
The Concept of Flexibility of Inter-Organizational Networks: Research Assumptions

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Abstract:

Purpose: One of the distinguishing features of the network's efficiency is its flexibility, quite strongly explored on the ground of individual business entities - in the network conditions, it is a set of many unknown factors and mechanisms. The article aims to identify the fundamental distinguishing features of interorganizational networks and define a set of research questions to exemplify them empirically.

Design/Methodology/Approach: The achievement of this goal was possible through the subject literature review introducing the design and conduct of in-depth empirical research in the future.

Findings: The theoretical research carried out made it possible to identify several research questions, thus showing how complex category the flexibility of interorganizational networks is. The conclusions identified the need to consider environmental influence when studying the flexibility of interorganizational networks, which seems obvious. However, a detailed analysis enabled identifying factors determining the balance of network conditions and network systems, being a novelty in the analyzed topic.

Practical Implications: The practical business implications concern mostly the consideration of the possibility of a deliberate impact on the flexibility of interorganizational networks in the result of the development and intentional use of interorganizational network flexibility mechanisms. For many interorganizational networks, this may prove to be an essential condition for the success of both the network and its nodes.

Originality/value: This research proposes the grounds for the procedure of researching the flexibility of interorganizational networks, using the analogy to organizational entities, and pointing out the flexibility of the network as one of the four categories of interorganizational network efficiency (next to engagement, exchange, and reciprocity).

Keywords: Strategic management, flexibility, effectiveness, interorganizational networks.

JEL classification: M10, M19, L24, L25, L29.

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1. Introduction

Interorganizational networks are increasingly being explored as a research object. That stems not only from the rapid dissemination of these cooperation arrangements but, above all, the fact that they represent an interesting combination of relational, organizational, intellectual, and organizational resources. Functioning in interorganizational networks is associated with obtaining a relational pension and an innovative and entrepreneurial pension (Niemczyk, 2013; Niemczyk and Latocha, 2014), determining the competitive advantage of entities entangled in the network. Moreover, interorganizational networks open an entirely new scientific research field, causing the researcher's attention to be shifted to the outside, beyond the boundaries of a single research object (organization). It leads to exploring such issues as types of bonds between objects building the network as well as types of relationships and ways of cooperation between them (Chakon, 2015).

According to J. Niemczyk (2013) the advancement of network and networking was determined by the development of processes related to information processing alongside changes in aggregation and processing of vast amounts of data, the introduction of IT systems supporting order management, and the application of large-scale process management, previously blocked by difficulties of coordination and implementation of comprehensive management of all the company's outcomes from the decision-making center level. That is not to be disagreed with, and the existing virtualization trends and the use of ITC solutions in communication should undoubtedly be added to this list (Turkish, 2011). It can be assumed that inter-organizational networks continuously evolve and adapt to changing environmental conditions. Passing through successive levels of network development - from level 1 to level 5 - related to working on new skills and the possibility of using new types of network annuities, i.e., specific types of benefits resulting from the implementation of various activities, appears an interesting concept of such changes (Organa and Niemczyk, 2017). Significantly, along with the evolution of the network, its processes and internal phenomena also change, which are different from subsequent ones in the initial phases of network development. These changes may occur in the context of changes in the specificity of leadership influence, which is significantly different in young, immature networks (Organa, 2019) compared to mature networks (Organa, 2017).

Interorganizational networks are defined as structural states, consisting of objects (nodes) that are connected by numerous ties, which are multiple and intersect each other (Barney, 2004; Organa 2014). A network of enterprises comprises at least three legally distinct entities, connected by relatively stable business relationships to create value for clients and themselves. Moreover, the distinguishing features of an interorganizational network include the number of nodes in the network, the permanence of business relationships, and the decision-making autonomy of the network nodes, which also leads to co-operations between them while maintaining a common goal and the lack of capital ties (Falencikowski, 2015). The category of

market flexibility, allowing the accumulation of many enterprises in the network system (whether centralized or decentralized) and the flexibility of their connections, determined by the possibility of correction of concluded agreements between nodes in the network, is significant as well (Niemyczyk and Jasiński, 2012).

For this study, it is worth noting that interorganizational networks are often analyzed because of their dynamics, and as such, are characterized by a high level of change in the number of entities and the dynamics of relations, which, in turn, can be an interesting tool used to achieve network objectives (Organa, 2014). Thereby, the network acquires the ability to learn, adapt flexibly to changing environmental conditions, and increase entrepreneurship and innovation. The triad of relations between flexibility, entrepreneurship, and innovation has been described in the subject literature (Stańczyk and Sus-Januchowska, 2005), although in the context of individual business organizations. Following the current reflection on the dynamics and flexibility of the network, a research question was asked about the substantive way of examining the flexibility category. The present three-part study addresses elements to consider while researching the inter-organizational network flexibility. The first part focuses on the determinants of organizational and interorganizational network flexibility from the network environment's perspective. The second one concerns the determination of research areas in the field of interorganizational network flexibility. The first and second parts identify potential research questions on inter-organizational network flexibility. The final part constitutes the conclusion and attempts to discuss the other elements of the network flexibility in the context of its structural characteristics of reciprocity, engagement, and exchange.

2. Flexibility of Organizations and Interorganizational Networks

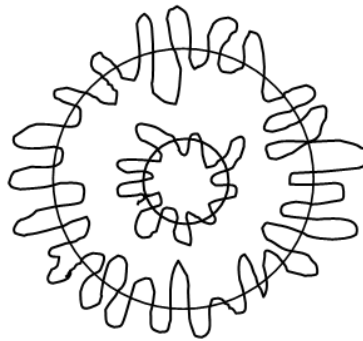
Modern enterprises operate in a turbulent environment, i.e., one where changes are disorderly, chaotic, multi-directional, and multi-level (Lichtarski 1992; Puszek-Machowczyk, 2007). This environment is characterized by complexity and variability. Complexity is determined by the number and diversity of the elements that constitute it, which an organization should consider in its activities. Most often, two essential environmental components are distinguished, and many heterogeneous elements can be identified within the framework of the near and far environment, which is widely analyzed in the literature. Changes in these elements concern the transformation of the elements and the relationship between them and the organization. Therefore, the system is dynamic, vibrating in the amplitudes of the environment, whose potential is strengthened by the interference of waves (Krupski, 2005) in the following directions organization, environment and environment organization.

The environment transforms in the effect of changes taking place within its components and relationships between them. The graphical turbulence model proposed by Ansoff can be used to present the environment's variability. It is an

analogy of the atomic orbital concept, in which electrons change their place in separate orbits depending on the appearance of an appropriate impulse (Figure 1). Ansoff identifies the following states of the environment (Ansoff, 1975):

1. Constant turbulence, at which the environment remains in each orbit.
2. A change in turbulence - a violent transition from one orbit to another.
3. A shift in turbulence - a gradual transition from one orbit to another.

Figure 1. *Graphical turbulence model*



Source: Ansoff, 1975.

From the above and provided in the literature as characteristics of the changing environment, the following attributes of changes taking place in the environment of modern enterprises can be distinguished as:

- they occur for many reasons (they may come from different sources),
- they are violent, discontinuous, both in structure and direction,
- they cover a wide range,
- they are challenging to predict, identify,
- they may affect the whole undertaking or individual parts of it,
- they have a high intensity and depth,
- they offer little opportunity to use the experience to date in new situations.

What consequences does the existence of the environment (its complexity and variability) bring to the enterprise? How can an enterprise function in a turbulent environment? Should an entity ignore changes in the environment, adapt to them, or anticipate them? It raises questions about how an interorganizational network can function under such conditions, especially when it is not possible to identify an organization that would not be connected to elements of eco-business networks. Simultaneously, the question should be asked how do decentralized and centralized networks function in current conditions?

Variability limits the enterprise's capability of anticipating, disrupts its current

functioning system, and causes the enterprise to be driven out of internal and external balance. The company's future does not constitute a continuation of its past and present. Disturbances in the environment cause a specific uncertainty, which shows the delta-shaped company's future (in the model view, the company cannot predict the environment's development direction at a given time). Changes occur at such a high speed that companies are unable to keep up with them. They have a deep, violent character, destroying the existing system of the enterprise. While past companies could afford the luxury of assuming in advance that business models were unchangeable, now the destruction of the company's business model at time t_0 is taking place. Obtaining a competitive advantage has become more complicated, and once achieved, it quickly becomes obsolete. As Hamel and Välikangas say, "success has never been as fleeting as it is now" (Hamel and Välikangas, 2003).

Until recently, the approach to adaptation as an organizational search for matching to the environment was one of the basic assumptions of strategic thinking (Zajac, Kraatz and Bresser, 2000; Obłój, 2001). The organization defined as an "input-transformation-output" system is open to contacts with the environment and adapts to its pressures, thus increasing its effectiveness as well as the efficiency of other entities involved in the interorganizational network.

Internal factors (characteristics of a company treated as an organization, especially cultural learning patterns and accumulated human capital) affect efficiency almost twice as much as external ones (external market factors shaping the competitive position of the company, mainly its attractiveness and position concerning competitors) (Tvorik and Givern, 1997; Bratnicki, 1998). The traditional fit as a desirable and beneficial state that a company manages to achieve has recently been replaced by the assumption of interaction between dynamic fit and mismatch (Zajac, Kraatz and Bresser, 2000; Obłój, 2001). According to Pant, when the environment changes rapidly, mismatch becomes the norm. Empirical studies also confirmed that thesis (Pant, 1998). They show that companies are increasingly moving away from the fitting model and can benefit from such behavior. Matching environment and strategy, or strategy and structure, does not provide better financial results than a mismatch. The difficulty of achieving and maintaining an enterprise's balance with its environment makes the enterprise more sensitive to change (Osbert-Pociecha, 2004). This sensitivity to change can manifest itself in the ability to capture and interpret environmental signals to quickly adapt to changes in the environment and anticipate changes in environmental conditions. It is suggested that a modern enterprise is "in movement," i.e., an enterprise that vibrates in the environment's amplitudes, and a specific interference enhances its potential. A modern enterprise is also one that causes the environment to vibrate in the amplitudes of the company (Krupski, 2004). Nevertheless, the vibration has nothing to do with responding to a single crisis or making minor modifications to the existing company's business concept. It is based on strategic regeneration, i.e., the ability to interfere with its business model (Hamel and Välikangas, 2003).

To sum up, the turbulence of the environment is demanding but not against the company. Therefore, companies that demonstrate flexibility can secure not only their continued existence but also their growth. According to Tarondeau companies with a high degree of flexibility will adapt, while rigid companies will be at risk of a fatal breakdown in severe turbulence in the environment. Rejecting flexibility is, therefore, suicidal (Tarondeau, 1999). How does an interorganizational network behave in this situation? In the context of these considerations, the first research question was asked, namely:

Q1: Can interorganizational networks be treated through the prism of "networks in movement"?

If the company's ability to operate flexibly is a prerequisite for meeting the environment's challenges, do networks also behave flexibly? Do individual network nodes "feel" loyal enough in the network to start vibrating together in the amplitudes of the environment? Or does the movement of one element create a domino effect that destroys the network?

3. Organizational Flexibility Versus Interorganizational Networks' Flexibility

It seems that the topic of flexibility, especially in the context of conceptualization of this category, has already been exhausted. The insight into the essence of the term flexibility through a metaphorical approach indicates that as well (Table 1).

Table 1. *Metaphorical approaches to flexibility*

Flexibility metaphors	Justification
Ability to adapt - Bamboo	Bamboo can survive even very violent storms and strong winds. Unlike trees, it can bend and then return to its original shape.
Adaptation - Chameleon	The ability to quickly change body coloration to become more like the environment, thus self-ensuring safety
Agile - Cheetah	The cheetah's speed of the is an asset when hunting other animals; it gives it an advantage over others.
Balance - String instrument	The strings of a musical instrument must have a certain tension - which reflects the state of balance; the functioning of an organization also involves maintaining a balance between centralization/decentralization, formalization/improvisation, stability and variability
Freedom - Independent country	Freedom to think and act makes an entity's activity more effective, stimulates creativity, innovation; however, disciplined freedom is concerned here, i.e., one that also imposes obligations by providing certain rights.
Autonomy - Having a child	Consent to autonomy involves the possibility of establishing and developing new entities; it is about reducing the new entities' dependence on the parent organization

Liberalization - grandparents' approach to raising children	In a general sense, liberalization equates to the reduction of limitations and control. Parents impose many constraints on their children in raising them, while grandparents tend to reduce constraints and control.
Dedication and consistency in action - Mother	A mother is a symbol of the sacrifice required to achieve the goal of raising the child; on the other hand, her actions must be very responsible and consistent
Openness - Sky	Although the sky is unlimited, when looking at it through the window, one can have the impression that it is a "cut out piece" of space. The openness of people in an organization can also be limited by, e.g., systems, values, legal norms, knowledge, etc. To increase openness, one must overcome specific barriers, expand the horizon of thinking, namely, look at the sky through an open window.

Source: Bujak and Puszko-Machowczyk, 2009; Osbert-Pociecha, 2009.

The presented associations emphasize that flexibility is a mixture of various properties that provide a relatively capacious space for different actions, characteristics, and mechanisms. Indeed, most definitions point to the imperative of responding to changes in the environment (Reix, 1979; Eppink, 1975; Tarondeau, 1999; Wanielista and Miłkowska, 1998), and more specifically to adaptability (Everaere, 1997; Golden and Powell, 2000).

The definition proposed by Stabryła (2004), who defines this category as adaptable, enabling a company to maintain or achieve a stationary and dynamic equilibrium, is crucial for this paper. The author identifies the balance through the invariability of the system's distinguishing features (system balance), or factors that provide conditions for the system's functioning (balance of conditions), whose duration over time is determined for a given period. The stationary equilibrium occurs when a given feature takes on a constant value under fixed conditions. On the other hand, the dynamic balance is expressed by a parallel shift of the stationary balance characteristics, connected with the occurrence of unfixed conditions or internal decisions, changing the existing objectives of action and the way of their realization. A parallel shift can be continuous, jumping, incremental, or declining. Its size is calculated in relation to the original characteristics of the equilibrium level as a reference. The stationary and dynamic equilibrium refer to a specific time T, or its multiplicity, specified for the assumed time horizon (Stabryła, 2004). The second research question appears from the above consideration as:

Q2: What factors balance the system and the conditions under which interorganizational networks operate?

Fixed conditions are the set of external and internal events that are assumed to be constant for a given system at a given time T. On the other hand, the following factors can be considered as unfixed conditions extortion as external influences, e.g., economic, environmental, and technical factors, and all factors treated as

disturbances, specific external decisions, e.g., changes in development programs, new legal regulations, extraordinary decisions of superior authorities, operational wear and tear of equipment, learning processes, i.e., improvement of technology, the introduction of computer support for administrative and office work and management process, aging processes, e.g., depreciation of the quality of technical equipment, natural changes in material and raw material resources, reduction of employees' qualifications (Stabryła, 2004).

In the context of the analyzed issues, attention should be paid to the fact that flexibility is also understood as control property. Leeuw and Volberda (1996) believe that flexible organizations can maintain a specific scope of independence from their environment and not necessarily undertake reactions resulting from the business ecosystem's transformation. Considering an organization as an autonomous (or controllable) system, the authors conclude that flexibility is a property of the control and may mean insensitivity to the environment's influence and the ability to influence (prevail or even dominate) the environment effectively. The relationship between control and flexibility corresponds to high "controllability" and high or at least sufficient controllability. Flexibility is, therefore, a minimum of "controllability" and the ability to control (Leeuw, Volberda, 1996).

As it also turns out, coordinating many different nodes of an interorganizational network in such a way as to achieve common goals is not a simple task either (Cock, 1988; Park, 1996), thus proving that the management and control of cooperation between elements in the network is a critical factor determining the success or failure of the network (Geringer and Herbert, 1989; Park, 1996). Miles and Snow (1986) stress that decentralized networks (the authors write about a temporary arrangement of disaggregated functions) should be treated as a "dynamic network organization," to which the network's institutional control mechanisms become the imperative of improving the cooperation effectiveness. These include discrete contracts and intertwined contracts as formal conditions of control between nodes (Macneil, 1987; Chrisidu-Budnik 2015), and informal ones, based on trust. Chrisidu-Budnik (2015) stresses that the complementary role of trust in the law is revealed in intertwined contracts.

When analyzing individual operators without considering their network relationships, the achievement of an adequate range of control capacity depends on (Leeuw and Volberda, 1996; Osbert-Pociecha, 2004a):

- the existence of current and potential management procedures. Not only is the current scope of procedures significant, but also the scope of potential procedures that have not been activated in case of opportunities or threats to date,
- diversity of management procedures in a turbulent environment, a wide range of procedures should be available in proportion to the disturbances in

- the environment that arise. In other words, it is essential to have a collection of flexible procedures to control the organization and the environment. The diversity of procedures can be achieved by influencing both quantity and quality which, in turn, may be associated with a one-off or permanent increase in flexibility, e.g., the latter can be achieved by training employees, while the former by reducing employment,
- the speed of the procedure implementation, flexibility is a dynamic process and does not work under static conditions. Time is an essential factor when a response time is too short, overreaction, instability, chaos, and possibly system explosion may appear. However, careful management can reduce the acceleration process. Therefore, it is necessary to optimize the decision cycle and sometimes wait for the influence of certain factors i.e., reaching a certain critical level to "stabilize."

However, the fundamental determinants of a company's "controllability" are:

- Technology and universally understood technology (tools, machines, manufacturing methods and related organization of the material and information stream),
- organizational structure, including the current distribution of power and responsibility, planned and control systems, and processes for decision making, coordination, and execution. Flexibility can be expressed in the transition from a mechanistic to an organic structure,
- organizational culture, including a set of beliefs, values maintained by the organization. Flexibility may be expressed in the transition from conservative forms of organizational culture to innovative ones. Organizational culture can play a significant role in interpreting environmental stimuli and configuring appropriate responses.

On the one hand, an organization must have many procedures to increase its flexibility in order to avoid rigidity, but these must be embedded to avoid chaos. This paradox implies that the organization participates in change and survival. Consistent management must be shared between what is to be changed and what is to last. Flexibility does not have to be seen in opposition to stability but as a requirement for higher-level stability (Leeuw and Volberda, 1996). A preliminary analysis of the diversity and variability of the factors determining the network system flexibility has identified the following research questions:

Q3: How to comprehensively control the factors determining the balance of network systems?

Q4: How to comprehensively control the factors determining the balance of network conditions?

Q5: Are the identification of the mechanisms determining the balance of the system and the conditions sufficient to speak for the flexibility of interorganizational networks?

It should be stressed that the considerations contained in this study are highly generalized and will be operationalized in future theoretical and practical work. Nevertheless, they are potential entrants to wide-ranging scientific research.

4. Discussion and Conclusions

Miles and Snow (1986) emphasize that effective management of an interorganizational network requires the development of network efficiency mechanisms determined by optimal relationships between the categories of reciprocity (Kirman *et al.*, 2007; Pesamma *et al.*, 2013), engagement (Ihm, 2015; Cross *et al.*, 2012) and exchange (Provan and Milward, 2001), and between nodes in the network. The objects of interorganizational exchange, which determines the effectiveness of relations, are resources, both in material and non-material terms, and the typology of exchange focuses on material and energy flows (Chakon, 2005). In effect, the achieved efficiency of the exchange is higher than an individual's, this is one of the motives for building interorganizational networks (Chakon, 2016). Network involvement is associated with a certain degree of interdependence on partners, which results from the involvement of negative (risk) and positive (benefit) consequences of functioning within network structures. Such interdependence affects the network's cohesion and the cooperation between its constituent elements, which are based on trust, i.e., the belief that partners will fulfill their obligations (Odlanicka-Poczobutt and Knop, 2016). In turn, reciprocity is a critical element of the formal assessment of ties by the parties to the relationship, leading to the construction, modification, and disintegration. The components of reciprocity include the parties' involvement, the negotiation processes when establishing the agreement, and its implementation by the parties (Ring and Ven de Ven, 1994).

Flexible adaptation of interorganizational networks, which is visible in realizing optimal engagement, exchange, and reciprocity, determines the network flexibility. Thus, another component appears on the empirical map of interorganizational networks, the exemplification of which may constitute an essential element of building new knowledge about the effective functioning of these relations.

In conclusion, it should be emphasized that although intuitively, the flexibility of an enterprise is understood as the capability to make changes and/or respond to changes (Bujak and Puszko-Machowczyk, 2009) in the face of the presented conceptual approaches. It is an extremely desirable category, especially from the point of view of network systems, it is also very complicated, as evidenced by its specific characteristics constituting the basis for planned empirical research.

The network paradigm has already become a permanent feature of modern organizations' ecosystem. It has been proved effective in creating a significant competitive advantage as a model of business operation (Chakon, 2011), which also emphasizes the need to study these structures. Especially in the light of the

insignificant number of studies on the flexibility of interorganizational networks, mainly focused on the relations between standard flexibility and network evolution (Van den Ende *et al.*, 2012), or the development of specific network connections (franchise networks) after applying the real options theory in a resource-based view, and their effect in the form of an increase in managerial flexibility (Gorovaia and Windsperger, 2013). Nonetheless, the study focuses not on the flexibility of the organization in the network but the flexibility of the entire interorganizational network.

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