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Structural pathologies in inter-organizational networks and their consequences

Joanna Cygler^{a*}, Włodzimierz Sroka^b

^a *Warsaw School of Economics, Institute of Management, Niepodległości ave.162, 02-554 Warsaw, Poland*

^b *Academy of Business in Dąbrowa Górnicza, Faculty of Management, Informatics and Social Sciences, Ciepłaka street 1c, 41-300 Dąbrowa Górnicza, Poland*

Abstract

The literature about pathological phenomena within the inter-firm networks is very limited. Therefore the goal of this paper is to draw attention to the structural factors which create pathological situations in the networks and to the threat these situations pose to the development of the network system. We analyse structural pathologies associated with the position in the network, its density as well as a type of links between the companies in the network. Our analysis begins with a review of the benefits from the functioning in the network. We then presented the major structural pathologies in the networks and their threats. Finally, we described the consequences of pathologies which can be considered on three levels: the company, intra-network relationships, and the network as a whole.

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1. Introduction

The issues of the creation and growth of network connections have been the subject of scientific research for more than 120 years (Simmel, 1890). However, the boom in research focusing on multilateral relationships (especially in the economic and organizational dimensions) dates back to the mid-twentieth century, being particularly intense over the last thirty years. This is mainly a result of the growing importance of cooperative

* Corresponding author. Tel.: +048-022-5648502; fax: +048-022-8495312
E-mail address: cygler@sgh.waw.pl

relationships (including networks) to the success of the company's growth strategy. Network connections have become a necessary condition for survival in a highly turbulent and globalized environment. Literature in the field of management mainly focuses on the creation of network connections (Larson & Starr, 1993; Iacobucci & Hopkins, 1992), taking into account multilateral strategic alliances (Child et al., 2005; Sroka & Hittmár, 2013), both between competitors (Bleeke & Ernst, 1993; Gomes-Casseres, 1996; Cygler, 2010; Brandenburger & Nalebuff, 1996), and between suppliers and customers (Provan, 1993; Yoshino & Rangan, 1995; Dyer, 1996).

Most researchers focus their research on the essence of network formation and the competitiveness of a company resulting from its functioning within a multilateral system (Jarillo, 1998; Dunning, 1995; Gulati, 1999; Wassmer & Dussauge, 2011; Michaelides et al. 2013). Network benefits arise both from collective actions, as well as the opportunity to cooperate with particular partners (which possess the key resources needed to create competitive advantage). In recent years, however, there are also studies which increasingly concentrate on the phenomena and processes preventing the generation of those benefits (Dyer & Hatch, 2006; Vrgovic et al. 2012; Hicklin, 2004; Leick, 2011).

The structural abnormalities require special attention as they may lead to the emergence of pathological situations within the inter-organizational networks. The danger of structural pathologies is confirmed both by the size and diversity of the risks which arise. They may indeed bear fateful consequences, both for the individual companies as well as for the entire system. The goal of this paper is to draw attention to the structural factors which create pathological situations in the networks and to the threat these situations pose to the development of the network system. The problem is seemingly significant because of its importance to the success of the network and its member companies, as well as the comparatively little attention which researchers have thus far devoted to structural pathologies in inter-organizational networks. Indeed the literature discussing the issues of structural pathologies is very limited, even snapshot; thus, our study aims to fill this gap. We commenced our analysis with a review of the benefits from functioning in the network; we then presented the major structural pathologies in the networks and the threats caused by these irregularities. Pathological situations in inter-organizational networks lead to certain consequences which can be considered on three levels: the company, intra-network relationships, and the network as a whole.

2. Benefits of functioning within networks

Companies decide to function within network structures because of the benefits which are generated therein. These benefits can be distinguished according to the theory of transaction costs, game theory and the resource approach. Organizations will seek to create multilateral network connections if cooperation creates greater benefits than the market transactions or hierarchical structures (Williamson, 1991). Functioning in the network reduces opportunistic behaviour (freeriding) through the repeatability of the transactions and the resulting increase in the level of trust. Network connections reduce operating costs in a highly turbulent environment in which independent functioning is subject to high transaction costs (Walker & Weber, 1984). In such a case, the costs of functioning in the network structures are lower than those of independent activity. At the same time, the networks are burdened by much lower bureaucratic costs, compared to those in hierarchical structures (Park, 1996). Multilateral network links reduce transaction costs but also increase transaction value, which may lead to an increase in the bargaining power of the network members compared to the other participants in the market (Clarke-Hill et al., 2003).

Cooperation in networks is regarded as a non-zero-sum game, in which participants seek to generate common benefits (Jarillo, 1998; Brandenburger & Nalebuff, 1996). Through repetition and reciprocity of the transactions, the time horizon of the projects is extended (strategy *tit for tat*: Rapaport, 1988, *the shadow of the future*: Axelrod, 1984). Inter-relationships within the network stimulate organizational flexibility and the actions of the parties involved, allowing for specialization, a higher return on investment than the costs of investment itself, economies of scale, scope and synergies. Inter-organizational networks facilitate and accelerate the internationalization of companies as well as their industrial diversification (Dunning, 1995, 1997). It is thus easier to overcome market and cultural differences. At the same time, the risks of investment borne by the company are reduced.

Networks also generate benefits by reducing the risk associated with activities in the field of R&D. Apart from the cost reduction and opportunities for the faster, cheaper and easier acquisition of new technologies, networks promote the implementation of quality, technology and market behaviour standards (Cygler, 2002; de Man, 2004).

In light of the resource concept, functioning in the inter-organizational networks creates an opportunity to obtain valuable resources which otherwise would be more expensive, or even impossible, to acquire (Zaheer & Bell, 2005). Networking allows companies to obtain both tangible and intangible assets. Due to the turbulent environment and the phenomenon of hyper-competition (D'Aveni & Gunther, 1995), the companies seek resources which are more difficult to copy and substitute (Henderson & Cockburn, 1994). Therefore, they are keenly interested in intangible resources within the framework of network connections. Access to the information is regarded as the most basic resource resulting from multilateral cooperation (Gulati, 1999, 2007; McEvily & Marcus, 2005). This applies to technical, market and organizational information.

Co-management of resources in the network mostly includes the transfer, co-creation and the common utilization of the information and knowledge generated. Both explicit and tacit knowledge is transferred within the network (Polanyi, 1966). Explicit knowledge can be characterized by qualitative and quantitative standards. It is treated as formal and systematic knowledge, whilst tacit knowledge is informal, non-verbal and intuitive. It is difficult to express such knowledge through formal means of expression and communication. Thus, the transfer of tacit knowledge is not unique, and its effects are neither clear nor abrupt (Sroka et al. 2014). However, this type of knowledge is also considered as the basis for the creation of competitive advantage, especially with reference to the resource concept of the organization (Barney, 1991).

Both the specificity of the knowledge transferred and the process of the knowledge transfer itself require the appropriate competences from the parties involved. The transfer of knowledge requires the parties to have relevant qualifications, such as: innovation (Sankowska, 2013), creativity, openness to change, the ability to implement knowledge, the absorption of the knowledge acquired (Zahra & George, 2002), the ability of knowledge diffusion (Minbaeva & Michailova, 2004), or the competence of cooperation (Lambe et al. 2002). The skills and competencies required for the effective transfer of knowledge within the network can be acquired through multilateral cooperation, or alternatively can be jointly created. Network links also create an opportunity for mutual learning, as well as the acquisition of new skills, techniques and technologies. This process is not limited to the transfer of knowledge, but also includes the creation, absorption and utilization of mutual knowledge (Goerzen, 2007). Collective learning therefore occurs within the network.

Companies within the network also create new resources as a result of cooperation, which allows them to generate a collective competitive advantage which is unique and very difficult to copy (Dyer & Singh, 1998). There are four main principles which lead to cooperation (including multilateral) in the resource concept: the diversity of resources, the imperfect mobility of resources and the reduction of *ex-ante* and *ex-post* competition (Peteraf, 1993). In terms of strategic benefits, cooperation within the network is an effective pathway to the acquisition of deficit resources. The parties seek to maximize the benefits not only to resources which are co-managed, but also from the relationship between common resources and resources managed on an exclusive basis (Tsang, 2000). Networks also restrict access to scarce resources for companies not associated in the network system. It means that these companies have to incur significantly higher costs to generate competitive advantage, which would imitate or function as a substitute for the collective competitive advantage of the network. This collective competitive advantage is applied both at the network level and at the level of its members.

Functioning in the network system generates undeniable and tangible benefits for the members thereof. These benefits are noticeable both in terms of organization (improving efficiency and flexibility, improving the quality of human capital, and organizational restructuring), technical and technological (innovation growth, access to new technologies and skills and competencies related thereto (Cowan, 2005), market (commercialization of new technologies and products, development of product and market policies, internationalization, diversification, market innovation, strengthening its market position in the industries, reduction of market risk (Baum et al. 2003; Gemunden et al. 1998) and financial (the rationalization of costs and investments, increase in the company's value, financial benefits of specialization within the network, better stability and financial situation) (Scalera & Zazzaro, 2011). Through cooperation within the networks, the companies can gain tangible and intangible assets which would otherwise be inaccessible. Generally, functioning in the network structures causes the reconfiguration of the members' business models, which generates a greater chance of success in the turbulent environment from a long-term perspective (Lecocq & Yami, 2002).

3. Structural pathologies of inter-organizational networks

The richness of the available literature in the field of management highlights the benefits generated by networking, covering a wide range of growth opportunities for companies which function within the network structures. In practice, however, multilateral cooperation does not always bring such significant benefits; indeed a noticeable disproportion in the benefits of network membership may be observed. Limitations may result, *inter alia*, from the specific environment and the emergence of phenomena and pathological processes. This pathology should be considered as a morbid state of the unit which differs from the correct functioning (Kopaliński, 1970). Most often, pathology (as the science of the disease phenomena) relates to the natural and medical sciences. However, this term is more frequently used in the social sciences, and especially in the field of management. Although pathologies within organizations have become the subject of (very preliminary) research (Kieżun, 1971; Pasieczny, 2012), the issue of irregularities in inter-organizational networks should be regarded as a relatively new research area.

Pathologies in inter-organizational networks may arise in different areas of the constellation; however those of a structural nature are probably the most significant. They generate major conflicts within the system; moreover, a lot of benefits from the functioning of the network are thereby eroded. They are, therefore, a significant threat to the success of the network. It should be noted, however, that networks are very dynamic structures and various forms of constant interaction and changes are vital for their survival and growth. It is mostly the result of tasks of the networks. It is easier to execute some tasks with the certain network members, whilst the others require a change of the position of members (central vs. peripheral) or even a completely new network structure. This dynamic and changing nature of the network causes that pathologies may have a substantial negative impact on the growth of the network. It may impede (or even preclude) the execution of basic tasks of the networks. Some scholars claim, however, that the process of interaction in networks may also be in various forms of conflict and have the positive impact on network development (Håkansson et al. 2009). They also are of the opinion that business interaction is a substantial process and is likely to involve over time the adaptation or transformation of aspects of the activities and resources of either or both counterparts and of the actors themselves, leading to their interdependence.

Structural pathologies are relatively easy to observe and diagnose in terms of their field of destruction. They are also dangerous because they cause a chain reaction through the appearance of irregularities.

Arguably the most important structural pathologies in inter-organizational networks are those related to the position of the companies in the system, the density of the network and the choice of links (ties) in the network. Zaheer & Bell (2005) claim that the resources (i.e. the quality and relevance thereof) possessed by the network members should decide on the position in the network structure. The more valuable the resources possessed by the company, the more favourable its position in the network. In turn, Gnyawali et al. (2006) emphasize the importance of multiplicity of the partnerships formed by individual companies. In their view, the identity of the partners is also important. It relates mostly to relationships with the key companies in the network possessing valuable assets, both tangible and intangible. Such a privileged position in the network is combined with the obtainment of specific benefits, allowing for better use of growth opportunities. A privileged position in the network also promotes creativity and innovation of the key companies in the network (Galunic & Rodan, 1998). Thus, companies are more competitive against non-members of the network

Business practice indicates that an informal network of social relationships appears within the network along with more formal links. Social networks are of an integrated nature and support business relationships between the companies. Trust between the member companies therefore increases, and a growing tendency towards cooperation can be observed. Within healthy inter-organizational networks, formal (economic) relationships have a higher strength of impact than informal (social) ones. Pathological situations can arise in the network, if interpersonal relationships dominate business relationships. Indeed, situations have been known to arise in which the economic success of the company is determined by interpersonal relationships rather than achievements. An example is the phenomenon widespread in Russia and known as the *blat* (Ledeneva, 2009) which is based on an informal exchange of favours which facilitate the achievement of personal and business goals (Oleinik, 2004). These solutions apply to different spheres of life and involve different representatives, such as: the government, army, police, health service, or politics. The more links within the *blat*, the easier one can avoid formal procedures and gain a more favourable position in society and business (and thus within the network). People with a wide-ranging *blat* often go unpunished

for their actions. This phenomenon is viewed differently according to location, in that Russian business treats it as an element of “folk”, whilst the Western world views it as a kind of corruption.

A similar phenomenon, known as a *guanxi* network, can be observed in China (Cygler, 2011). The term “*guanxi*” is most frequently defined as a network of informal interpersonal relationships and the exchange of favours established in the operation of a business (Lovett et al. 1999). The strength and nature of the relationship depends on three groups of factors: a) the relationship resulting from familial ties and place of birth (family relationships, childhood); b) relationship by nature (locality, classmate or alumni, relationships with teachers, masters, co-workers, including supervisors, colleagues from the branch); and c) acquired relationships (mutual friends, friends, sworn brotherhood). *Guanxi* is also perceived as a process of social interactions associated with the achievement of a given goal. Functioning within the *guanxi* is based on connections, in that the more relationships you have, the better you are perceived by those around you. Research carried out by Lu et al. (2009) indicates that an increase in the number of members and links within the *guanxi* gives rise to an overall increase in the trust level between units (individuals and companies). It has a measurable effect on the results (especially economic) of the parties and the general satisfaction arising out of the relationship. The core of relationships within the *guanxi* is based on personal relationships. They have, however, a significant impact on contacts between organizations. Research conducted by Szeto & Wright (2006) argues that such personal links are reflected in the behaviour not only of individuals but also organizations. The authors examined 850 top managers from public and private companies, of whom 94 percent responded in the affirmative when asked about the need to grant favours to members of their *guanxi*, even if this may bring about negative consequences for their organizations.

If informal structures have a greater impact than formal ones, certain anomalies and threats may appear within the network. The centralization and anarchy of decisions and actions taken in the network is enhanced. This causes polarity amongst the network members and the establishment of two camps: ‘sharks’ and ‘roaches’. Sharks are companies which achieve significant benefits (e.g. through social connections and the exchange of pleasantries), and dictate the rules of the game in the network. Their willingness to share knowledge and information with others decreases, because correlation becomes weaker, and the effects of activities increasingly depend on multilateral cooperation within the entire network. In turn, roaches are companies which do not play a greater role in the network structure. They give more than they take, and they need to adapt to the rules of action as defined by the sharks. Subsequently, there is a considerable disproportion in the distribution of benefits from the functioning of the network. Trust in business partners declines, conflict appears, and opportunistic behaviours are intensified.

The danger of competition between members of the network increases, and retaliation for such actions can be extremely aggressive (Chen, 1996). However, the privileged position of the sharks means that the actions of roaches (both initiated and reactive) are moderated. It further enhances the feeling of frustration and helplessness of the latter. Limited trust also brings about an increased need for control of intra-network transactions, which generates additional transaction costs across the entire system. General animosity requires additional collateral and assurance.

Besides the risks associated with the pathologies of the position in the network structure, there are also threats resulting from the density of the network, which determine the number of links in the system, allowing direct contact between the partners. A dense network allows for the faster transfer of information and knowledge between its members. The numerous links also allow for the flow of expertise related to the acquisition, transfer and utilisation of information (Coleman, 1990). Companies involved in a dense network are more active in the creation and transfer of knowledge (Uzzi, 1997). In addition, the relationships in a dense network allow the joint development of standards of behaviour and the more rapid sanctioning of any deviations from these standards (Walker et. al., 1997; Burt, 2000) thus enhancing the reputation of the entire network. A dense network also weakens the central units of the network which is regarded as an additional benefit. The companies which act as the key lose their advantage resulting from exclusive or privileged access to the valuable resources of the network. Therefore, it can be expected that by increasing the number of multilateral relations in the network, its structure will gradually flatten, through the weakening of key companies.

The limitation of autonomy of partners is another feature of a dense network. Structural autonomy occurs, if there are structural holes in the network. Burt (1992) pointed out that if the company is linked to others which do not have direct contacts with each other (in other words, if a structural hole exists), it has structural autonomy. It then controls the partners and resources which flow within the framework of direct links. Companies with more structural

autonomy are more competitive than those characterized by lower structural autonomy (Gnyawali & Madhanavan, 2001).

However, the dense network in its most extreme form may lead to the closure of the network. In closed networks, all members are mutually linked (Coleman, 1990). Access to the information within the network is comparable for all members; but the same information is available within the circuit, ceasing to be unique, which reduces the competitiveness of the companies. In addition, we can observe the growth of competitive behaviour between the members of the system with an increase in network density. The increase of aggressive behaviour precipitates the brutalization of reactions to this behaviour. Therefore we are faced with the syndrome of a “too small aquarium”, in which the limited space intensifies the aggressive behaviour of its inhabitants. Increased competitive activity, in extreme cases, may lead to internal hyper-competition. Simultaneously, mutual, multilateral interdependence stimulates the proliferation of conflicts in the network.

In turn, networks which are too loose (i.e. open) cause much longer elongation of knowledge and information transfer and the distortion thereof (Kenis & Knoke, 2002). Simultaneously, it is very difficult to mutually establish basic norms of behaviour in the network, and opportunistic behaviour can be more frequently observed. There is a growing threat of competitive activities within open networks (Raub & Weesie, 1990). The innovativeness and competitiveness of the companies are also reduced through the existence of multiple structural holes and the limitations of knowledge and information transfer (Ahuja, 2000). Therefore, the transaction costs of the functioning of open networks increase.

Structural pathologies within such networks may also be brought about due to the particular links between network members. When analysing the types of relationships within inter-organizational networks, the strength of said links is often taken into account. Both strong and weak links can exist within these networks, and can affect the relational embeddedness (Hite, 2005). The nature and condition of those links affect the potential for benefits arising out of the network. However, the strength of ties should be distinguished from the power of the network itself (Jack, 2005). Ties, both weak and strong, can have a hand in creating either weak or strong networks as a whole. This especially relates to such situations in which they are created and utilized improperly (i.e. create pathology), which threatens the benefits generated within the network.

Granovetter (1973) pointed out that the distribution of links, both strong and weak, is a function of several variables: the commitment of the parties, the number of interactions (including reciprocity) and trust (friendship). Strong links require higher commitment (time, emotional, frequency of mutual contacts) from the parties, and increased interdependence. The “closeness” of contact between members of the system determines the strength of the links (Marsden & Campbell, 1984). Strong ties more frequently take the form of formal than informal (Grabher & Stark, 1997). They often have a form of equity links (Kenis & Knoke, 2002; Capaldo, 2007). Strong links bring about an increase in the compatibility of the parties involved. They also reduce the conflicts between parties due to the frequency of contact (Nelson, 1989). Thus, the networks which have strong decision-making centres, and strong mutual ties, are characterized by lower inclination towards conflicts than structures created as a result of weak links. However, such a system of strong ties can excessively stiffen the network and reduce flexibility therein, which is important in creating competitive advantage for the system and its members.

In an extreme case, within the framework of strong multiple links, the company will essentially become a prisoner within the network, without the possibility of its own autonomous operation (Capaldo, 2007). In addition, redundant knowledge is also transferred within the framework of strong links (Hansen, 1999). Strong links can also limit the innovativeness of the companies through stiffening in the mutual relationship (Capaldo, 2007). Simultaneously, strong ties increase the likelihood of oligopolistic coordination (Galaskiewicz & Zaheer, 1999) which can generate transaction costs. In turn, the weak links take a very loose form and feature sporadic interaction mostly in the form of informal contacts, although this factor is not considered necessary. There are weak links in the network which are of a formal nature, but they take the form of non-equity links (Cygler, 2002; Kenis & Knoke, 2002). Networks based on such weak ties allow greater freedom of action for the companies involved, but accordingly also expose the companies to much larger conflicts. Weak ties are utilized to the transfer of a simple knowledge. The loose nature of these relationships means that the transfer of complex knowledge is not as effective as in the case of strong links (Bergenholtz, 2011). However, networks based on weaker ties are characterized by greater flexibility. Due to the much lower frequency of contact between the companies than in the case of stronger mutual ties, companies typically provide each other with non-redundant knowledge (Hansen, 1999).

The choice of the type of links in the network depends on its specifics. Stronger links are preferred in the networks in which complex knowledge is transferred (including non-codified or tacit knowledge). Jack (2005) has shown the existence of preference for the creation of strong links within the network, for the most part due to the features and benefits generated by such a link. Strong links will be selected if the networks operate in a highly turbulent environment. A perfect example is the change from weak links (non-equity) towards stronger links (equity) evident in the aviation sector over the last few years (Marciszewska, 2013). Enhancing the links enables companies to operate in a highly globalized, hypercompetitive and highly advanced sector.

Strong links will also dominate within the network if related to a degree of competitiveness within the network. Strong ties are the foundation of relationships between the parties in cooperative networks. In most cases, a choice of weaker links becomes an incentive for opportunistic behaviour and/or economic espionage, which consequently leads to an imbalance in the cooperative system and the erosion of the benefits arising from cooperation. In turn, weak links are selected if the relationships in the network include companies and their suppliers or customers (Mahmood et al. 2011).

The choice of the type of links also depends on the development of the technology implemented by the network members. Weak ties are preferred in order to acquire new information and knowledge (Osborn & Baugh, 1990). However, at the later stages of the development of technology, strong links become more important.

The size of the companies in the network also affects the choice of links. Large companies prefer strong ties because they believe that only the stronger relationships are able to harness the competitive and expansionist aspirations of partners. Smaller companies in the network use the weak links more frequently (Chen & Hwang, 2008). The choice of weak ties stems from the desire and the ability to maintain the organizational autonomy of smaller organizations.

In turn, a design network typically prefers weak links, although not in the initial phase of its growth. Knowledge is transferred during the growth of the system, which accelerates the process of learning (individual and collective). The parties preferably use the weak links, which provide the network and its members with more flexibility, in conjunction with the growing maturity of the network (Hansen, 1999). Strong links become a threat to design networks at the time. This means that the importance of links also changes over time. The same links may be essential for the proper growth of the network, whilst due to the strategic and development changes of the network, ties can create a pathological situation and become a growth barrier to the whole system (Baum et al. 2003).

It should be noted that the choice of links in the network is subject to both external and internal factors, which can change over time. If we take the external factors into account, the characteristics of the network environment are analysed. In turn, in the case of internal factors, the relationships between the members of the system, as well as the specificity of individual companies, are analysed. Therefore, the choice of appropriate links between the companies in the network is complex and burdened with a high risk of failure. An inadequate choice of links, instead of generating benefits, can limit them or even threaten the growth of members of the network, and in extreme cases even the very existence of the entities themselves.

When analysing the pathological situations caused by structural reasons, one should emphasize the multiplicity and commonness of the threats. Threats resulting from the structural pathologies have consequences both for the functioning of the network and its members.

4. The consequences of pathologies in the network

Pathologies cause a real threat to individual members of the network as well as to the entire system. These consequences can be analysed at three levels: those of the company, intra-network relationships and the network itself (Figure 1). The level of a company can be linked with greater consequences of such pathological phenomena. They differ in scope and strength of impact. The difficulties in the flow of information and knowledge transfer within the network contribute to the decline in the innovativeness of the network members. In a pathological network, the companies do not have access to the new solutions, whilst their competitors (functioning in healthy systems) have access to new information, knowledge and skills. In addition, the larger the network, the stronger its bargaining power. This situation, however, is also combined with higher operating costs which have to be covered by the network members. Simultaneously, structural pathologies require additional security measures, including

contractual ones. Opportunistic behaviour and an increase in competitive actions also result in higher operating costs due to the need to expand or build a completely new management structure. As a result, these higher operating costs have to be borne by the member companies.

A network, instead of generating growth opportunities for its members, may also become a ‘prison’ for the companies associated. It may expose the company to becoming stuck in poor relationships with the other entities (Gulati et al. 2000), as well as bringing about the formation of an inefficient management structure (Goerzen & Beamish, 2005). Such a situation typically has long-term consequences for such entities, because, counting on an improvement in the situation, they remain in such relationships for an extended period of time.

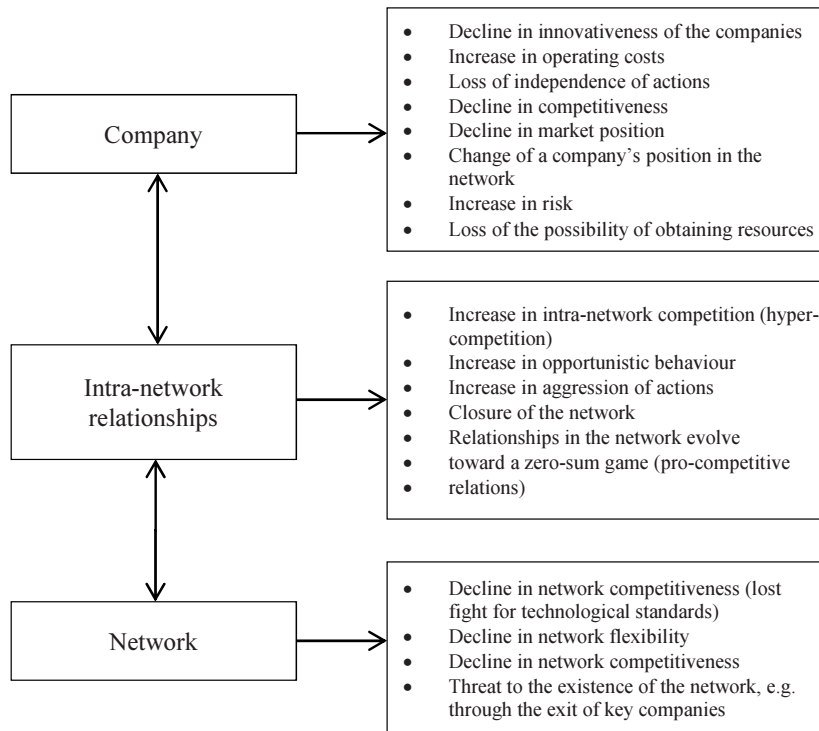


Fig. 1. The consequences of pathologies in the network

A long-term consequence of participation in negative network relationships could be a decline in the company's competitiveness. Such a company does not have access to the resources of the other members of the network, and therefore does not take advantage of the opportunities of the organizational learning process provided by the partners and thus does not develop itself. In other words, it remains in stagnation. This negatively affects its competitiveness compared to the companies outside the network.

In certain circumstances, a further consequence of pathological phenomena is also a radical and unpredictable shift in the power of individual network members. Such a change in the balance of power in the network may cause an increase in the risk of operation. The change of the balance of power in the network may also lead to problems in obtaining resources. It may occur as a result of problems with communication and knowledge transfer in the network, the reluctance of companies to share their resources (the principle of reciprocity does not function sufficiently), as well as a deterioration in the competitive position of those members of the network who possess valuable resources.

The consequences of pathologies at the level of intra-network relationships are also differentiated. One should remember that there exists strong internal competition within large networks which can include hundreds of member companies. This competition can sometimes take the form of hyper-competition, especially if many companies in the

network compete directly with each other. Such a set of circumstances causes a risk of conflict in the network, of which excessive levels can be harmful to the entire system. It means that from day one, mechanisms should be developed to resolve conflicts, even before such time when they come to a head (Child et al. 2005). The establishment of formal mechanisms for dispute resolution and conflict management is a factor in encouraging the exchange of knowledge and ideas between the parties (Kim & Mauborgne, 1998). One should remember that there is potential for the opportunistic activities of the parties within every network. This potential may even increase as the result of pathological phenomena. The pathology in the network causes chaos and weakens the value system (in particular the principle of solidarity). This situation is an invitation to deceitful and cunning behaviour aimed at creating a particular benefit. Such behaviour is widespread due to the lack of inevitability of any punishment; therefore, many networks implement solutions according to which a company may be exposed to certain sanctions (including removal from the network) for breaches of generally accepted standards of behaviour.

The increase in opportunism of the network members may turn into mutual aggression (e.g. guerrilla-style tactics, sneaking know-how, etc.). One has to remember that there is a shortage of resources and therefore one needs to fight more fiercely for them. In other words, if you have certain resources, you win. There are big winners and the big losers. Either you have resources, or you die.

Networks do not always evolve and grow. They sometimes cease their activities and indeed cease to exist. There are many reasons, e.g. lack of a sense of community, erosion of benefits, and the maintenance and growth of rivalry. There exists the spirit of competition, instead of cooperation, which enhances a mutual competition between the companies within the network. Sometimes the "death" of the network is slow, whilst in other cases it runs very quickly, if both parties decide to terminate cooperation. If the potential of partners and market conditions change, the termination of cooperation may be the only possible option. The consequences of pathologies at the network level, as in the case of a company and intra-network relationships, are also varied, and their effects relate to organizations grouping even up to hundreds of entities. The scale of the impact is therefore the highest under such circumstances. One should keep in mind that speed is key in the case of growing competition between networks. We observe the symptoms of an open combat in the networks with structural pathologies. Hence, the costs of coordination are very high, and the effect can be disproportionate to expenditure. The flow of information is hindered, which delays the coordination of actions. Flexibility declines and results in an inability to meet the new challenges of the market and to compete effectively with other networks as well as individual companies.

A negative effect can also be a decline in network innovativeness and a losing fight for technological standards. One of the main goals of the network, especially larger ones, is the establishment of a specific standard in the industry (e.g. Sroka, 2012). The benefits of such a situation are obvious. In turn, if the network loses the race to establish a technological standard, resulting from insufficient innovation, its negative effects are difficult to estimate. As a result, the network may even terminate its activity.

The competitiveness of the network declines as a result of reduced innovativeness and flexibility. It means less chance of effective competition with the other networks and an inability to attract new members. The result may be a drift of the network and even the liquidation thereof.

5. Conclusions

The deliberations about structural pathologies clearly indicate the diversity and strength of the threats generated within inter-organizational network to the members thereof. These pathologies both directly and indirectly threaten the growth of network structures. Pathological phenomena arising in the network generate new pathologies. This is particularly evident in the case of pathologies associated with the density of the network and the choice of the type of links. Irregularities relating to the multiplicity and the nature of the links lead to pathologies which are specific to a privileged position in the network. Simultaneously, pathologies resulting from a privileged position in the network generate threats specific to the pathology associated with the density of the network and the type of links between its members. There subsequently exists feedback between pathologies in the inter-organizational network.

Network links not only facilitate the transfer of assets (tangible and intangible), but also the proliferation of pathological situations. An irregularity which arises in one part of the system can rapidly affect another. That mobility of pathological phenomena should be taken seriously as a major and real threat to the entire network. A

lack of any quick response to signs of irregularities means that in a relatively short time a large part of the network is affected by the symptoms of disease. Any delay in such anti-crisis activities can increase the transaction costs within the network. Taking into account both the mutual stimulation of pathological situation in the network and their mobility, it can be concluded that pathological phenomena can create a network of pathology, both in terms of the area of their functioning (part or the whole network), as well as the diversity of pathological phenomena.

The structural pathologies can indeed play havoc within inter-organizational networks. The consequences presented in Figure 1 clearly indicate that structural pathologies negatively affect both the company, the intra-network relationships, as well as the network as a whole. Given these consequences, it should be noted that they threaten not only the growth of the network and its members but also its very existence. The benefits of network activity significantly erode as a result of structural pathologies. Functioning in the networks with widespread structural pathologies is very risky. At the same time, the time horizon of operations taken by the network is shortened, which leads to an increase in the aggression of reactive behaviour of other network members. In extreme cases, it can lead to a situation in which there are stronger competitive relationships in the network than outside the system. It results in higher levels of risk and operating costs. In addition, we observe opportunistic behaviour and an unwillingness to countenance the mutual transfer of existing assets and creation of new intangible assets. As a result, both the companies themselves and the network system lose the ability to create competitive advantages. The result is the high probability of defeat in the competitive fight, both at the network level as well as the individual company level. Inter-organizational networks with developed pathological phenomena become a kind of pitfall for the companies operating within them. Due to the distribution of companies into sharks (stronger, privileged) and roaches (weaker), the latter lose their organizational independence as a result of structural pathologies. The roaches bear the costs of network functioning and are dependent on stronger companies, including when making the decision to withdraw from the system itself. Thus, the network is a waste rather than a benefit for these companies.

Being aware of the inevitability of the occurrence of structural pathologies and the threats they pose to the network and its members, it seems necessary to create an early warning system against the excessive growth of irregularities. Previous empirical studies are limited to the identification of pathologies. Given the complexity of the structural pathologies and their consequences in inter-organizational networks, there is a pressing need for in-depth analysis of this phenomenon and for the development appropriate mechanisms and tools to limit the scale and impact of these irregularities.

References

- Ahuja, G. (2000). Collaboration networks, structural holes, and innovation: a longitudinal study. *Administrative Science Quarterly*, 45, 425–455. <http://dx.doi.org/10.2307/2667105>
- Axelrod, R. (1984). *The Evolution of co-operation*. Basic Books.
- Barney, J. (1991). Firm resources and sustained competitive advantage. *Journal of Management*, 17, 99–120. <http://dx.doi.org/10.1177/014920639101700108>
- Baum, J. A. C., Shipilov, A.V., & Rowley, T. J. (2003). Where do small worlds come from? *Industrial and Corporate Change*, 12 (4), 697–725. <http://dx.doi.org/10.1093/icc/12.4.697>
- Bergenholtz, C. (2011). Knowledge brokering: spanning technological and network boundaries. *European Journal of Innovation Management*, 14(1), 74–92. <http://dx.doi.org/10.1108/14601061111104706>
- Bleeke, J., & Ernst, D. (1993). *Collaborating to compete. Using strategic alliances and acquisitions in the global marketplace*. New York: John Wiley & Sons.
- Brandenburger, A.M. & Nalebuff, B.J. (1996). *Co-opetition. A Revolutionary mindset that combines competition and cooperation: The game theory strategy that's changing the game of business, currency*. Doubleday, New York.
- Burt, R.S. (2000). The network structure of social capital. *Research in Organizational Behaviour*, 22, 345–379. [http://dx.doi.org/10.1016/S0191-3085\(00\)22009-1](http://dx.doi.org/10.1016/S0191-3085(00)22009-1)
- Burt, R.S. (1992). *Structural holes: The social structure of competition*. Harvard University Press, Cambridge, Massachusetts.
- Capaldo, A. (2007). Network structure and innovation: the leveraging of dual network as a distinctive relational capability. *Strategic Management Journal*, 28, 585–608. <http://dx.doi.org/10.1002/smj.621>
- Chen, M. (1996). Competitor analysis and interfirm rivalry: toward a theoretical integration. *Academy of Management Review*, 21, 100–134.
- Chen, D., & Hwang, Y.-S. (2008). Network pattern and linkage strength in standard competition. *Business Renaissance Quarterly*, 3(4), 67–86.
- Child, J., Faulkner, D., & Tallman, S. (2005). *Cooperative strategy. Managing alliances, networks and joint ventures*, Oxford University Press, 2nd edition, Oxford.
- Clarke-Hill, C., Li, H., & Davis, B. (2003). The paradox of cooperation and competition in strategic alliances: towards a multi-paradigm approach. *Management Research News*, 26(1), 1–20. <http://dx.doi.org/10.1108/01409170310783376>
- Coleman, J. S. (1990). *Foundations of social theory*. Cambridge: Harvard University Press.

- Cowan, R. (2005). *Network models in innovation and knowledge diffusion*, In: Breschi, S., Malerba, F. (eds.) *Clusters, networks, and innovation* (pp. 29–53), Oxford: Oxford University Press.
- Cygler, J. (2002). *Alianse strategiczne*. Warszawa, Difin. (in Polish).
- Cygler, J. (2010). Co-opetition in network relations between businesses. *Organization and Management*, 139(1), 59–71.
- Cygler, J. (2011). Guanxi – chińska koncepcja sieci. *Przegląd Organizacji*, 6, 14–18. (in Polish).
- D'Aveni, R.A., & Gunther, R. (1995). *Hypercompetitive rivals*. Competing in highly dynamic environments. New York: The Free Press.
- de Man, A.-P. (2004). *The network economy. Strategy, structure and management*. Cheltenham: Edward Elgar.
- Doz, Y.L., & Hamel, G. (1998). *Alliance advantage. The art of creating value through partnering*. Harvard Business School Press.
- Dunning, J. H. (1995). Reappraising of the eclectic paradigm in the age of alliance capitalism. *Journal of International Business Studies*, 26(3), 461–491. <http://dx.doi.org/10.1057/palgrave.jibs.8490183>
- Dunning, J. H. (1997). *Alliance capitalism and global business*. London: Routledge.
- Dyer, J.H. (1996). Specialized supplier networks as a source of competitive advantage: evidence from the auto industry. *Strategic Management Journal*, 17(4), 271–291. [http://dx.doi.org/10.1002/\(SICI\)1097-0266\(199604\)17:4<271::AID-SMJ807>3.0.CO;2-Y](http://dx.doi.org/10.1002/(SICI)1097-0266(199604)17:4<271::AID-SMJ807>3.0.CO;2-Y)
- Dyer, J.H., & Singh, H. (1998). The Relational view: cooperative strategies and sources of interorganizational competitive advantage. *Academy of Management Review*, 23, 660–679.
- Dyer, J., & Hatch, N. W. (2006). Relation-specific capabilities and barriers to knowledge transfers: creating advantage through network relationships. *Strategic Management Journal*, 27(8), 701–719. <http://dx.doi.org/10.1002/smj.543>
- Galaskiewicz, J., & Zaheer, A. (1999). Networks of competitive advantage, In A.Andrews and D.Knoke (eds.), *Research in the sociology of organizations*, (237–261). Greenwich: JAI Press.
- Galunic, D.C., & Rodan, S.A. (1998). Resource recombinations in the firm: knowledge structures and the potential for Schumpeterian innovation. *Strategic Management Journal*, 19(12), 1193–1201. [http://dx.doi.org/10.1002/\(SICI\)1097-0266\(199812\)19:12<1193::AID-SMJ5>3.0.CO;2-F](http://dx.doi.org/10.1002/(SICI)1097-0266(199812)19:12<1193::AID-SMJ5>3.0.CO;2-F)
- Gemünden, H.G., Ritter, T., & Walter, A. (eds.) (1998). *Relationships and networks in international markets*. Pergamon.
- Gnyawali, D.R., Madhavan J., & He R. (2006). Impact of co-opetition on firm competitive behaviour: An empirical examination. *Journal of Management*, 32(4), 507–530. <http://dx.doi.org/10.1177/0149206305284550>
- Gnyawali, D. R., & Madhavan, R. (2001). Cooperative networks and competitive dynamics: A structural embeddedness perspective. *Academy of Management Review*, 26 (3), 431–445.
- Goerzen, A. (2007). Alliance networks and firm performance: the impact of repeated partnerships. *Strategic Management Journal*, 28(5), 487–509. <http://dx.doi.org/10.1002/smj.588>
- Goerzen, A., & Beamish, P.W. (2005). The effect of alliance network diversity on multinational enterprise performance, *Strategic Management Journal*, 26(4), 333–354. <http://dx.doi.org/10.1002/smj.447>
- Gomes-Casseres, B. (1996). *Alliance revolution. The new shape of business rivalry*. Cambridge: Harvard University Press.
- Grabher, G., & Stark, D. (1997). Organizing diversity: evolutionary theory, network analysis and postsocialism. *Regional Studies*, 31(5), 533–544. <http://dx.doi.org/10.1080/00343409750132315>
- Granovetter, M.S. (1973). The strength of weak ties. *American Journal of Sociology*, 78(6), 1360–1380. <http://dx.doi.org/10.1086/225469>
- Gulati, R. (1998). Alliances and networks. *Strategic Management Journal*, 19(4), 293–317. [http://dx.doi.org/10.1002/\(SICI\)1097-0266\(199804\)19:4<293::AID-SMJ982>3.0.CO;2-M](http://dx.doi.org/10.1002/(SICI)1097-0266(199804)19:4<293::AID-SMJ982>3.0.CO;2-M)
- Gulati, R. (2007). *Managing network resources. Alliances, affiliations, and other relational assets*. Oxford: Oxford University Press.
- Gulati, R. (1999). Network location and learning: the influence of network resources and firm capabilities on alliance formation. *Strategic Management Journal*, 20 (5), 397–420. [http://dx.doi.org/10.1002/\(SICI\)1097-0266\(199905\)20:5<397::AID-SMJ35>3.0.CO;2-K](http://dx.doi.org/10.1002/(SICI)1097-0266(199905)20:5<397::AID-SMJ35>3.0.CO;2-K)
- Gulati, R., Nohria, N. & Zaheer, A. (2000). Strategic networks. *Strategic Management Journal*, 21(3), 203–215. [http://dx.doi.org/10.1002/\(SICI\)1097-0266\(200003\)21:3<203::AID-SMJ102>3.0.CO;2-K](http://dx.doi.org/10.1002/(SICI)1097-0266(200003)21:3<203::AID-SMJ102>3.0.CO;2-K)
- Håkansson, H., Ford, D., Gadde, L-E., Snehota, I., & Waluszewski, A. (2009). *Business in networks*. Chichester: Wiley & Sons.
- Hansen, T.M. (1999). The search-transfer problem: the role of weak ties in sharing knowledge across organizational subunits. *Administrative Science Quarterly*, 44, 82–111. <http://dx.doi.org/10.2307/2667032>
- Henderson, R., & Cockburn, I. (1994). Measuring competence? exploring firm effects in pharmaceutical research. *Strategic Management Journal*, 15 (S1), 63–84.
- Hicklin, A. (2004). Network stability: opportunity or obstacles? *Public Organization Review*, 4(2), 121–133.
- Hite, J.M. (2005). Evolutionary process and paths of relationally embedded network ties in emerging entrepreneurial firms. *Entrepreneurship: Theory & Practice*, 29(1), 113–144. <http://dx.doi.org/10.1111/j.1540-6520.2005.00072.x>
- Iacobucci, D. & Hopkins, N. (1992). Modelling dyadic interactions and networks in Marketing. *Journal of Marketing Research*, 29(1), 5–17. <http://dx.doi.org/10.2307/3172489>
- Jack, S.L. (2005). The role, use and activation of strong and weak network ties: A qualitative analysis. *Journal of Management Studies*, 42(6), 1233–1259. <http://dx.doi.org/10.1111/j.1467-6486.2005.00540.x>
- Jarillo, J.C. (1998). *Strategic networks. Creating the borderless organization*. Oxford: Butterworth Heinemann.
- Kenis, P., & Knoke, D. (2002). How organizational field networks shape interorganizational tie-formation rates. *Academy of Management Review*, 27(2), 275–293.
- Kim, W.C., & Mauborgne, R. (1998). Procedural justice, strategic decision making and the knowledge economy. *Strategic Management Journal*, 19(4), 323–338. [http://dx.doi.org/10.1002/\(SICI\)1097-0266\(199804\)19:4<323::AID-SMJ976>3.0.CO;2-F](http://dx.doi.org/10.1002/(SICI)1097-0266(199804)19:4<323::AID-SMJ976>3.0.CO;2-F)
- Kiezun, A., & (1971). *Autonomizacja jednostek organizacyjnych. Z patologii organizacji*. PWE, Warszawa. (in Polish)
- Kopaliński, W. (1970). *Słownik wyrazów obcych i zwrotów obcojęzycznych*. Wiedza Powszechna, Warszawa. (in Polish).
- Lambe, C.J., Spekman, R.E., & Hunt, S.D. (2002). Alliance competence, resources, and alliance success: conceptualization, measurement, and initial test. *Journal of the Academy of Marketing Science*, 30(2), 141–158.
- Larson, A., & Starr, J.A. (1993). A network model of organization formation. *Entrepreneurship: Theory & Practice*, 17(2), 5–15.
- Lecocq, X., & Yami, S. (2002). From value chain to value networks: towards a new strategic model. In: Ludman, S.M. (ed.) *Network knowledge in international business*, (9–27). Edward Elgar, Cheltenham.
- Ledeneva, A. (2009). From Russia with blat: can informal networks help modernize Russia? *Social Research*, 76 (1), 257–288.

- Leick, B. (2011). Barriers to co-operation and competitive advantage: cross border business networks of Saxon and Northern Bohemian firms. *Journal of East European Management Studies*, 16(2), 162–184.
- Lovett, S., Simmons, L. C., & Kali, R. (1999). Guanxi versus the market: ethics and efficiency. *Journal of International Business Studies*, 30(2), 231–248. <http://dx.doi.org/10.1057/palgrave.jibs.8490068>
- Lu, H., Trienekens, J.H., Omta, S. W. F., & Feng, S. (2009). The role of guanxi networks in vegetable supply chains: empirical evidence from P.R. China. *Journal of International Food & Agribusiness Marketing*, 21, 98–115. <http://dx.doi.org/10.1080/08974430802587612>
- Mahmood, I.P., Zhu, H., & Zajac, E.J. (2011). Where can capabilities come from? Network ties and capability acquisition in business groups. *Strategic Management Journal*, 32, 820–848. <http://dx.doi.org/10.1002/smj.911>
- Marciszewska, E. (2013). Kooperencja w sektorze lotniczym w świetle procesów deregulacji i globalizacji sektora. In Cygler, J., Aluchna, M., Marciszewska, E., Witek-Hajduk, M.K., & Materna, G. *Kooperencja przedsiębiorstwa w dobie globalizacji: wyzwania strategiczne, uwarunkowania prawne*, (pp. 195–218). Wolters Kluwer, Warszawa. (in Polish).
- Marsden, P.V., & Campbell, K.E. (1984). Measuring tie strength. *Social Forces*, University of North Carolina Press, 63(2), 482–501.
- Nelson, R.E. (1989). The strength of strong ties: social networks and intergroup conflict in organizations. *Academy of Management Journal*, 32(2), 377–401. <http://dx.doi.org/10.2307/256367>
- McEvily, B., & Marcus, A. (2005). Embedded ties and the acquisition of competitive capabilities. *Strategic Management Journal*, 26, 1033–1055. <http://dx.doi.org/10.1002/smj.484>
- Michaelides, R., Morton, S.C., & Weisheng, L. (2013). A framework for evaluating the benefits of collaborative technologies in engineering innovation networks. *Production Planning & Control*, 24(2/3), 246–264. <http://dx.doi.org/10.1080/09537287.2011.647880>
- Minbaeva, D.B., & Michailova, S. (2004). Knowledge transfer and expatriation in multinational corporations. *The role of disseminative capacity*. *Employee Relations*, 25(6), 663–679. <http://dx.doi.org/10.1108/01425450410562236>
- Oleinik, A. (2004). A model of network capitalism: basic and post-Soviet evidence. *Journal of Economic Issues*, XXXVIII(1), 85–111.
- Osborn, R.N., & Baugh, C.C. (1990). Forms of interorganizational governance for multinational alliances. *Academy of Management Journal*, 35, 503–519. <http://dx.doi.org/10.2307/256578>
- Park, S.H. (1996). Managing an interorganizational network: a framework of the institutional mechanism for network control. *Organization Studies*, 17(5), 795–824. <http://dx.doi.org/10.1177/017084069601700505>
- Pasieczny, J. (2012). Patologie organizacji w okresie kryzysu. *Zarządzanie i Finanse*, 4(2), 117–128. (in Polish). <http://dx.doi.org/10.1002/smj.4250140303>
- Peteraf, M.A. (1993). The cornerstones of competitive advantage: a resource-based view. *Strategic Management Journal*, 14(3), 179–191.
- Polanyi, M. (1966). *The tacit dimension*. Doubleday & Co, Garden City.
- Provan, K.G. (1993). Embeddedness, interdependence, and opportunism in organizational supplier-buyer networks. *Journal of Management*, 19(4), 841.
- Rapaport, A. (1988). Experiments with n-person social traps I: prisoner's dilemma, weak prisoner's dilemma, volunteer's dilemma, and largest number. *Journal of Conflict Resolution*, 32(3), 457–472. <http://dx.doi.org/10.1177/0022002788032003003>
- Raub, W., & Weesie, J. (1990). Reputation and efficiency in social institutions: an example of network effect. *American Journal of Sociology*, 96, 626–654. <http://dx.doi.org/10.1086/229574>
- Sankowska, A. (2013). Relationships between organizational trust, knowledge transfer, knowledge creation, and firm's innovativeness. *Learning Organization*, 20(1), 85–100. <http://dx.doi.org/10.1108/09696471311288546>
- Scalera, D., & Zazzaro, A. (2011). *Do inter-firm network make access to finance easier?* Issues and empirical evidence, In: Caffaggi, F. (ed.) *Contractual networks, inter-firm cooperation and economic growth* (pp. 39–65). Edward Elgar, Cheltenham. <http://dx.doi.org/10.4337/9781849809696.00009>
- Simmel, G. (1890). *Über soziale Differenzierung*. Soziologische und psychologische Untersuchungen. Leipzig, Dunker and Humboldt. (in German).
- Sroka, W. (2012). *Sieci aliansów. Poszukiwanie przewagi konkurencyjnej poprzez współpracę*. PWE, Warszawa. (in Polish).
- Sroka, W., & Hittmár, Š. (2013). *Management of alliance networks. Formation, functionality, and post operational strategies*. Springer Verlag.
- Sroka, W., Cygler, J., & Gajdzik, B. (2014). Knowledge transfer in networks – the case of steel enterprises in Poland. *Metallurgia*, 53(1), 101–104.
- Szeto, R., & Wright, P. (2006). Business networking in the Chinese context. *Management Research News*, 29(7), 425–438. <http://dx.doi.org/10.1108/01409170610690880>
- Tsang, E.W.K. (2000). Transaction cost and resource-based explanations of joint ventures: a comparison and synthesis. *Organization Studies*, 21(1), 215–242. <http://dx.doi.org/10.1177/0170840600211004>
- Uzzi, B. (1997). Social structure and competition in interfirm networks: The paradox of embeddedness. *Administrative Science Quarterly*, 67(1), 674–698.
- Vrgovic, P., Vidicki, P., Glassman, B., & Walton, A. (2012). Open innovation for SMEs in developing countries – An intermediated communication network model for collaboration beyond obstacles. *Innovation: Management, Policy & Practice*, 14(3), 290–302. <http://dx.doi.org/10.5172/impp.2012.14.3.290>
- Walker, G., Kogut, B., & Shan, W. (1997). Social capital, structural holes and the formation of an industry network. *Organization Science*, 8(2), 109–125. <http://dx.doi.org/10.1287/orsc.8.2.109>
- Walker, G., & Weber, D. (1984). A transaction cost approach to make and buy decisions. *Administrative Science Quarterly*, 29(3), 373–391. <http://dx.doi.org/10.2307/2393030>
- Wassmer, U., & Dussauge, P. (2011). Value creation in alliance portfolios: The benefits and costs of network resource interdependencies. *European Management Review*, 8(1), 47–64. <http://dx.doi.org/10.1111/j.1740-4762.2011.01003.x>
- Williamson, O.E. (1991). Comparative economic organization: The analysis of discrete structural alternatives. *Administrative Science Quarterly*, 36, 269–296. <http://dx.doi.org/10.2307/2393356>
- Yoshino, M.Y., Rangan, U.S. (1995). *Strategic alliances. An entrepreneurial approach to globalization*. Harvard Business School Press, Boston.
- Zaheer, A., & Bell, G.G. (2005). Benefiting from network: firm capabilities, structural holes, and performance. *Strategic Management Journal*, 26, 809–825. <http://dx.doi.org/10.1002/smj.482>
- Zahra, S., & George, G. (2002). Absorptive capacity: A review, reconceptualization and extension. *Academy of Management Review*, 27(2), 185–203