Organizational Underpinnings of Supply Chain Resilience: The Interactive Role of Organizational Capabilities and Organizational Alignment

Abstract

Resilience is becoming an increasingly important phenomenon and popular concept in business and management research. In this paper, we highlight supply chain resilience, collective resilience of firms forming a core supply chain, as a dynamic capability, incorporate the concept to studies of global supply chain, and discuss its organizational underpinnings. In particular, we developed a conceptual framework where we suggest synergistic interplay between relational capability, absorptive capacity, and adaptive capability that is argued to be strengthened by organizational alignment. In turn, we argue that these three capabilities and their joint leverage improve firms' supply chain resilience. We finally discuss the implication of our study and suggest paths forward for future research.

Key words: Supply chain resilience, Organizational capabilities, Relational capability, Absorptive capacity, Adaptive capability, Organizational alignment

INTRODUCTION

In a turbulent world, risks are becoming unquantifiable uncertainties (Gephart, Van Maanen, & Oberlechner, 2009), engendering their management pivotal to long-term success and survival. For example, the resilience of Nokia's supply chain in relation to that of Ericsson's following a major disruption at their common supplier in 2000 defined the following success and position of the two major rivals in handset industry and paved the way for Nokia's market dominance until the second half of the decade (Lee, 2004). Hence, resilience, long-term persistence of businesses and organizations, emerges as a pivotal factor for responding to various challenges, adversities, and uncertainties (Carmeli & Markman, 2011), and for surviving in settings where firms and their competitive advantages are often short-lived. In fact, rooted in ecology (Holling, 1973) and psychology (Rutter, 1987) disciplines, the concept of resilience has captured increasing attention especially in operations management (OM) / supply chain management (SCM) (Ponomarov & Holcomb, 2009), strategic management (Carmeli & Markman, 2011), international business (IB) (Branzei & Abdelnour, 2010), and organization studies (Youssef & Luthans, 2007) fields. Resilience is argued to be a key ingredient for risk management (Gölgeci & Ponomarov, 2015) across the globe, as risks increase exponentially with international expansion (Manuj & Mentzer, 2008). Thus, such an increased interest in resilience for businesses at home and abroad is underpinned by the recognition that many managers, firms, and their supply chains are not sufficiently equipped to meet the challenges they face and are often vulnerable to disruptions and adversities (Gölgeci & Ponomarov, 2015).

Understanding forces underlying resilience at the system level is a pressing need for advancing the knowledge on this relevant topic. However, though there are many studies examining antecedents of resilience in various contexts and at various levels of analysis (e.g., Golgeci & Ponomarov, 2013; Lengnick-Hall, Beck, & Lengnick-Hall, 2011), interactive role of key organizational capabilities and organizational alignment in enabling the firm's supply chain resilience has not been addressed. Organizational capabilities have persistently been viewed as pivotal elements in achieving competitive advantage (Barney, Ketchen Jr,

& Wright, 2011; Barney, Wright, & Ketchen Jr, 2001). Especially (dynamic) capabilities that command resources and enable reconfiguring ordinary capabilities are key to achieve evolutionary fitness in dynamic environments (Teece, 2014). However, how such capabilities are bundled and applied within organizational frame and strategy of the firm matter as much as the existence of those capabilities (Augier & Teece, 2008, 2009). In particular, though often overlooked in the literature, organizational alignment (OA) may have defining role in bundling and synergistic leverage of organizational capabilities (Jüttner, Christopher, & Godsell, 2010; Powell, 1992) to enable resistance to adversities and survival against turbulence.

The purpose of this study is to investigate the interaction between key organizational capabilities and organizational alignment in enabling resilience of the firm's supply chain. We seek to reveal how key organizational capabilities interact with each other under various levels of OA. We also seek to reveal how the bundle of these organizational capabilities explains supply chain resilience (SCR) as a pivotal dynamic capability and attribute for long-term performance and survival. Within the IB literature value chain research has recently gained more attention as e.g., new players and new methods to govern value chains have come to the fore (cf. e.g., Gereffi & Lee, 2012; Saliola & Zanfei, 2009). The framework advanced here contributes to this line of literature by providing management scholars with a tool to study how SCR is developed.

THEORETICAL BACKGROUND AND PROPOSITIONS

Organizational Environment and Organizational Capabilities

Organizational environment is pivotal to the interface and interaction among capabilities embedded in organizational domain (Ambos et al., 2009; Augier & Teece, 2008, 2009; Carnabuci & Operti, 2013). As organizational structure co-evolve with organizational capabilities, one of the key challenge managers face is aligning the firm's formal organizational structure with the distribution of capabilities across its units (Ambos et al., 2009). Moreover, as firms are embedded in supply chains and no longer compete stand-alone but rather as supply chains (Christopher, 2000), their supply chains have reciprocal and dynamic interplay with their organizational factors such as organizational environment and organizational capabilities.

Three focal organizational capabilities examined in this study are: relational capability, absorptive capacity, and adaptive capability. The underlying common threads interlinking these capabilities are as follows. First, they are all dynamic in nature. Relational capability (RC) enables dynamically accessing and leveraging resources and capabilities scattered within and across firm boundaries (Borgatti & Halgin, 2011; Capaldo, 2007). Absorptive capacity (ACAP) has been conceptualized as a key dynamic capability for knowledge and innovation management (Zahra & George, 2002). Adaptive capability (AC) is viewed as a central attribute of market-oriented organizations for understanding and quickly adjusting to fast-changing markets (Day, 2014). Second, they are operant on resources and other ordinary capabilities. RC enables orchestration of internal and external resources for firm purposes (Möller & Svahn, 2003). ACAP is effective particularly in absorbing, transforming, and reconfiguring knowledge related resources and capabilities for innovative purposes within intra and interorganizational networks (Tsai, 2001). Likewise, AC rests on deploying and utilizing various resources and capabilities to survive the change (Day, 2014). Third, for parsimony reasons, we delve into capabilities that we view as most pivotal for SCR. Organizational capabilities as antecedents of SCR is an under researched area (Ponomarov, 2012), and we argue that these capabilities are among the most relevant organizational capabilities to improve SCR.

Relationships among firms' employees as well as with its supply chain partners play an important role in value creation and competitive advantage (Borgatti & Halgin, 2011). Nonetheless, accessing and leveraging resources and capabilities embedded in networks require presence and systematic application of a dynamic capability. This capability, *RC* is defined as the firm's capability to create, manage, and leverage relationships in its network (Capaldo, 2007). Based on this definition, there are three core attributes of RC that may also be viewed as stages where RC can be applied. These dimensions are establishment, governance, and leverage of relationships. The core utility of RC resides in its enabling role in accessing and leveraging resources and capabilities embedded in firms' internal and external networks (Borgatti & Halgin,

2011; Capaldo, 2007). The three dimensions of RC cyclically feed and complement each other in the pursuit of seeking competitive advantage from firms' intra- and interorganizational relationships.

Managing knowledge effectively is critical to make proper business decisions and achieve competitive advantage (Tsai, 2001). The capability that enables this, *ACAP* refers to organizational routines and processes by which firms acquire, assimilate, transform, and exploit knowledge to produce a dynamic organizational capability (Zahra & George, 2002). ACAP is a fundamental requisite for innovation and change, and ACAP routines and their underlying processes of evolution strongly influence the efficiency and effectiveness of management innovation (Peeters, Massini, & Lewin, 2014). ACAP is a dynamic capability that typically grows and is applied in organizational context for organizational learning (Tsai, 2001). Nonetheless, its relevance to an organization stems from its function as acquiring, assimilating, transforming, and exploiting external knowledge (Zahra & George, 2002).

Third focal organizational capability, *AC* simply refers to the flexibility and efficacy in adapting to a rapidly changing environment (Yiu, Lau, & Bruton, 2007). Adaptability is argued to be pivotal for surviving drastic change and challenges (Lee, 2004). AC is a strategic capability that enables firms to fit and perform in new environments by embracing what this external world offers (Day, 2014). It focuses on balancing exploration and exploitation strategies (Wang & Ahmed, 2007). AC involves being dynamic in achieving better and more effective fit to the alien environment as well as creativity and openness in responding to various external requirements (Molinsky, 2007). Accordingly, AC emerges as an important dynamic capability to achieve evolutionary fit in an increasingly interdependent, vigorous, and intricate world (Day, 2014; Teece, 2014; Wang & Ahmed, 2007).

Supply Chain Resilience

To understand resilience in a supply chain context, we first need to understand supply chains as cotemporary holistic business systems. A supply chain denotes "a set of three or more entities (organizations or individuals) directly involved in the upstream and downstream flows of products, services, finances, and/or

information from a source to a customer" (Mentzer et al., 2001, p. 4). Supply chains can be viewed as a business system often led by an organization, e.g., Apple Inc., with the primary purpose of value creation to relevant stakeholders. Because most supply chains are highly interconnected, embedded, and interdependent especially at their core (Mentzer et al., 2001), characteristics, capabilities, and activities of one important actor can have strong implications for the whole system (Möller & Svahn, 2003). Thus, the understanding of one actor in the chain can better be achieved through encompassing the whole immediate system. In this vein, aggregating the understanding of resilience to a supply chain context is likely to foster the strength of the concept in depicting the actual phenomena (Sheffi & Rice, 2005).

Resilience denotes the ability of mitigating hazards, absorbing disturbance, containing the effects of disasters, recovering from disruption, and reorganizing into a fully functioning system (Cutter et al., 2008). In turn, *SCR* is defined as "the adaptive capability of the supply chain to prepare for unexpected events, respond to disruptions, and recover from them by maintaining continuity of operations at the desired level of connectedness and control over structure and function" (Ponomarov & Holcomb, 2009, p. 131). Resilient supply chains are both robustly *malleable* in withstanding disruptions within acceptable degradation parameters and smoothly effective in *recovering* within an acceptable time and composite costs and risks (Haimes, 2009). Nonetheless, SCR is more than a capability deployed reactively, since it enables supply chain member firms both to resist difficulties and adversities and realize the benefits of various opportunities environment present (Sheffi & Rice, 2005).

As an example of the potential benefit of SCR it can be pointed out that beyond being a dynamic capability, SCR is also an effective tool for risk management at the system level. This is true for both pre- and post-management of risks, because SCR enables supply chain members to both prepare and respond to adverse incidents (Colicchia & Strozzi, 2012; Ponomarov & Holcomb, 2009). Thus, though SCR is an integral component of risk management, its utility reaches beyond the purposes of conventional risk

management. SCR is also important for unforeseeable disruptions, i.e. when precautionary measures cannot be implemented (Sheffi & Rice, 2005).

SCR is composed of resilience of relevant supply chain members. Every relevant member of a supply chain is responsible first for building resilience at their own enterprises and then for contributing to the resilience of the whole system (Gölgeci & Ponomarov, 2015). Organizational characteristics of each member firm and relational and activity dynamics among these members are essential to build, sustain, and manifest resilience in supply chain contexts that have become the primary domain of competition (Christopher, 2000). As supply chains are holistic business systems (Mentzer et al., 2001), resilient capabilities of its entities can translate into SCR, as long as member firms makeup a coherent entity as a whole and interactions among them are managed and coordinated effectively.

Synergies among Organizational Capabilities and Organizational Alignment

Although little is known about how various relational capabilities influence firms' AC, higher interactive involvement with business partners is found to be positively associated with adaptiveness (Boorom, Goolsby, & Ramsey, 1998). Thus, we argue that socioeconomic entities with higher RC can be better at interactive involvement with their business partners. Likewise, as firms with high RC are sensitive and tolerant, they are likely to be better at adaptive market behavior (Magnusson et al., 2013). Relationships involve compromises as much as benefits; and firms with higher RC who have holistic and multifaceted understanding of business relationships can have higher levels of AC suited to different contexts and requirements. In fact, firms can utilize their RC manifested in and across their organizations to achieve higher levels of market adaptation through innovativeness (Walter, Auer, & Ritter, 2006). RC could be source of innovative ideas and practices that could in turn be used to adapt market needs (Capaldo, 2007). Thus, we argue that regardless of whether it is developed and manifested in intra- or interorganizational contexts, RC can play a positive role in enhancing development and application of AC.

P1A: *A firm's relational capability has a positive influence on its adaptive capability.*

AC and ACAP are intricately intertwined as two key dimensions of dynamic capabilities (Wang & Ahmed, 2007). Both capabilities could possibly have bidirectional and synergistic influence on each other. Nonetheless, ACAP, as a capability whose utilization is likely to precede that of AC, could have stronger positive contribution to AC than vice versa. Continuous morphing permeated in various aspects of firms' lifespan (Rindova & Kotha, 2001) is typically made possible through knowledge management practices and absorption of environmental inputs both of which are undergirded by ACAP. Liu et al. (2013) argue that a firm with high ACAP is adept at sensing market changes and learning from experiences that could play a defining role in the extent of adaptiveness that a firm can manifest over time. Thus, ACAP can smoothly translate into increased AC thanks to the application and utilization of knowledge from partners or other external sources for achieving strategic flexibility and alignment of resources, reshaping organizational forms, and constantly shifting strategic needs.

P1B: *A firm's absorptive capacity has a positive influence on its adaptive capability.*

Creating an integrated collaboration network within the firm is argued to concurrently enhance capabilities of divergent nature and enable potential synergies among such capabilities (Carnabuci & Operti, 2013). Nonetheless, the extent of synergies among organizational capabilities is contingent upon organizational dynamics. A key ingredient in organizational dynamics, *OA* refers to the extent to which organizational design, strategy, and culture work together harmoniously (Quirós, 2005). Organizational capabilities can only be bundled effectively if firm objectives are aligned and co-owned by its constituents (Jüttner et al., 2010). Alignment and congruence of organizational elements with one another (internal fit) is essential to jointly leverage various kinds of DCs embedded within organizations (Wilden et al., 2013).

Drawing on this overall notion, we first discuss the role of OA in the relationship between RC and AC. We argue that OA can strengthen the potential positive influence of RC on AC. The essence of our position stems from organizational theory investigating behaviors in organizations and their outcomes (e.g., Powell, 1992). By unifying organizational constituents and smoothening intraorganizational interactions for

better adaptation, OA can provide necessary ground that enables RC to function more effective in fostering AC. RC could be more useful for accommodating market changes when there is a higher alignment among firms' priorities, activities, and structure that enables moving to one targeted direction instead of rambling around due to organizational forces pulling toward different directions.

P2A: *Organizational alignment strengthens the influence of relational capability on adaptive capability.*

Likewise, OA can strengthen the influence of ACAP on AC. Utilizing external knowledge and executing these decisions to adapt quickly to market changes entail unified mindset as well as streamlined and aligned processes (Gligor, 2013). Given its nature and key benefits discussed above, OA can function as a catalyst in translating ACAP into AC. Firms that align and unify their internal structures and activities can be effective in orchestrating their supply chains and managing supply chain knowledge for adapting to market needs (Möller & Svahn, 2003). As many firms have to deal with multitude of values, worldviews, and business paradigms within their organizations (Hoskisson et al., 2005), OA could be pivotal in leveraging potential synergies between ACAP and AC, by facilitating the leverage of immense potential of external knowledge for more effective adaptation to business environment.

P2B: *Organizational alignment strengthens the influence of absorptive capacity on adaptive capability.*

The Linkages between Organizational Capabilities and Supply Chain Resilience

The role of various capabilities in achieving resilience has been addressed before (e.g., Ponomarov, 2012). Such studies suggest that resilience represents adaptive and dynamic attributes that integrate individual capabilities creating positive synergetic effects to achieve long-term competitive advantage and survive change (Ponomarov & Holcomb, 2009). Accordingly, it is expected that resilience of the firm's supply chain and supply chain partners are at least partially contingent upon the organizational capabilities that supply chain members possess and apply in response to unexpected change or adversities. We start our last set of propositions with the role of RC in SCR.

Revisiting the key elements in the definition of SCR, where the word of *connectedness* highlights the place of interorganizational relationships in SCR, can give hints about the link between RC and SCR. In fact, one of the key underlying elements that keep supply chains resilient is the nature of relationships between supply chains reflected in connectedness and coherence among the partners. A key ingredient that keeps such relationships working effectively is RC and its various manifestations such as cultural capabilities (Magnusson et al., 2013) and collaboration (Ponomarov, 2012), since collaborative partnerships help manage risks effectively (Sinha, Whitman, & Malzahn, 2004). RC can make the whole supply chain more visible due to its role in accessing various information resources (Borgatti & Halgin, 2011; Capaldo, 2007). In turn, increasing the visibility of information and activities across the supply chain reduces the risks (Chopra & Sodhi, 2004). In a similar vein, collective use of resources and access to valuable resources provided by networks (Borgatti & Halgin, 2011) could be fostered by RC in the pursuit of SCR.

P3A: *A firm's relational capability has a positive influence on its supply chain resilience.*

Adaptiveness is an integral part and defining attribute of resilient supply chains (Ponomarov & Holcomb, 2009). Especially with regard to its *malleability* attribute, firms' and their supply chains' resilience could partially be measured against the extent of their adaptive responses to sudden impacts and adaptiveness to new conditions. Firms with high AC can face sudden disruptions and adversities flexibly without losing intactness of their structure and operations. They can adapt to new situations quite smoothly and effectively, which can foster their likelihood of survival and bouncing back from deformity. Likewise, adaptive firms and supply chains are more likely to endure extended periods of difficulties and challenges.

P3B: *A firm's adaptive capability has a positive influence on its supply chain resilience.*

Uncertainty and uninformedness cloud judgement, and socioeconomic entities need knowledge of the external environment to navigate their daily activities and sustain their existence. Accordingly, ACAP as a capability that determines success of acquiring, assimilating, transforming, and exploiting external knowledge (Zahra & George, 2002) could serve as a critical enabler of SCR. Firms and their supply chain

could leverage their ACAP to acquire and utilize knowledge against abrupt and/or sustained difficulties. Furthermore, ACAP could be critical for putting knowledge for innovative use (Peeters et al., 2014) against disruptions and adversities that has been shown to enable SCR (Golgeci & Ponomarov, 2013; Gölgeci & Ponomarov, 2015). Knowledge and understanding of supply chain structures (physical, relational, and intangible), which could be harnessed via ACAP, are important elements of SCR (Choi & Hong, 2002). Thus, we argue that ACAP can function as an important enabler or SCR.

P3C: *A firm's absorptive capacity has a positive influence on its supply chain resilience.*

The conceptual model of our paper is presented in Figure 1.

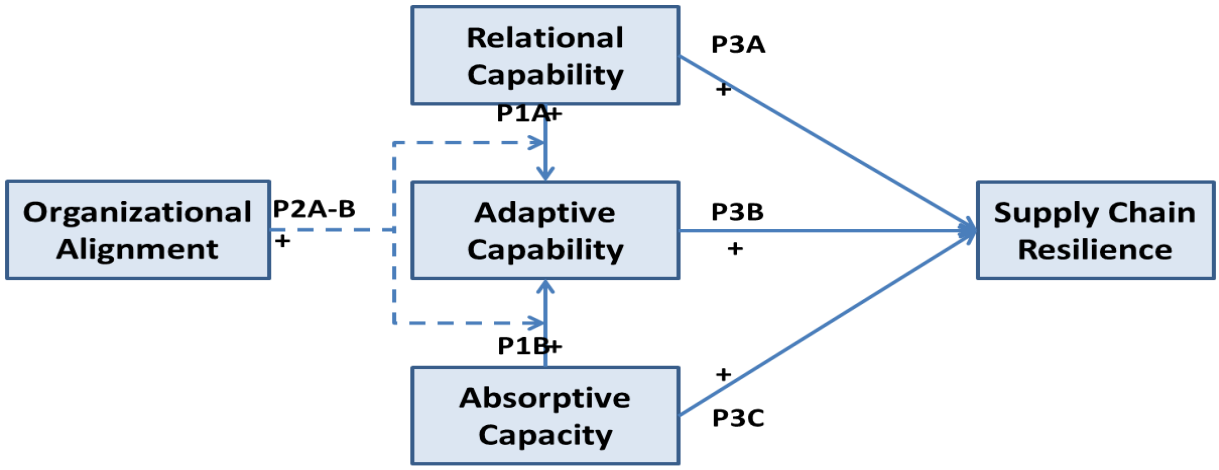

Figure 1: Conceptual Framework

Discussion and conclusions

In this paper we have provided a platform on supply chain resilience (SCR) for further studies in the domain of global supply chain management. With resilience, we have meant long-term persistence of businesses and organizations that is pivotal for responding to challenges, adversities, and uncertainties they face (Carmeli & Markman, 2011). Bello and Kostova (2012, p. 539) have noted that "the heart of any research is its conceptual underpinnings in terms of theory or theoretical perspective taken, constructs, models and hypotheses". The main driver behind our conceptualization has been that the interactive role of key organizational capabilities and organizational alignment in enabling the firm's SCR has not been addressed.

Existing IB research has surprisingly been rather silent about the determinants of the SCR, although supply chains' importance has been highlighted (e.g., Gereffi & Lee, 2012). Our main premise has been that organizational capabilities and dynamics among such capabilities at the organizational level are likely to play an important role in the resilience of the firms' supply chains which form often complex business entities spreading their operations into all parts of the world (cf. Buckley, 2009).

We suggest that organizational alignment and three dynamic capabilities, namely RC, ACAP, and AC, can be seen as important antecedents of SCR. The interplay between different capabilities can be complex and contingent upon the focal organizational environment. For example we suggest that the level of AC, which can be viewed as a one of the central enablers of SCR as it would e.g., enable quick adjustments of the supply chain, would be determined by the firm's RC, which would e.g., help the firm to learn from its partners, and its ACAP, which would enable the firm to utilize the gained knowledge. However, these capabilities should fit contextually to the organizational environment which would require careful planning from the managers how to develop their respective organizations in the best possible way. The alignment process of the organization should include integrative objectives for the whole supply chain and performance evaluations on the basis of these objectives, rewarding on the basis of co-operation, and work in cross-cultural teams, for example. All in all, the role of organizational alignment (OA) should be highlighted as a basis for success, and in our model we suggest it would play a positive moderating role in the development of AC. In particular, we argue that the positive influence of RC and ACAP on AC will be stronger when firms align their processes, activities, goals across functions.

Drawing on these informed arguments, our paper makes distinct contributions to research on organizations and IB. First, by highlighting the interplay between organizational capabilities, we contribute to inquiries on capability bundling and reconfigurations within organizational setting. We trust that our study could be one of the stones for building knowledge on dynamic capabilities within organizations. Second, we link research on organizational environment and organizational capabilities and put forth a position that

suggests OA could be a critical element for synergistic deployment and utilization of dynamic organizational capabilities. We argue that development, application, and utilization of capabilities cannot be separated from organizational environments such capabilities are embedded in, and we highlight OA as an important element to consider within organizational environment. Third, we put forward SCR as a critical dynamic capability for the management of supply chains across national boundaries. We believe the topic of resilience deserves to receive the same level of attention from organization and IB research as it does from other disciplines like ecology and psychology.

Future research should naturally consist of empirical testing of the suggested model. Other further research could focus on e.g., the role the firm plays in the supply chain. In this vein, the linkage to the network approach to internationalization could be built, for example (cf. Johanson & Vahlne, 2009). There is a limited research on upstream value chains in the IB journals and it can even be suggested that studies focusing on the importance of complementary resources that endow firms with their strategic position (Teece & Pisano, 1994) are even less common (cf. Griffith, Cavusgil, & Xu, 2008; Lew, Sinkovics, & Kuivalainen, 2013). For this literature stream we would see the use of SCR as a performance measure a useful addition. When we would gain more confidence in our knowledge of the determinants of SCR based on empirical testing, the next step would be to develop more detailed managerial and organizational processes associated with SCR. In this we hope our model provides a good starting point.

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