to be the critical resources of the enterprise. Business networks are increasingly being digitized, allowing members to connect and collaborate online. This can enable businesses to access new markets, resources, and knowledge and to achieve greater efficiency and innovation.

Geographic expansion is the fourth research direction: business networks can expand geographically by adding new members in different regions. It allows businesses to access new markets, resources, and knowledge.

Fifth, business networks are also increasingly focused on sustainability, incorporating environmentally and socially responsible practices into their operations. It can improve their reputation, attract new customers, and create long-term value.

Overall, the development of business networks is characterized by increasing collaboration and interconnectivity, focusing on geographic expansion, diversification, specialization, digitalization, and sustainability.

5. Summary

In sum, it is worth noting that although analyzing the forms of cooperation between enterprises is deeply rooted in research and literature, there is no systematization of relationships between many issues related to business networks.

The conclusion of the considerations on business network models may be that the essence of the network is not the form of cooperation, but its content, i.e., the nature of the bonds between the participating entities. The network approach is a synthetic and analytical approach using various concepts of cooperation. Therefore it is neither their sum (some elements were rejected and replaced by others) nor none.

In this study, the business network is treated in a broader sense than it results from the assumptions of the origin of the network approach and the model developed by a group of Swedish researchers. It is an internally differentiated category of organizational network models covering various forms of networks, which are included in the study within the four categories indicated earlier. This approach to developing business network typologies is more comprehensive and holistic.

The practical usefulness of the proposal contained in the study is related to the possibility of using the proposed concept in the assessment of various types of business network models, which will enable the formulation of diagnostic findings and conducting comparative and dynamic research in the field of analysis and evaluation of business network models.

The indicated directions of research determine the possibilities of improving the proposed concept. A deeper analysis of business network models and improvement of their typology is recommended, as well as an empirical verification of the proposed concept.

The approach proposed in the study is a response to the growing demand for research on organizational networks, including in the field of a comprehensive approach to business network models. To some extent, it fills the research gap related to the scarcity of studies in this area, although this issue still offers inspiring research potential.

Acknowledgments

The publication was financed from the subsidy granted to the Cracow University of Economics – Project no. 064/ZZP/2022/POT.

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