
Network theory and complexity theory in the context of organization and management sciences

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Abstract

The paper presents network theory and complexity theory in the context of organization and management sciences. Both theories today are of great interest among researchers whose purpose is to explain and understand the complexity of the organization's functioning and management through the lens of the network of relationships between the components of a given system. The main idea is to consider the organization as a socio-technical system linked by a network of relationships, interactions, and interdependencies (network theory) and as a self-organizing, complex adaptive system (complexity theory). A narrative review was used to capture the theoretical context, with the possibility of formulating research questions that can lead to further empirical research. The paper indicates the possibilities of interpreting organization and management in terms of these two theories, which until now have not been combined with each other (or in very individual cases), although they have a large, complementary explanatory potential for both organization and management.

Keywords: *network theory, complexity theory, organization science, management science, organization, management.*

1. Introduction

Research in the field of network theory and complexity theory is interdisciplinary and concerns many disciplines. In the case of network theory, it has been used in the mathematical analysis of social network, qualitative methodology used in social sciences and complex networks studied in the framework of statistical physics and complexity theory. The first works on network theory in the field of organization and management sciences are related to such authors

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as Tichy and Fombrun (1979) as well as Tichy, Tushman, and Fombrun (1979). The contemporary network approach to organization and management is found, for example, in works on managing intangible resources in an IT sector organization (Ujwary-Gil, forthcoming), information modeling for the purposes of creating an inter-organizational support network (Durugbo, 2015), management of regional sport tourism networks from the perspective of egocentric network analysis (Wäsche, 2015), performance (Agbim, 2019), or broadly understood management of healthcare and healthcare organizations (Merrill et al., 2008; Valente, 2010).

In turn, complexity theory has mainly developed in physics, biological, chemical and economic sciences. The application of complexity theory assumptions in organization and management sciences is largely associated with such authors and works as Anderson (1999), Stacey, (1995), Griffin, Shaw, and Stacey (1998) or Griffin, Shaw, and Stacey (1999). The precursor of the complexity associated with organization and strategy was Simon (1962), who considered the use of an analytical and computer tool to study complex systems, laying the foundations of management theory. Social systems (organizations, industries) are characterized by non-linear relationships and complex interactions that evolve dynamically over time. This perception of organizations has increased the interest in applying complexity theory to a number of areas in the field of organization and management sciences, such as virtual organizations (Papastefanou, 2010), learning organization (Chiva, Grandio, & Alegre, 2010), public management (Eppel & Rhodes, 2018), strategic management (Basile, Kaufmann, & Savastano, 2018), and change management (Lauser, 2010).

A review of literature sources using global databases (mainly Web of Science and Scopus), focused on searching for works in the field of network theory and complexity theory in the context of organization and management, did not show works that would combine these two theoretical approaches together. The exception is the work recently published by McGee and Jones (2019), which refers to the modeling of policy subsystems using social network analysis. Of course, there are many works that present network theory or complexity theory in connection with organization and management. However, there is no work that would show at least similarities, treating these two theories complementarily. The paper fills this gap and aims to answer the question of whether network theory and complexity theory associated with it, can be a source of practical implications in terms of organization interpretation and management.

2. Research approach

The paper is a theoretical review, aimed at presenting network theory and complexity theory through the prism of organization and management sciences. The narrative review was used as the basic research method. A relatively small number of scientific papers devoted simultaneously to network theory and complexity theory in analyzing organization and management supports the choice of this method, which makes it possible to draw conclusions relating to both empirical and theoretical research, taking into account a certain degree of freedom and using a critical approach to analysis (Gancarzyk & Bohatkiewicz, 2018; Green, Johnson, & Adams, 2006; Takeuchi & Chen, 2013; van Knippenberg, 2012). The narrative review allows one to capture qualitative differences between studies, combine different concepts and indicate the context of the problem, which is the advantage of this method over the systematic review (Jones, 2004; Sisson & Ryan, 2017). Its supporters (e.g., Ferrari, 2015) also suggest that the narrative review goes beyond the synthesis of previous research, makes a new contribution in the form of original inference, and identifies areas for further research or concept development.

To understand the essence of network theory and complexity theory, the focus was mainly on sources indexed in two global databases: Web of Science and Scopus, which had the phrase “network theory,” “complexity theory,” “network” or “complexity” in the title. The publications (articles, books) indexed in the period 1900-2018 (dictated by the time period included in the Web of Science database) were taken into account. Only single cases of papers from 2019 are included. The multi-stage process of source selection, including keywords and the appearance of phrases in the abstract, is not enough. Additional analysis is required to exclude documents that treat this topic in a trivial or marginal way (Coombes & Nicholson, 2013). It is for this reason, choosing a phrase in the source title leads to a greater probability that the article/book will relate to the selected research area. Sources are reflected in the References section.

This article, based on narrative, aims to capture a broader theoretical context with the possibility of formulating research questions that can lead to further systematic reviews of literature and empirical research. The theoretical perspective was based on an interdisciplinary search for literature, including scientific work in the field of network theory and complexity theory on the canvas of organization and management sciences. Theoretical and empirical research was reviewed to analyze these two approaches to theory in relation to organization and management. The research procedure ends with an indication of restrictions, directions and questions for further research.

3. Network theory

Network theory is one of the disciplines of network science and has become a platform for active exploration of interdisciplinary research areas because relationship networks are visible in almost every area of human and non-human activity. In this theory, elements of graph theory (Foulds, 2012), the associated matrix algebra (Abadir & Magnus, 2005) and network statistics (Brinkmeier & Schank, 2005) are also visible. Network theory is oriented, among others, at learning and studying the complex structures and behaviors that take place between organizations, called social networks, which distinguish the intentionality (human agency) of network actors compared to other networks (Robins, 2015). Complex structures of emerging dependencies between the studied actors and obtained results, based on relationship structures, characterize network theory. Network theory perceives the totality and the results of interrelationships in opposition to reductionism, which has decomposed complex systems in a way that makes it possible to learn about separate and individual nodes and connections. As noted by Parkhe, Wasserman, and Ralston (2006), network theory shifts the focus from the atomistic explanation of phenomena and independent cases to the relationship between dependent system factors.

The network is described by its structure, which is formed by nodes and connections, dynamics, and behaviors. Network models constitute representations of a given phenomenon within the network concept using network data and observations that are not independent of each other. However, abstracting a network to form a model and its representation requires basic elements, which include nodes that can take any kind of animate and inanimate form; connection (dyad) and recognition of the network structure. The conceptualization of the organization as a network in which there is a combination of individual socio-technical elements, consequently forming the system, is the fundamental premise of organizational network theory. Understanding the complexity of the system, understood as a whole composed of a set of elements working together as part of the mechanism or connected networks, is therefore not possible without a deeper penetration of the network of relationships and connections that make up a given system (Barabási, 2016). The socio-technical system itself includes technical elements such as processes, tasks, techniques, knowledge, and resources used in creating and proposing values. Whereas, social elements include people, attitudes, behaviors, as well as organizational norms, principles, and culture.

Understanding the roots and characteristics of networks that bond network elements into various complex systems has become the main goal of network theory. The structure and position in the network as well as

its function (e.g., distribution, flow) play a key role and examine how the structure of the network interacts with a given process (e.g., distribution of resources or information flow). The general thesis of network theory is the assumption that the actor's position in the network determines his/her limitations and opportunities in the context of his/her achievements, behaviors or beliefs. At the group level, what happens in a group of actors is a function of the structure of connections between them.

Two concepts have become popular in network theory: the strength of weak ties (Granovetter, 1983; Granovetter, 1973) and structural holes (Burt, 2009), in which the structure and position in the network and the explanation of the relationship between the structure and results of the network play a key role. For example, the stronger the ties between a pair of people in an organization, the greater the chance for weaker links with the same third parties. Strong ties in the same social group, however, do not favor the exchange of new knowledge, access to new information, and the latest innovative trends. There may be a risk of redundant relationships and duplication of the same activities, as well as sending the same information or knowledge that is not conducive to creating value. Hence, Granovetter draws attention to bridging connections, weak ties, which are a potential source of new information and knowledge.

The second concept is Burt's structural holes (2009). It mainly refers to the shape of the actor's ego network and the pattern of relations in at least two unrelated social networks. Hence, it is beneficial for the ego to connect with many other networks whose actors have no relationship with the given networks. Then it means a larger number of so-called structural holes. In the context of this redundancy, an ego network with many structural holes is likely to receive more new information.

The theory of networks in which social networks play a dominant role is called the social network theory (Kilduff & Tsai, 2003; Wasserman & Faust, 1994). It explains the interpersonal mechanisms and social structures that exist between interacting individuals (groups, departments within an organization, and between organizations). It allows one to determine how a person's, group's, or organization's relationships affect beliefs or behavior. Kilduff and Tsai (2003) diagnosed three areas from which social network theory derives its assumptions:

- imported theories and concepts (mathematics, especially graph theory; social psychology: equilibrium theory and social comparison theory);
- native concepts (heterophilia: strength of weak ties, structural holes; structural roles: structural equivalence, structural cohesion, role equivalence);

- organization theories (resource dependency theory; situational theory, population ecology theory; transaction cost theory, knowledge-based view).

Social network theory indicates a network of individual and collective relations understood as a resource that is exchangeable for other goods or services. Contextual influences of social ties and networks on participants' activities are a central mechanism by which networks provide participants with structural resources and benefits, creating social capital (Granovetter, 1985). This mechanism is called embeddedness (Moran, 2005). Because entities in organizational contexts are closely embedded in a network of interpersonal relationships, their activities are inevitably subject to the consequences of network embeddedness. The embeddedness means the history of interaction between network members that leads to the routine and stabilization of network connections. The embeddedness results from personal ties and is a function of configuring the entire network. It takes two forms: relational and structural embeddedness.

In strategic management and organization theory, the occurrence of networks as a new model for testing competitiveness and value creation has given rise to the consideration of the network paradigm (e.g., Borgatti & Foster, 2003). The components of this paradigm are three reference theories (Czakon, 2011): sociological theory of social networks, resource theory, where the network is understood as a strategic resource, and the theory of transaction costs as a way of coordinating cooperation. Emirbayer and Goodwin (1994) identified three paradigms of the social network that researchers refer to: structural determinism, structural instrumentalism, and structural constructionism. In structural determinism, there is no room for human agency and free will, culture, actor beliefs, values that could play a role in social processes, and historical change. People are seen as biological organisms, and the social phenomenon is a property of the social network (organization). In turn, structural instrumentalism allows agency as a rational choice, instrumental activity stimulated by material benefits and maximization of benefits. In structural constructionism, similar to instrumentalism, there is causality in social changes, and actors are motivated by non-material (values, norms, obligations arising from the cultural rootedness of the individual in a given community count). These three paradigms de facto define the relationship between culture, agency and social structure.

Organization management can be characterized as the science of managing relationships in networks to achieve organizational goals such as high performance and value creation. In organization and management, network theory is used to understand various research problems related to the formation of dependency networks in project management (Mok, Shen, & Yang, 2017;

Ruiz-Martin & Poza, 2015); human resource management (Soltis, Brass, & Lepak, 2018); professional achievements and promotions (Burt, 1992); multilevel organizations (Moliterno & Mahony, 2011) and many others.

There is extensive literature regarding the use of network techniques in organization and management. The use of a network approach can be observed in the context of knowledge management. Tsai (2002) analyzed formal and informal coordination mechanisms affecting knowledge sharing in a large organization that has many cooperating and/or competing parts. Sharing knowledge between individual units can increase overall organizational possibilities through collective learning and synergistic benefits resulting from the process of information exchange, know-how and local knowledge. Knowledge is asymmetrically distributed in various units within an organization. Without effective coordination, knowledge is not evenly distributed throughout the organization, hence reducing constraints resulting from hierarchy and centralization can increase inter-individual social relationships, leading to an internal flow of knowledge. Indirect transfer of knowledge within an organization in the Currie and White studies (2012) is characterized by a professional hierarchy. Professional affiliation and power differentiate the impact resulting from the mediation of knowledge at individual and group levels in the organization. Social structures can be considered at any level of the organizational hierarchy. The development of knowledge is reflected in both formal and informal organizational procedures that create social relationships which go beyond the professional hierarchy. Thanks to this, the transfer of knowledge becomes more widespread. Social network analysis and structural models are used to identify alternative mechanisms of influence (Meyer, 1994), such as interactions (contact) and norms determining group cohesion, occupying structurally equivalent positions or roles. The relative effectiveness of these different structural configurations in predicting similarity in perception and attitudes about the organization is assessed. These mechanisms are analyzed in the perspective of the process of social information processing in the organization.

The above, a brief overview of research interests, indicates a diverse use of the network approach in organizational research and management, creating the foundations for building network theory. Some of the articles were empirical or theoretical. In empirical studies, authors most often used centrality metrics, and at the level of the entire network -density and centralization. They also used structural gaps and clique analysis as part of the network structure.

4. Complexity theory

Complexity theory in an organizational context assumes that organizations are created by complex networks of relationships that respond dynamically to external pressures and contexts. Complexity occurs through relationships in networks in which individuals influence others, who in turn influence others in the network. This theory describes the interactive processes between individuals in a dynamic network, in particular, collaboration, decentralized decision making, initiative, or leadership (Arena & Uhl-Bien, 2016). Complexity theory embodies a non-linear system-oriented perspective that attempts to conceptualize and understand organization systems at many levels (micro, meso, macro), fully recognizing the dynamic relationships and influences that operate within and between aspects of these levels of systems in time and space. This has implications for both organization and management resulting from the non-linearity of interdependent elements. This means that an organization cannot be studied or understood in terms of its isolated components or what the organization does in isolation (Anderson, 1999).

There is some kind of pressure in the organization caused by these influences and interactions causing changes in the organization or the network. Complexity theory provides a framework for understanding the basic behavior of interdependent entities in the network because it is a study of the dynamic symbiotic and adaptive interactions of entities affected by internal and external forces. There are dynamics acting on the actors in the network (Gear, Eppel, & Koziol-McLain, 2018). First, the network does not need external influences to create order in the network; rather interactions in network create order. Secondly, when the network evolves or interacts, there is a tendency to destabilize. This destabilization causes a new and changed organization. Finally, the future is unknown. Network interactions are influenced by other network interactions that are random and complex, causing even more complex and unpredictable interactions.

Complexity theory is needed in situations where there is environmental variability, complex dynamics, and uncertainty, which is the domain of most socio-technical systems, including organizations. One of the most basic elements of this theory is the importance of interaction between individuals and between complex adaptive systems (McElroy, 2003), understood as groups (aggregates) having adaptability (Uhl-Bien, Marion, & McKelvey, 2007). The required complexity can be seen by measuring the adaptive voltage in the system, looking at the diversity of responses compared to the diversity of the stimulus. Element simulation can predict intentional and accidental changes, looking at the network as a complex adaptive system where learning occurs through interaction and change (Carley & Gasser,

1999). Complexity theory is now seen as a valuable source of insight into understanding the functioning of humanities, the nature, and role of learning in such organizations (Chiva et al., 2010).

Interaction is an important part of the network that is subject to moderation. It can be part of positive (enhancing actors) or negative feedback (suppressing effects). The interaction between the actors is not equal; not all actors have the same impact on others or the network. In addition, the complex dynamics occurring in the organization are due to the interaction between diverse actors, since heterogeneity between nodes encourages learning. Interaction can involve the flow of information that is interdependent on the degree to which people share information based on interdependent tasks. Interactions are limited. For example, a given (human) actor cannot behave in a certain way without violating someone else's preferences or needs. Dynamics are putting pressure on the system to find solutions for its interactive, interdependent problems. Interaction and interdependence are, therefore, factors driving the dynamics of the socio-technical system in which interacting social and technical elements play a dominant role (Ujwary-Gil, forthcoming). Resources are also inherently limited, while decisions on resource allocation, and too much or too little delivery, can have a dramatic impact on the system. Because actors affect networks and networks affect systems, so too does the environment affect systems, networks, and actors in networks (Mitleton-Kelly, 2003). By using this understanding of actors, one actor with many connections with other actors, crossing the boundaries of the network, can have a much greater impact on the system than an actor with only a few connections.

The theory of complexity becomes helpful in understanding the complexity of the studied socio-technical system and its interactions, which lead to non-linear results, self-organization and evolution – all of which, however, makes an understanding of the complex system impossible (Cilliers, 2000). However, the theory of complexity may be appropriate to study the activities of an organization and management, because organizations develop and change as a result of the interaction of actors; such a change is referred to as evolution (Salem, 2002). An important point about the relationship between complexity and organizational change is that the theory of complexity is not trying to assess whether a given change is positive or negative; it simply illustrates how and why change occurs.

Newman (2010) stated that a complex system is one that consists of many interacting parts, often called agents, which show collective behavior that does not result from the trivial behavior of individual parts. A complex system is one that shows a high degree of systemic interdependence, which, among other things, leads to non-linearity, creating a new order and other surprising dynamics. The following properties of complex systems exist:

1) the interaction of many different elements or parts; 2) non-linearity in which the system's inputs and outputs are not proportional, a change in X does not always result in a predictable change in Y; 3) connectivity between components of a complex system is usually high or dense (connection structures define the system more and the meaning of the system lies in the flow through the network); 4) autonomy and adaptation indicate the lack of top-down centralized control to coordinate the entire system. In complex systems, components have some autonomy due to the ability to adapt to local conditions. Bulutlar & Kamaşak (2014) listed three features of complex systems: 1) the whole is greater than the sum of the parts, therefore dividing the whole does not facilitate its understanding; 2) understanding of all input data does not necessarily predict the results generated by complex systems; 3) the behavior of complex organizations that are on the brink of chaos is neither predictable nor unpredictable.

4.1. Complex adaptive systems and self-organization

Complex systems organize themselves from within, reacting together and adapting to external stimuli relative to the system boundary (e.g., organization). The term complex adaptive system (CAS) (Gell-Mann, 1995) is often used as a metaphor to counteract the more mechanistic description of organizations as machines (Morgan, 1996). Complex adaptive systems generally refer to open dynamic systems that are able to self-organize their structural configuration by exchanging information, energy, and other resources in their environment. They can transform these resources to support operations (Larson, 2016) and are self-organizing systems that have little or no direct control over these systems. Thanks to organic interactions within and between systems that constantly occur when system components learn to adapt to external forces, these systems are also dynamic. Complex adaptive systems tend to transform into new states as systems learn to adapt to the new environment; this is called "appearance" in the literature of complexity. The behavior of a complex adaptive system depends on the openness of the organization to the environment in the design of the organization, technology, culture and strategy (Papastefanou, 2010).

The theory of complexity shares some concepts of organization and management theory, including self-organization, emergence, and adaptation (Mitchell, 2009). Self-organization is a process in which elements of the system spontaneously communicate with each other and cooperate in coordinated joint behavior (Stacey, 1995). Thanks to self-organization, the group's behavior emerges from the collective interaction of all people. The principles of self-organization generate a new approach to management

because the emphasis is on adapting to rapid and continuous change. The consequence of this is shifting key management issues from maintaining control to supporting the emergence of new management principles based on interdependencies between agents (actors). Management has been designed as a trigger for the behavior of a complex adaptive system, and thus as an orchestrator for agents (actors), their functions, activities, capabilities, and resources. In this approach, managerial roles are emphasized, not positions in the hierarchy. The emphasis on management has shifted from structures to people. The theory of complexity emphasizes the holistic approach to management, in which managers see the relationship between the organization and the environment, and information flows are used to coordinate the whole (Papastefanou, 2010).

All complex adaptive systems consist of, and are maintained by, the flow of energy (e.g., information, knowledge) and resources from the environment. Emerging structural configurations or relationship patterns make it possible to achieve the goal while achieving the goals recreates the configuration. Therefore, a high level of interactivity is necessary for coordination that takes place in extensive communication networks. Through interaction, knowledge is acquired, created or shared, and information is disseminated to ensure productivity and efficiency (Ujwary-Gil, 2019). Self-organization does not create structures in the traditional sense. Rather, it leads to communication networks that increase interaction and can be hierarchical. Therefore, the organization is based on patterns of relations between actors. Who communicates with whom largely depends on the tasks being carried out. Relationship patterns arise as a result of synergies created between actors or agents perceived as system components. Synergy improves the flow of tacit knowledge, which culminates in a result greater than the sum of its parts.

5. Common areas of network and complexity theory in organization and management

Combining network theory with the theory of complexity is a way of modeling complex socio-technical (adaptive) systems and their evolution depending on the types of interactions occurring between actors (agents) (see Figure 1.4). Network theory, with which the theory of complexity is more closely related, examines the properties of a node network and the functions of its connections with other nodes (e.g., organizations as departmental and human networks; industries as organization networks). Network models often try to capture the essence of interaction between multiple agents in a system. Economic and social systems, from individual organizations to the global economy, all involve many actors interacting in a complex way. These interactions

are iterative, in the sense that the results of one period become the starting point of the next, which causes path dependence. The relationship between the theory of complexity and network theory becomes apparent when we consider that nodes in the system can be people in a department, departments in an organization, or organizations in a society or business ecosystem. A relationship can identify social and economic entities as nodes in the system and associate these nodes with each other in terms of variables such as prices, income or investment decisions. Thanks to the network approach to organizational and management analysis, it is possible to identify patterns, clusters, and relationships through data sets related to human behavior. As part of the theory of complexity, identified patterns, clusters and interactions become the subject of in-depth research. Morela and Ramanujama (1999) attempted to apply the theory of complexity to the theory of organization. To the theory of system complexity, the authors included the concepts of the evolution of the organization as a biological organism and the analysis of the social network, especially the combination of graph theory with the study of self-organization in the network.

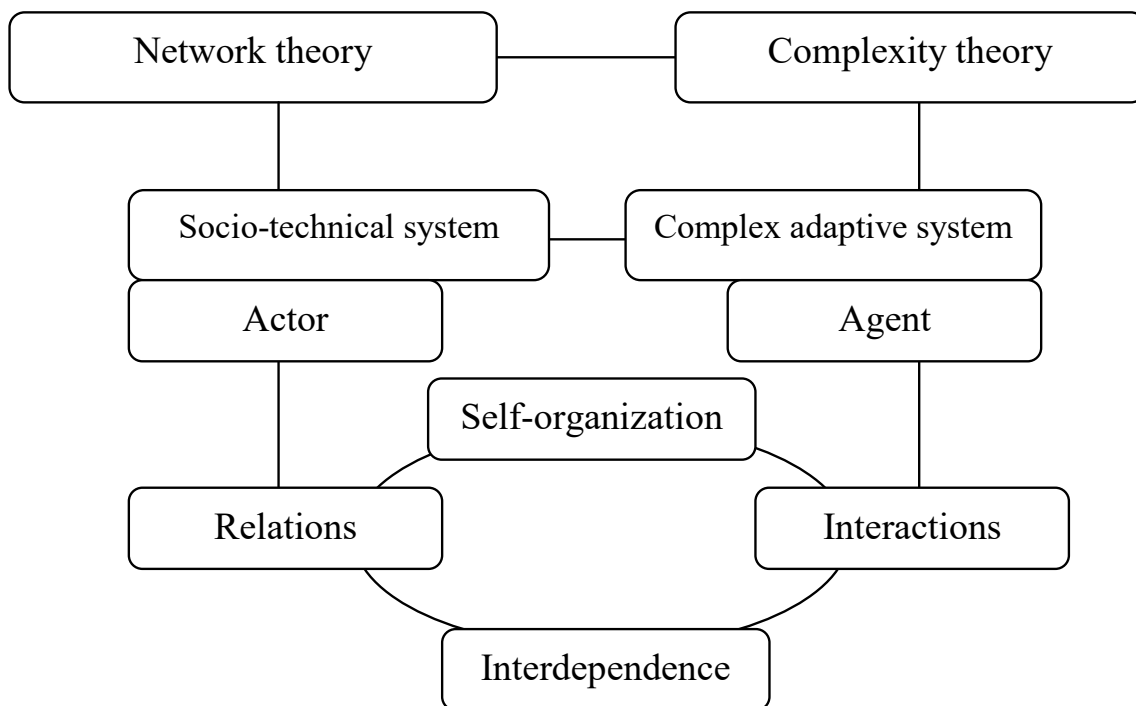


Figure 1.4. Network theory and complex theory – common areas

Both theoretical approaches to the system (organization) are based on common elements of the description of the complexity of the organization and management. These include (along with many others):

- system elements (actors/agents) that can be animate and inanimate (e.g., organizations, people, information, knowledge, resources, activities, business processes);
- non-linearity characterizing the actor/agent interaction created by the unpredictable reactions of the actor/agent to the actions of others. Non-linearity and positive feedback loops are the basic characteristics of organizational life (Stacey, 1995). The organisation's interactions with each other and with other entities in their environment, such as consumers, employees, government and financial institutions are strategic in the sense that the decisions of one actor take into account and anticipate the reactions of others, and thus reflect identified interdependencies;
- self-organization as the spontaneous appearance of new relationships, forms, and behavior patterns resulting from repeated interactions of actors/agents in time;
- the emergence of new system properties or levels of a complex organization generated by the self-organization of agents;
- a complex adaptive system as endogenous, non-linear dynamism created through interactions between various factors (internal and external), which enables adaptation and spontaneous, unpredictable self-organization.

6. Limitations and directions for further research

The article is one of the first attempts to link network theory with the theory of complexity on the basis of theoretical considerations related to the science of organization and management. It certainly requires a more detailed exploration of literature sources, perhaps including more indexing databases. The choice of the Web of Science and Scopus databases was primarily dictated by the selection of high quality, peer-reviewed references. This article focuses mainly on the basic elements of network theory and complexity theory, which are particularly evident in these two approaches. And these are: the system (organization as a socio-technical system and a complex adaptive system), system elements, actors/agents, relationships, interactions, interdependencies, and self-organization. It can be assumed that these theories can be a source of practical implications in terms of organization interpretation and management. Particular emphasis should be placed on the use of social network analysis (organizational, dynamic) not only for identifying dependency networks, but for empirical verification of a complex system, which is the organization (micro-level), inter-organizational relationships (meso-level), or the business ecosystem (macro-level) and processes taking place in them.

New types of models in organizational and management sciences require the combination of empirical observation with simulation-based on computing agents. Network theory and complexity theory creates promising directions for the development of such models and instruments that will help managers predict results based on changes in network configuration (adding/removing nodes (relationships) in the system). In a similar way, managers can indirectly influence the appearance of adaptive behavior by changing the distribution of agents in the network. The theory of organization and management does not yet have sophisticated tools that would allow the analysis of the behavior of complex adaptive systems or new techniques for modeling non-linear behavior.

Morçöl (2013) identifies networks and complex systems by claiming that systems are networks and networks are systems, which can promote conceptual and methodical borrowing. Networks, with the ability to map actors based on their relationships, provide a new way of theorizing and modeling many actors, and analyzing their impact depending on their interrelationships. An organization is a complex adaptive system in which management must reduce complexity while enhancing information diversity. According to this approach, in a turbulent environment, it must develop various competencies, especially in the field of innovation, to create or maintain relationships with various stakeholders.

The directions of future research, therefore, favor the formulation of new research questions:

- How can network theory methods and techniques be used to operationalize a complex adaptive system?
- In what new research areas could both network theory and complexity theory, be used as a source of interpretation, as well as empirical verification of organization and management problems?

7. Conclusion

Network theory and complexity theory are some of the most interesting approaches to organization and management. They are also a great example of the interdisciplinary nature of science, as well as a source of interpenetration of concepts and methods for understanding the same fragment of reality. The prospects for the development of both network theory and complexity theory in the context of organization and management are promising, especially if we consider the scenarios of creating new models and instruments for their operationalization, whether thanks to sophisticated network techniques and algorithms or using artificial intelligence solutions. The aim of the paper was to review related elements of network theory and complexity theory in explaining organization and management using a narrative review. Two research questions

were formulated for further exploration. The article may be an inspiration to undertake more in-depth research in this area in the future.

Acknowledgment

The work was carried out as part of statutory research. Title of the research task (in Polish): Teoria sieci i teoria złożoności w kontekście nauk organizacji i zarządzania.

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