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NETWORKING AND THE COMPETITIVE ADVANTAGE OF SUPPLY CHAINS

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Abstract: The paper seeks to elaborate on the competitive advantage of supply chains from the perspective of networking that is employed in a twofold sense. First, it is used to explore the issue of network competitive advantage, which is considered to deliver benefits to all major actors constituting the supply chains, while in the second sense networking is brought to demonstrate whether actors, as well as relationships formed by these actors, possess the necessary characteristics to deliver the network competitive advantage. Based on this conceptual reasoning, we then deliver theoretical propositions that assist in deeper understanding of how the network characteristics of supply chains can contribute to deriving the network competitive advantage of supply chains. Specifically, the study shows that most of these characteristics have a positive impact on the value of network rent. Likewise, the paper also points out that the specific characteristics of networking are mutually interdependent and remain in intermeshing and overlapping relationships. As a consequence, the independent variables, when considered holistically, may mutually interact in such a way that they may produce contradictory outcomes.

Keywords: network competitive advantage, network characteristics, supply chains.

1. Introduction

From the standpoint of strategic management theory, gaining and sustaining competitive advantage is considered to be a silver bullet – the essence and pillar of existence for contemporary supply chains. As nowadays, one may identify myriads of overlapping supply chains that form networks, we believe that the supply chains should be capable of deriving competitive advantage through networking.

As advocated by Ford et al. (2003), networking means that the companies are able to simultaneously suggest, request, require, perform and adapt their activities. This view highlights the importance of a bundle of activities constituting certain relationships established among the companies in a network. Building collaborative relationships based on mutual benefits and reciprocity leads to forming the phenomenon of network competitive advantage

(Coombs, and Metcalfe, 2000). Dyer and Singh (1998) acknowledge that the network perspective takes into account the advantages of one firm that are linked to the advantages of other partners embedded in the network. Essentially, the network advantage is generated for all actors involved in the certain network. Apart from this perspective, Lei and Huang (2014) posit that networking may be also used to measure the degree of the possession of network relationships. In the same vein, Johnsen et al. (2000) argue that networking is a transformation process performed by independent companies and their resources in order to establish a certain configuration of network. This opinion is more focused on a position and functions served by companies establishing network relationships. Networking may suggest either consolidation by stabilizing and strengthening the existing network position, or creation of a new position by changing the existing or developing a new relationship (Ford et al., 2003). Consequently, in line with this view, networking demonstrates basic characteristics of networks established by actors and their relationships, such as: network size, its density, intensity, reciprocity, heterogeneity, and finally centrality. The study aims to link these two complementary developments of networking to investigate whether and how the enumerated characteristics of networking can favor obtaining and sustaining the network competitive advantage of supply chains.

2. Network Competitive Advantage of Supply Chains

Contrary to the RBV underscoring the benefits reaped from defeating another company (Zacharia et al., 2009; Bowersox et al., 2003), the concept of network competitive advantage highlights the importance of relations. The RBV suggests that the firm does not evaluate the actual possibilities of gaining and sustaining network competitive advantage from a multilateral perspective involving suppliers, manufacturers and distributors. In contrast, Jarillo (1986) maintains that the network approach refers to a non-zero sum relationship. Herein, all participants of certain arrangement can be winners (win-win situation) (Dyer, and Nobeoka, 2000; Joshi, and Campbell, 2003). Following the opinion of Sheppard and Sherman (1998), cited by Das, and Teng (2003), we acknowledge that interdependence between supply chain partners may be either shallow (low reliance on each other) or deep (high reliance on each other). These two are conditioned upon the significance of relationships in maintaining the competitive advantage. Hogarth-Scott and Dapiran (1997) underscore that if the significance of relationships is high, the links tend to increase their self-interest in sustaining the relationships and make effort to facilitate the other party's goals by lifting their own exit barriers. In addition, Kumar et al. (1995) acknowledge that in order to reach interdependence, companies in the network have to increase investment in the relationships to ensure symmetry in dyads and balanced transfer of resources. Acs and Audretsch (1988) argue that if a symmetry is formed

by larger firms, the arrangement tends to experience more innovative outcome than that established by smaller partners. Both types of arrangements highlight the significance of relational capabilities that are distinguished to be fundamental from both the supplier's and customer's perspectives.

Essentially, the concept of relational competitive advantage is grounded on dyadic structures (Peterson, 1995), suggesting that two links of the arrangement are capable of reaping benefits in terms of delivery of superior value (Ulaga, 2001). The previous studies evidence that relational capabilities are of crucial importance in generating profits and gaining access to new markets (Ritter, and Gemunden, 2003; Xu et al., 2008). The objective of relational capabilities is to concentrate on the activities that enable the company to understand and meet customers' needs and expectations (Stank et al., 1999). It requires developing long-term relationships and involving supply chain partners in order to create and deliver value to customers (Lado et al., 2011).

Correspondingly, in the network approach, the held capabilities of a company are integrated and activated through interaction with other parties (Rigby et al., 2000). While smaller companies, for example, may often be considered to contain fewer capabilities than larger ones, therefore, the smaller firms are encouraged to develop their capabilities through establishing the relationships with other companies, such as their larger partners (Johnsen, and Ford, 2006). In addition, the capabilities of smaller companies may turn out to be too obsolete as compared to the capabilities required by larger partners. As pointed out by Hakansson and Ford (2002), smaller companies may redeploy their current capabilities in new relationships or develop a new set of capabilities to meet environmental changes. As a result, network capabilities are produced. Essentially, network capabilities are being tied up by way of interaction of the capabilities belonging to the individual companies. However, Gadde and Hakansson (2001) point out that the boundaries between capabilities within a firm and those deployed through external relationships are usually blurred. Moreover, Cox (1996) underlines that firms should employ a proactive approach that requires them to realize that their boundaries need to change constantly in response to consumer preferences. So, the role of external actors in building the network capabilities is critical, and the capabilities of a firm may be influenced by interaction in relationships. Hence, as advocated by Walter et al. (2006), network capabilities enable companies to initiate, maintain and exploit relationships based on the commitment of various external partners. Similarly, Christopher (1996) underscores that the ability to derive network competitive advantage is a major motivation for the companies to commit to the network. Thus, the notion of commitment is a key factor that determines the network competitive advantage. Commitment enhances building long-term benefits reaped from the collaboration with existing partners. Morgan and Hunt (1994) argue that commitment makes the committed party believe it is worth ensuring the relationship lasts infinitely. Moreover, commitment is determined by trust and consists of two essential elements – honesty and benevolence (Hogarth-Scot, and Dapiran, 1997). The first appears when a certain partner may be sure that the other

partner will keep its promises. On the other hand, benevolence denotes that certain links will not enjoy taking actions that may have negative consequences for the partner. Therefore, commitment and trust are perceived as pivotal when encouraging collaboration to sustain the network relationship. Essentially, the concept of network capabilities is anchored in the phenomenon of synergy. This means that network capabilities are more than a sum of the capabilities of individual firms. In other words, network capabilities produce new capabilities in a synergistic way.

The effect of synergy is translated into measurable benefits of a 'network rent' – the difference between the benefit of network companies acting together and the sum of benefits of the companies operating individually (see Mackintosh, 1992). Essentially, the concept of network rent denotes a superior performance generated by the companies in a network (Huxham, 1996). In the light of the above discussion, the collective benefit of network-related companies is not a simple sum of relational rents (O'Toole, 1997), although the network itself is built upon and comprised of a collection of bilateral relationships. This is in line with the general observation of Pathak et al. (2007) who acknowledge that supply chain network collective behavior can never be explained by the linear sum of dyads. Accordingly, we assume that the ability to generate a network rent determines the strength of network competitive advantage of supply chains. Foss (1999) highlights that in order to yield the rent, network capabilities should also be characterized by VRIN attributes (valuable, rare, inimitable and non-sustainable). In other words, not only are these attributes typical for RBV, as indicated by Barney (1991), but they may also be applied to network capabilities. The first characteristic suggests that network capabilities are valuable to firms, as they may accelerate the accumulation of R&D capabilities, and thus increase the rate of new product introduction. Another attribute indicates that network capabilities should be rare. This means that different firms in networks will possess the same network capabilities. Network capabilities are usually very difficult to follow and duplicate, as they embrace intangible and tacit assets, such as knowledge sharing, social links and behavioral norms that arise from interactions among the individual companies inside a network. Finally, network capabilities may be non-substitutable for a long time. Essentially, the uniqueness of network capabilities is the result of value-added benefits of innovation, generated through the network relationships. This value-added innovation allows the companies to manufacture and deliver more competitive products and services in terms of price and quality. As indicated by Foss (1999), due to the tacit and complex nature, network capabilities are largely immobile and cannot be easily transferred. In other words, network capabilities are usually stuck to the particular section of the network. This, in turn, results in dispersal of rents that are accrued to certain companies in different regions.

3. Formulation of Propositions

3.1. Key network metrics

In theory, there is a variety of measures of networking in supply chains that touch either the companies or their relationships. Among the most important characteristics of networking one may enumerate the following: size, density, intensity, reciprocity, heterogeneity, centrality and betweenness (Wasserman, and Faust, 1994; Świerczek, 2018).

3.2. Network size

Network size reflects a number of actors forming the network (Wei, 2010). Larger networks provide a greater opportunity for the companies to access the superior resources, possessed by other partners in the network (Zaheer et al., 2010). Other studies also demonstrate that while the networks grow in size, the levels of learning of each actor also increase (Borgatti, and Cross, 2003). Furthermore, the number of actors in the network is positively correlated with the number of relationships. Guliati (1999) argues that network relationships are often a critical factor that results in deriving competitive advantage. Similarly, Burt (2000) argues that a larger size of network contributes to a greater number of available opportunities. The importance of network size in enhancing firm performance has also been widely investigated at the organization levels by Baum et al. (2000). Although, the process of trust generation may constitute an important challenge, as the social mechanisms might be constrained by the size of the network (Doménech, and Davies, 2010), larger networks are more likely to promote the emergence of cliques that will have an informal impact on the way the other partners act. For instance, Terpend and Ashenbaum (2012) investigated the effects of suppliers on performance and trust in a network. Therefore, in the light of the aforementioned, we propose that:

Proposition 1: Larger network size has a positive effect on the network competitive advantage of supply chains.

3.3. Network density

As advocated by Craighead et al. (2007), supply chain density denotes the geographical proximity of nodes, usually measured by the average inter-node distance. Consequently, if certain nodes within a supply chain are located closely together, this supply chain can be described as being dense, that means it has a high level of supply chain density. Conversely, when nodes within a supply chain are loosely clustered together, the supply chain can be described as being less dense, which means it has a low level of supply chain density. As advocated by Kim et al. (2011), a higher level of density does not necessarily have a beneficial impact on the supply chain, as it may increase complexity, and thus burden the coordination efforts. Others argue that networks with a high level of density are characterized

by structural homophily, suggesting that the actors are very similar and, thus they do not possess an access to diverse resources (Ahuja et al., 2009). By the same token, Kim et al. (2011) maintain that higher density may bring about an expensive resource redundancy. A similar observation has been made by Gnyawali and Madhavan (2001) who claim that network relationships with a high degree of density affect negatively on the quality of resource flows. On the other hand, prior studies demonstrate that loosely coupled networks provide the opportunity for individual company to establish precious links and thus derive competitive advantage at the expense of other partners. In other words, networks with a low level of density do not promote balance and egalitarianism among partners and provide a potential for selected, individual companies to derive benefits by brokering the relationships among unconnected partners and possessing access to their diversified resources (Burt, 2004). Correspondingly, Rowley et al. (2000) demonstrate that dense networks support trust that encourages cooperation and curbs opportunism. In the same vein, Johansson and Quigley (2004) point out that a high level of network density reduces difficulties in circulating information to other partners, and thus alleviates the potential problems with distorted communication. Therefore, we propose that:

Proposition 2: A higher network density has a positive effect on the network competitive advantage of supply chains.

3.4. Network intensity

Network intensity is another characteristic of supply chains that describes the frequency of contacts among the companies in a period of time (Hoffmann, 2007). In other words, network intensity denotes a certain level of interconnections and shared routines between partners (Rowley et al., 2000). A higher level of intensity suggests that links are more tightly interconnected. This enables them to establish a more intense communication channel and share often redundant information, derived from multiple sources (Polidoro et al., 2011). There are many terms used to indicate the intensity of relationships in supply chains (Christopher, 2016; Hines, and Jones, 1996; Spekman et al., 1998). These usually range from less to more intense relationships. The former denotes that supply chain partners tend to exchange essential information and engage a selected number of suppliers/customers in long-term contracts, to ensure a "threshold" level of interaction (Wilding, and Humphries, 2006). On the other hand, in more intense relationships, supply chain partners act together closely and rely on each other's capabilities when performing a set of functions. They are engaged in joint planning and activity beyond levels reached in less intense trading relationships (Wilding, and Humphries, 2006).

The more frequent interaction among the partners, the stronger the relationships in a network Granovetter (1973). In other words, strong relationships manifest the extent to which a firm interacts frequently with another and exchanges knowledge and resources efficiently. Weak relationships, in contrast, are characterized by a loosely coupled links with no frequent interaction (Choi, and Kim, 2008). However, intensity is not the same as strength of

relationships. Generally, the strength of network relationships addresses the quality of ties linking partners in their pursuit to achieve common goals. When establishing stronger relationships, the partners are concentrated on a strategic vision of the future rather than on near-term planning and tactical execution (Cohen, and Roussel, 2005). Strong relationships provide the companies with a better problem solving and interorganizational communication (Daft, 1986). By the same token, Capaldo (2007) argues that strong relationships established around a focal firm contribute to obtaining and sustaining competitive advantage. Therefore, based on the previous studies, we argue that due to a greater interdependence among the companies, higher intensity of relationships is essential in deriving network competitive advantage. Similarly, Wincent et al. (2010) argue that although not being of the same character as strong ties, intense network relationships may contribute to obtaining and sustaining competitive advantage. Therefore, we postulate that:

Proposition 3: A higher level of network intensity has positive effect on the network competitive advantage of supply chains.

3.5. Network reciprocity

Reciprocity is another vital factor of network structure. It indicates that links in a network are expected to share their resources in order to attain common goals. Reciprocity is initiated when one company makes a contribution to the joint action and the partner makes a response to this contribution (Wincent, 2008). Reciprocity promotes alleviating opportunism and free-riding (Bercovitz et al., 2006). In order to apply reciprocity in practice, certain rules ought to be established. They increase a chance that one's efforts will be reciprocated through increasing social cost of free-riding, eliminating opportunism and promoting collaborative behavior (Becerra et al., 2008; Dyer, and Singh, 1998). However, it has also been indicated that too strict and invasive regulation may discourage potential partners from the reciprocal exchange (Lui, and Ngo, 2004). Therefore, instead of applying rigid norms, the companies should build a collaboration based on mutual trust and deep commitment that will contribute to opening the communication channels, and thus reducing information asymmetry (Lee et al., 2001). Moreover, doing so will make the flow of information more rapid and reliable (Kenis, and Knoke, 2002). This will encourage partner firms to apply an efficient and undistorted transfer of knowledge. These efforts will enhance establishing symmetrical relationships and provide more balanced exchange of resources between companies that will contribute to deriving competitive advantage. As a consequence, we propose that:

Proposition 4: A greater level of network reciprocity has a positive effect on the network competitive advantage of supply chains.

3.6. Network heterogeneity

Another characteristics of networking, increasing the probability for supply chain's diversity is heterogeneity. Generally, heterogeneity manifests if particular nodes and links play different roles in the network (Liang et al., 2015). Correspondingly, Bohlmann et al. (2010) mentioned two major types of network heterogeneities: structural and relational. The first arises from individual companies that are connected to certain network partners, while the latter refers to the strength of communication influences among connected partners in the network. Nowadays, one may observe a progress in proliferation of niche players, serving very specific functions that contribute to the supply chain's overall competitive advantage (Palin, 2013). For instance, the study of Capaldo (2007) showed that heterogeneous ties may bring a substantial competitive advantage to the focal company in a network. Interestingly, only a few selected links in the whole supply chain structure may appear to be characterized as heterogeneous, but still they can effectively determine its competitive advantage (Goerzen, and Beamish, 2005). By the same token, McEvily and Zaheer (1999) empirically evidenced that average nodal heterogeneity has a positive influence on the competitive advantage. Therefore, we postulate that:

Proposition 5: A high level of network heterogeneity has a positive effect on the network competitive advantage of supply chains.

3.7. Network centrality

Network centrality is another aspect that describes the firm's position in the network. It accounts for both direct and indirect links and indicates how "far" a firm is located to the other links in the network. The issue of centrality defines the relative importance or prominence of a particular company in a supply chain. The link with the higher level of centrality is perceived to exert more power and control over peripheral firms (Bellamy, and Basole, 2013).

There are several approaches to investigating the issue of centrality in networks. The first approach defines centrality as a number of direct and indirect connections to all possible partners in the network. Therefore, centrality of firm results from the scope of relationships established with network partners. What is more, firms with higher centrality are more attractive and visible for other network partners, and as a result, they are more likely to affect the network resources (Gulati, 1999).

The next approach is referred to as 'clique overlap centrality' (Everett, and Borgatti, 1998) and examines a firm's location in order to determine the number of cliques the firm belongs to. If the company belongs to many cliques, it tends to successfully use more opportunities and increase its position by bringing together separate nodes across the network (Gulati, 1999). This concept is widely accepted in the literature as "structural holes" and denotes that there is a space in the network in which the companies are generally disconnected. Consequently, structural holes provide an opportunity of establishing a non-redundant tie and accessing to the

unique information (Burt, 2000). Therefore, bridging structural holes delivers a potential of increasing the competitive advantage (Kim, 2014), as it enables the company to play the role of broker or so called "gatekeeper" with a potential to exert control over others (Scott, 1991). Structural holes are widely linked to the concept of betweenness (Pitt et al., 2006). Betweenness extends the scope of the analysis beyond the direct ties and measures the extent to which a focal firm lies "between" other firms (directly or indirectly connected) in the network. Therefore, from the supply chain perspective, centrality is sometimes referred to as a node criticality. It manifests the importance of certain links in the supply chain structure. In addition, the importance of any link is context-dependent which suggests that it is specific and relative to other nodes within a supply chain (Craighead et al., 2007). Networks with a low level of centrality (or with no central node) ensures a more balanced supply chain structure whose firms manifest less opportunism and eagerness to obtain particular interests. In such a network, there is no single company that possesses enough strength and prominence to influence on the other links. Overall, we expect that a low level of centrality is beneficial to the network competitive advantage of supply chain. Therefore, we propose that:

Proposition 6: A low level of network centrality has a positive effect on the network competitive advantage of supply chains.

4. Deliverables and Discussion

The provided discussion shows that there are some requirements concerning the network characteristics of supply chains that should be met to derive network competitive advantage – Figure 1. Most of these characteristics have a positive impact on the value of network rent. Specifically, the larger the network size, the higher the network competitive advantage of supply chains. Similarly, as indicated in the study, higher network density, intensity and reciprocity, as well as heterogeneity contribute to generating higher network competitive advantage. Finally, the paper also shows that there is a negative relationship between the network centrality and competitive advantage.

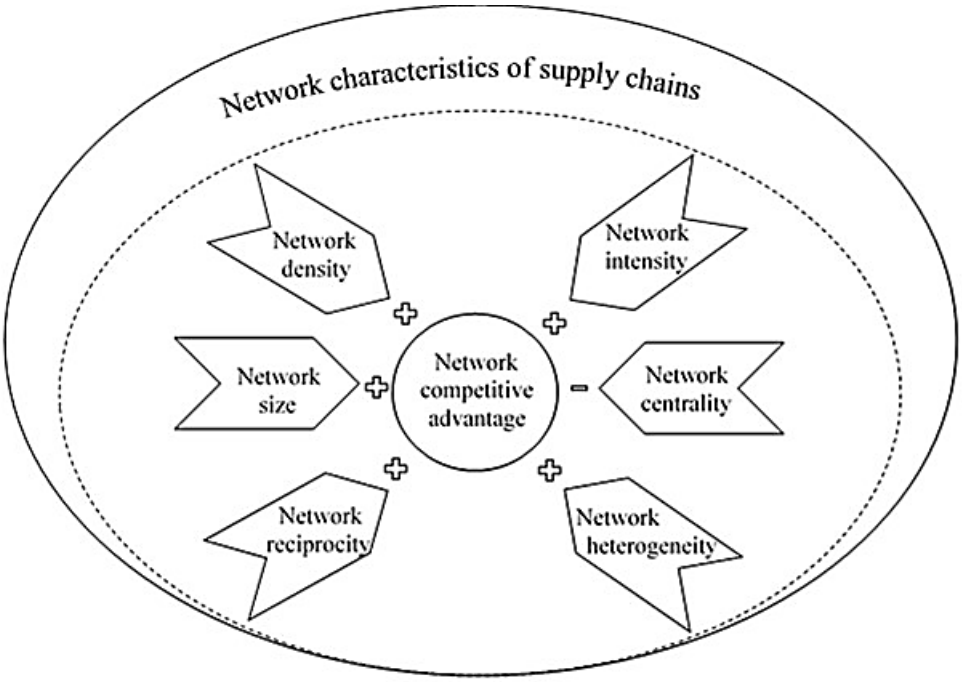

Figure 1. The contribution of network characteristics to the network competitive advantage of supply chains.

From the methodological point of view, the foregoing characteristics of networking are usually investigated in isolation and treated as interdependent items. In other words, a certain variable of networking usually demonstrates positive or negative effects on the competitive advantage. However, the collective analysis of the specific characteristics of networking may produce different results. For instance, if a link belongs to many cliques, it is usually located in dense clusters of firms and has direct ties with many nodes (Gulati, 1999). Similarly, intense relationships may also lead to abusive practices, mitigating the competitive advantage, especially when establishing intense relationships is associated with unbalanced power in a network (Kim et al., 2006; Uzzi, 1997). Correspondingly, higher network density makes contact easier and more frequent or routinized, which in turn enhances network intensity by increasing the frequency of interaction (Johansson and Quigley, 2004). Interestingly, an intense relationship does not necessarily imply reciprocity and may develop despite partner asymmetry and imbalance (Wincent et al., 2010). On the other hand, a higher level of betweenness denotes that it is more likely that the company serves a central role in the network. Therefore, betweenness is often negatively associated with density. Accordingly, it is more likely that a company positioned in the network characterized by a low level of density, will serve as a central link that bridges the structural holes. Contrarily, if the level of network density is high, the company presumably does not hold a central position.

Other authors suggest that density decreases when network size increases. In other words, larger networks demonstrate much less dense structure than do smaller ones. Moreover, network density is negatively correlated with heterogeneity. This means that the more the diversified partners, the lesser number of links established among them. Therefore, the higher

potential derived from network heterogeneity is usually shrunk by establishing denser networks. This shows that network density and heterogeneity are two mutually dependent constructs.

Judging from the aforementioned relationships, specific characteristics of networking are mutually interdependent and remain in intermeshing and overlapping relationships. As a consequence, the independent variables when considered holistically, may mutually interact in such a way that they may produce contradictory outcomes. In other words, when the characteristics of networking are analyzed together, they may demonstrate totally different effects on the competitive advantage, as compared to the isolated impact of a certain characteristic. Moreover, the relationships among independent variables of networking and competitive advantage are often curvilinear, demonstrating non-proportional contribution of certain variables into the process of gaining and sustaining the competitive advantage of supply chains. This suggests that there might be an inverted U-relationship between a bunch of network characteristics and the competitive advantage of supply chains (Świerczek, 2018). Herein, both extreme minimal and extreme maximal values of the characteristics of networking perform insufficiently from the perspective of their contribution to the competitive advantage. In addition, moderate values of networking might work best for achieving and sustaining competitive advantage. The complexity of relationships between networking characteristics makes the study particularly difficult. This might be a primary reason why research that simultaneously investigates all variables manifesting characteristics of networking to predict network outcomes (i.e. in terms of the network competitive advantage) are rare, if any. More importantly, the analysis of these relationships may show different results for both the individual and inter-firm levels. Therefore, it would be interesting to investigate the joint effects of these characteristics on the network competitive advantage of supply chains. Doing so may give rise to the patterns containing specific combinations of the key characteristics of networking that affect the competitive advantage.

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