
Towards a relational framework for supply chain resilience

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Abstract: Increases in disruptions coupled with enhanced competition have led firms to develop capabilities to sustain performance and enable them to gain competitive advantage. This has underscored the value of supply chain resilience. Supply chain is a network of multiple firms involved in an exchange relationship; hence, developing effective supply chain resilience requires stronger relationship and collaboration between the associated partners. This forms the foundation for investigating supply chain resilience using a relational view. With the help of theoretical lenses like resource-based view and relational view of firm coupled with dynamic capabilities theory, the study argues that a suitable combination of several relational resources such as trust, commitment, communication, cooperation, adaptation and interdependence will determine the effectiveness of supply chain resilience as a dynamic capability. Accordingly, the study aims to investigate the relationship between these relational resources and supply chain resilience. Further, these relationships might alter with varying levels of environmental uncertainty. To explore this, the moderating roles of environmental uncertainty on these relationships are also considered. Suitable outcomes like supply chain security culture and supply chain business continuity planning are also discussed.

Keywords: relational view; supply chain resilience; security; continuity; relational attributes.

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1 Introduction

The key challenge to supply chain managers is to maximise customer service. There is a continuous challenge to ensure the availability of the right product or service when a customer demands, while reducing costs (Sheffi, 2005a). The complexity of supply

developing the adaptive capability to prepare for unexpected events and to respond to disruptions and recover from them.

Supply chain resilience assumes that not all risk events can be prevented (Jüttner and Maklan, 2011).

Since inception, resilience has been a multidisciplinary and multifaceted concept. Originally, being a subject of scientific research for many years in psychology and ecosystems; recently, it is a subject of interest in relatively new emerging disciplines such as risk management and supply chain management. Still, supply chain resilience lacks sufficient empirical investigation except a few (e.g., Jüttner and Maklan, 2011; Blackhurst et al., 2011). Mostly conceptual works can be cited to date which either review the literature and provide definitions (Rice and Caniato, 2003; Ponomarov and Holcomb, 2009) or guidelines based on best practice examples (Sheffi, 2005b).

Pettit et al. (2010) conceptualised supply chain resilience as a state that can lead to enhanced performance when vulnerabilities are matched with capabilities. Ponomarov (2012) in his dissertation investigated for the antecedents and consequents of supply chain resilience from a dynamic capability perspective and found supply chain management capabilities and information management capabilities act as positive and supply chain vulnerability as negative antecedents to SC resilience. On the consequences side, the study found supply chain resilience to enhance supply chain capital and knowledge development while reducing supply chain process variability. Zsidisin and Wagner (2010) found in their study of supply chain risk sources on disruption occurrence, a significant moderating impact of supply chain resiliency practices. They measured supply chain resilience in terms of redundancy and flexibility in supply chains.

But supply chain, being a network of organisations, consists of entities engaged in exchange relationships and working in collaboration for ensuring overall profitability and success. As disruptions are inherent, therefore, the importance of relational attributes (for e.g., trust, commitment, etc.) in integrating supply chain partners for effective supply chain resilience cannot be undermined. Supply chain studies have repeatedly underscored the importance of various relational attributes like trust, commitment (Johnston et al., 2004), mutual adaptation (Mukherji and Francis, 2008) including supply chain relationship quality (Fynes et al., 2004, 2005a) and buyer-supplier partnership quality (Srinivasan et al., 2011) in models explaining supply chain performance under contingencies. But the field lacks in investigation on supply chain resilience using the lens of relational exchange. Therefore, the following study attempts to address the corresponding gap in the literature.

Specifically, the study tries to address the following questions:

- 1 What are the important relational attributes for ensuring effective supply chain resilience?
- 2 What is the relative importance of specific relational attributes for building resilient organisations?
- 3 What are some of the outcomes of supply chain resilience?
- 4 What are the ways to measure supply chain resilience, the antecedents and outcomes?

to be a crucial component of supply chain relationship quality. Therefore, higher the adaptive capability between supply chain members, greater is the effectiveness of supply chain resilience. Accordingly, the next proposition is formulated as:

- P5 A greater level of adaptation between supply chain members is positively associated with supply chain resilience.

3.1.6 Interdependence

Firms in supply chain need to maintain exchange relationships for achieving desired goals. This is referred to as dependence (Frazier, 1983). Dependence can be viewed in two ways. First, dependence may be defined in terms of a relationship between one party (usually supplier) on another party (usually buyer). Second, the power one party has over another may be due to dependence, usually due to a high percentage of a supplier's output going to one buyer (Handfield and Bechtel, 2004). But in a market with limited suppliers, buyers will have limited interest in negotiating with suppliers. Exchange relationship sometimes makes both the parties to depend on each other (Gundlach and Ernest, 1994). The structure (magnitude and relative asymmetry) of this bilateral dependence establishes the extent of interdependencies exchange relationship (Mohr and Nevin, 1990). Therefore, "interdependence exists whenever one actor does not entirely control all of the conditions necessary for the achievement of an action or for obtaining the outcome desired from the action" [Pfeffer and Salancik, (1978), p.40]. Interdependence results from a relationship in which both firms perceive mutual benefits from interacting (Levine and White, 1962). However, if a firm becomes more dependent on its suppliers, then it loses its flexibility to respond to environmental changes. Therefore, greater interdependence might adversely affect the capability of a firm to respond to disruptions. Accordingly, the study proposes:

- P6 A greater level of interdependence between supply chain members is negatively associated with supply chain resilience.

3.1.7 Moderating role of environmental uncertainty

Environmental uncertainty refers to the degree to which a firm's external environment in terms of its competitors actions, technology, and consumer tastes and preferences, is characterised by an absence of pattern, unpredictability, and unexpected change (Fynes et al., 2004). The success of a firm's strategies depends on the environment in which their partners operate (Holweg, 2005). The allied literature presents two contradicting viewpoints relating to environmental uncertainty.

The first one highlight that firms will collaborate more to reduce uncertainty when it is high (Pfeffer and Salancik, 1978). Based on transaction cost theory, the second one suggests that firms will make efforts to be more self-reliant in times of high uncertainty (Heide and Miner, 1992). Perceived environmental uncertainty has significant impact on a firm's processes (Sutcliffe and Zaheer, 1998). Uncertain environment often mandates high information exchange between partners (Tushman and Nadler, 1978). But transaction cost theory-based literature indicates the difficulty in performance evaluation of partners in uncertain environments (Williamson, 1985). Consequently, it may be difficult for firms to form exchange relationships in such environments (Williamson, 2008).

However, the current study posits that as per RDT, a firm cannot produce everything alone and has to depend on other firms for complementary resources. Hence, the presence of strong relationships will not only help in procuring essential inputs; but will enable both partners to an exchange to perform better under normal circumstances and recover effectively when encountered with environment uncertainties. Studies have portrayed that stronger supply chain relationships are important predictors of performance in times of environmental uncertainties (Fynes et al., 2004, 2005a). This leads to the following argument: greater the environmental uncertainty, stronger is the relationship between the relational resources and the dynamic capabilities.

This forms the ground for the next segment of propositions:

- P7a The greater the environmental uncertainty, the stronger the relationship between trust and supply chain resilience.
- P7b The greater the environmental uncertainty, the stronger the relationship between commitment and supply chain resilience.
- P7c The greater the environmental uncertainty, the stronger the relationship between communication and supply chain resilience.
- P7d The greater the environmental uncertainty, the stronger the relationship between cooperation and supply chain resilience.
- P7e The greater the environmental uncertainty, the stronger the relationship between adaptation and supply chain resilience.
- P7f The greater the environmental uncertainty, the stronger the relationship between interdependence and supply chain resilience.

3.1.8 *Outcomes of supply chain resilience*

Though there can be several outcomes of supply chain resilience, but mainly three constructs are of interest in this study mainly because of recent importance such as:

- 1 supply chain security culture
- 2 supply chain innovation
- 3 supply chain business continuity planning (BCP).

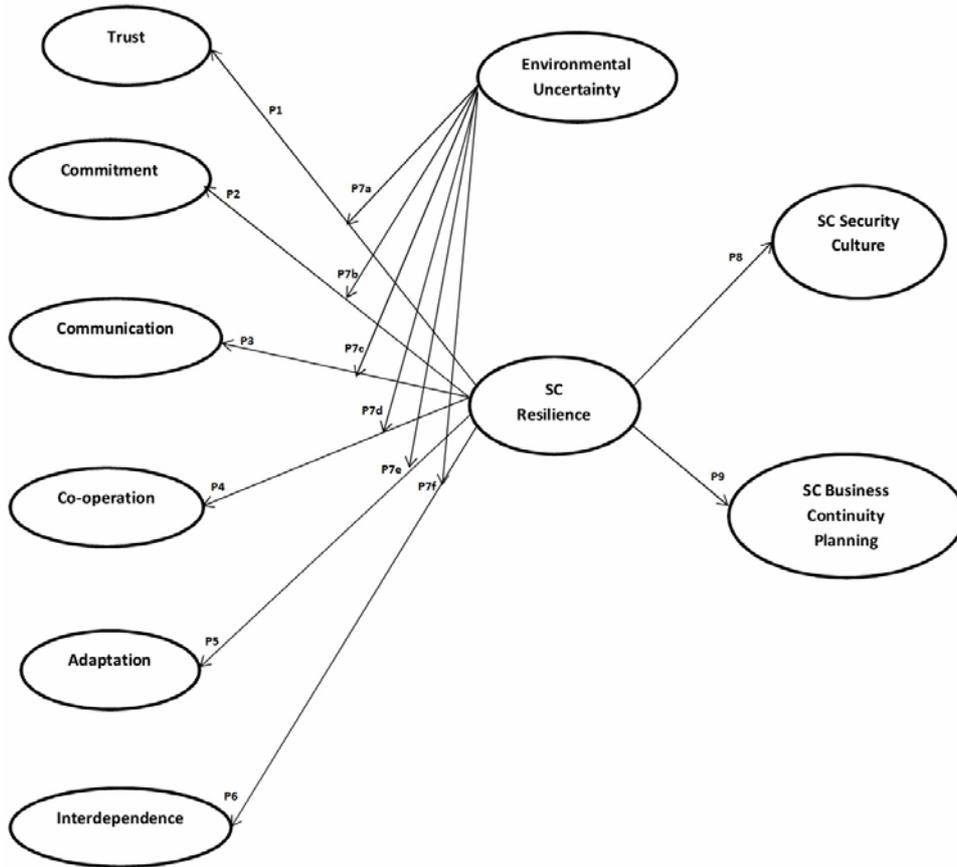
3.1.9 *Supply chain security culture*

The disastrous events of September 11, 2001 (9/11) have alarmed many firms regarding the security of their business operations. The consequences are of more significance to supply chains recently due to their global spread, integrated and complex nature and involve many firms. Many US-based supply chain firms have become aware of these issues and are participating efforts in securing their supply chain (Eggers, 2004).

Therefore, supply chain security has become an essential part of supply chain risk management. Due to its complex nature, supply chains are inherently vulnerable to disruptions, and the failure of any one element in it could cause the whole network to fail [Rice and Caniato, (2003), p.22]. Disruptions have negatively impacted business operations, whether intended or unintended (Hendricks and Singhal, 2005).

“planning which identifies the organization’s exposure to internal and external threats and synthesizes hard and soft assets to provide effective prevention and recovery for the organization, whilst maintaining competitive advantage and value system integrity.”

Figure 2 Theoretical model



BCP in the realm of supply chain consists of four main phases creating awareness, prevention, remediation and knowledge management (Zsidisin et al., 2005) The study also highlights that risk management is central and an undeniable component in supply chain BCP. Supply chain resilience aims to restore supply chain operations profitably under disruptive conditions. Therefore, such a capability acts as remedy whenever a supply chain faces a disruption. Accordingly, supply chain resilience must have a positive influence on BCP in supply chains. Hence, the next proposition can be formulated as:

P9 Greater supply chain resilience will be positively associated with BCP in supply chains.

The above propositions can be summarised in the conceptual model in Figure 2.

4 Managerial implications

The proposed model holds important implications for managers despite being in the conceptual stage. Firstly, managers should understand that recent times urges the presence of trust, commitment, communication, cooperation along with a significant amount of adaptability are all the more important for maintaining effective supply chain relationships. Without these, the benefits of effective collaboration can never be felt to the full. Therefore, supply chain managers must accept that trust with their suppliers and commitment for maintaining the same is vital for mutual existence and optimal performance. The maintenance of the above factors in supply chain relationships urges timely information exchange between the relevant supply chain members. This underscores the importance of communication in supply chain. Without communication it becomes extremely difficult for the partners to understand each other and creates confusion about each other's standing in terms of resources and performance. Cutting-Decelle et al. (2007) discussed various types of supply chain systems and underscored the importance of communication in transmitting relevant and timely information among them. They also highlighted the kind of information that might be required at the critical supply chain junctions depending on the nature of the supply chain.

Secondly, the model suggests managers to collaborate with their partners for preparing for contingencies. This is impossible without the presence of effective relationships between the supply chain partners. Developing capabilities for meeting the environmental changes and uncertainties urges focal firm to collaborate well with each and every member of the relevant supply chain coupled with efficient information exchange between the same. Managers must urge their partners to develop capability to adapt to each other's need for a better 'fit'. At the same time, managers should ensure that their firm is not too dependent on all of its partners and is self-reliant in the main activities and routine operations. In short, a firm should have a certain level of flexibility also in terms of decision making. Lower interdependence is the key for having this desired flexibility.

Thirdly, though the model ignores (to maintain model parsimony) the interrelationships between the relational factors considered, managers must understand that like earlier studies, e.g., Morgan and Hunt (1994), Mohr and Spekman (1994), etc. the above factors are interlinked. This is also fostered by the discussion of the earlier implications in the preceding paragraphs. Hence, supply chain managers should understand that a single factor of those discussed above; though necessary but not sufficient enough for harnessing the benefits of relational exchanges. Accordingly, all the factors are equally important for the maintenance of effective supply chain partnerships.

Fourthly, the model suggests managers to go for stronger relationships in times of environmental uncertainties. Technology will evolve, customer's tastes and preferences will change but to meet these challenges, every member should collaborate with the other one in the chain. This is required for mutual existence and also for performing optimally during such uncertainties. The model also suggests that development of any kind of capabilities in a supply chain mandates the presence of strong relationships which are formed by a culmination of relational attributes of trust, commitment, communication, cooperation, adaptation and interdependence.

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