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Re-visiting collaborative behavior in supply networks – structural embeddedness and the influence of contextual changes and sanctions

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ABSTRACT

This study considers decision making beyond a dyadic buyer-supplier context to the network context. Decisions made by firms are shaped by behavioral norms within the supply network as perceived by the decision makers. Firms can perceive themselves to be part of a collaborative regime or one in which the potential for non-cooperation is high. Further, the ability to put sanctions on non-cooperating firms could shape the overall behavioral patterns in the network. To gain further insights into these aspects and their interactive effects on firm behavior, our study investigates decision-making in supply network by means of behavioral experiments. By organizing practicing managers in a supply network, the study investigates the role of structural embeddedness, incentive structure, and sanctioning mechanisms on the level of collaboration. The results of this study confirm that while sanctions are detrimental for collaborative behavior in a supply network, they play an important role when the underlying norms of governance of such a network are perturbed. The results show that structural embeddedness provides a context that aids adaptive collaborative behavior by firms that are part of the supply network. Once the incentive structure is altered such that there is a higher payoff from defection, the adaptive collaborative behavior is replaced by a behavior in which firms try to maximize their returns and forego collaborative decision-making behavior.

1. Introduction

Dyadic buyer–supplier relationships are part of extended networks that have come to bear influence on the nature of inter-organizational relationships. Buyer-supplier relationships could manifest themselves in terms of the direct link between a buyer and a supplier as well as indirect connections among firms that are part of the overall supply network. Dyads are embedded within a triadic network structure and triads, in turn, are embedded in a higher-order network structure (Choi and Kim, 2008). Each iteration of network evolution embeds the previous level. As such, structural embeddedness has been proposed as a useful conceptual foundation to examine the nature of collaborative behavior in supply relationships (Granovetter, 1985; Uzzi, 1997). It captures interconnections and the loose and tight coupling of relationships among firms as well as the interdependent nature of buyer-supplier relationships with the entities in the extended supply network (Ghoshal and Bartlett, 1990; Gulati et al., 2000; Echols and Tsai, 2005).

The complexities associated with these extended networks make the examination of inter-organizational collaborative relationships more difficult than when these relationships are investigated in isolated dyadic settings. Studies have emphasized the need to consider such embedded nature of supply networks to gain a deeper understanding of buyer-supplier relationships (Uzzi, 1997; Choi et al., 2001; Pathak et al., 2007; Choi and Kim, 2008). Recently, the primary focus of studies on supply networks has moved from dyads to triads, to examine the dynamics of supply networks as a complex adaptive system (Wu and Choi, 2005; Dubois and Fredriksson, 2008; Choi and Wu, 2009a). For instance, Choi and Wu (2009b) emphasize that considering triads can help us understand the relationships of the supply chain from a network perspective, extending the theoretical lens beyond Transaction Cost Economics (TCE) which has been the tradition in supply chain management research. Meanwhile, many researchers have adopted various tools of social network analysis (SNA) through network and graph theories to broaden the scope of inter-organizational relationships (Carter et al., 2007; Autry and Griffis, 2008; Borgatti and Li, 2009; Tate et al., 2013; Kim et al., 2015).

In this study, we build on the notion of progressive levels of structural embeddedness to illuminate the issue of collaborative relationships in supply networks. Structural embeddedness sets the context that is instrumental in determining the contingent economic actions of

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buyers and suppliers who are embedded in the larger supply network structure. In essence, the behavior is not an outcome of a series of buyer-supplier relationships but is based on a network of relations among members of the supply network. Thus, structural embeddedness focuses on the network architecture and the relational quality of inter-organizational exchanges (Uzzi, 1997; Rowley et al., 2000) and informs that both direct and indirect network ties of a firm can facilitate or impede its decisions and outcomes (Gulati and Westphal, 1999; Moran, 2005). A focused examination of structural embeddedness in supply network enables an interpretation and analyses of individual firm decisions and collaborative buyer-supplier relationships within the larger relational context.

Given the salience of structural embeddedness in shaping firm behavior in supply networks, the underlying incentive structures need to be considered (Lazzarini et al., 2008). Incentive refers to "an event or object external to the individual which can incite action" (Locke, 1968; p. 161) that can play an important role in developing relational norms such that a group of decision makers will have shared behavioral expectations (Thibaut and Kelley, 1959; Heide and John, 1992; Aulakh et al., 1996). Embeddedness creates a governance structure that is cognitively based on heuristics and mutual expectations of collaboration. Social processes and psychological mechanisms, therefore, foster the emergent nature of collaborative behavior in supply networks. Notwithstanding the enriched opportunities gained by firms, embeddedness can turn into a liability when "(1) there is an unforeseeable exit of a core network player, (2) institutional forces rationalize markets, or (3) overembeddedness characterizes the network" (Uzzi, 1997; p. 57). Our study focuses on the altered incentive structure caused by contextual changes, such as a change in institutional forces impacting supply networks. Uzzi (1997) presents evidence from the apparel retail trade in the 1980s whereby the longstanding embedded relationships among clothing manufacturers were broken due to the acquisitions of many of the large retailers such as Macy's, Bullock's, and A&S by corporate conglomerates such as Federated, Inc. This resulted in a change in the norms of business such that retail buyers moved from "relationship buying" to "numbers buying" among the retail buyers. In this new context short-term gains, one-shot bidding, and competitive bidding replaced the long-term relationship regime. Another example can be traced to Toyota's move of dissolving or restructuring the U.S. joint ventures of three of its largest seat suppliers.[1] Toyota took this step to reduce overembeddedness and increase competition among its North American Suppliers. Specifically, Toyota Boshoku America Inc., a Toyota affiliate, bought out partner Lear Corp.'s share of Total Interior Systems-America, a joint venture that makes seats and components for the Sienna minivan. Similar actions were taken with regards to Trim Masters Inc., which was formed in 1987 as a joint venture 49%-owned by Johnson Controls (JCI) and 51%-owned by Toyota Boshoku and Toyota Tsusho. After Toyota realized they were getting too embedded with JCI, Toyota and JCI phased out the joint venture in 2008. Now Trim Masters, Inc. operates as a subsidiary of Toyota Tsusho America, Inc.

In this study we consider a similar contextual change to investigate how an altered incentive structure resulting in higher temptation to choose a non-cooperative stance (when others are cooperating) impacts the propensity of supply network members to collaborate with each other. Extending the relational issues born by incentive structures, this study investigates the role played by sanctions. Sanctions are obligations that are conditional on certain violations so as to make it possible for violations to be redeemed (Dignum et al., 2004). They provide a mechanism to influence collaborative behavior among firms. They offer the means for reinforcing the desired behavior (Skinner, 1953) and form the basis for creating systems that can ensure compliant actions (Pfeffer, 1994). Despite the promise of sanctioning mechanisms in shaping cooperative behavior, their efficacy has been questioned by a growing number of skeptics (Pfeffer, 1994; Tenbrunsel and Messick, 1999; Mulder et al., 2006; Hartl et al., 2016). The use of sanctions has been argued to contribute to firm inefficiencies and failures (Walsh and Seward, 1990) as well as unethical behavior (Cialdini, 1996). In addition, sanctioning systems create an environment of mistrust, which promotes resentment and potentially forms the basis for non-cooperative behavior (Pfeffer, 1994; Cialdini, 1996). The potential outcome is an adverse impact on the core foundation of embedded network structures. The control exerted by sanctioning systems induces feelings of increased pressure and tension, and the intrinsic motivation to collaborate is replaced by an extrinsic pressure to engage in a pre-specified behavior (Pfeffer, 1994; Cialdini, 1996). In this study, we examine how a sanctioning mechanism performs when the incentive structure within the supply network changes.

To address the theoretical tension among structural embeddedness, incentives, and sanctions, we conduct two behavioral experiments administered to practicing managers in a leading pharmaceutical company in Western Europe. The two experiments differ such that in the second experiment the participants are able to sanction someone who did not contribute to the collaborative project. The results present evidence towards collaborative behavior in supply networks. Structural embeddedness of decision makers (i.e., firms) enables adaptive behavior in supply networks and fosters collaboration. A change in the incentive structure that offers greater return from non-cooperative behavior results in decision makers aiming to maximize their returns from each exchange, which compromises the collaborative behavior in the network. Interestingly, the results indicate that while sanctions are ineffective (and counter-productive) in a structurally embedded supply network, it becomes effective once the network is subjected to an incentive structure with greater temptation to defect.

The remaining paper is organized as follows. In the next section, we develop our research hypotheses. In the following section, we present our research design along with details regarding the two experiments. The last two sections present the results and discuss the implications and directions for future research.

2. Theory and hypotheses development

2.1. Structural embeddedness, incentive structure, and contextual changes

Embeddedness is one of the most important concepts in network-related studies. Since Granovetter (1985) defined embeddedness as a contextualization of economic behaviors in social structures, there have been many discussions over the two key dimensions of the concept: structural embeddedness and relational embeddedness (Gulati and Gargiulo, 1999; Rowley et al., 2000; Moran, 2005). Structural embeddedness is defined as the structural configuration between actors (Granovetter, 1985; Nahapiet and Ghoshal, 1998), and it shows how the network is shaped and how the common ties between units, people, or firms are interconnected (Borgatti and Foster, 2003). Relational embeddedness, on the other hand, is defined as the personal relationships developed through a history of interactions (Granovetter, 1985; Nahapiet and Ghoshal, 1998). Rowley et al. (2000) suggest that relational embeddedness focuses on the collaboration, information and resource sharing, and social learning between the actors within the network.

In a supply network context, Choi and Kim (2008) emphasizes the importance of structural embeddedness, suggesting that the performance of a supplier is largely dependent on its structural relationships with other companies who are embedded together in the supply network. Additionally, Tate et al. (2013) introduces both dimensions of embeddedness and develop several propositions in the domain of environmental supply chain practices in a hypothetical supply chain network. This study focuses on structural embeddedness to shed further

[1] http://www.autonews.com/article/20081208/OEM01/312089737/toyota-pushes-breakup-of-seat-suppliers-to-boost-competition.