

Effects of Supply Chain Flexibility towards Supply Chain Collaboration and Supply Chain Agility

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Abstract - Facing uncertain environment, the cultivation of agility is approached as a strategic ability that assists organizations rapidly to sense and respond internal and external uncertainties via effective collaboration of supply chain relationships. The objective of the study is to uncover how organizational antecedent, supply chain collaboration (SCC) and organizational competency, supply chain flexibility (SCF), aimed at augmenting the supply chain agility (SCA) of firms. To take advantage of available market opportunities, firms would see the supply chain that are flexible will outperform those are less agile. Thus, SCF has emerged as a vital management strategy to strengthen the relationship between SCC and SCA as firms will be more flexible and responsive to an unpredictable environment and cope with ever changing customer's requirements. In this paper, an attempt is made to present a conceptual model of the organizational antecedents that affect the agility of supply chain in the context of small and medium manufacturing firms.

Keywords— Supply Chain Collaboration, Supply Chain Agility, Supply Chain Flexibility

1. Introduction

An emerging body of research in supply chain management pertains to the development of supply chain collaboration (SCC) and supply chain agility (SCA) in order to cope with the challenges of more dynamic market places. In recent years, in addition to increasing levels of competitive pressure, business environment especially for small and medium manufacturing firms have also been characterized by growing levels of unpredictability and turbulence. Therefore, it has been stressed that organizations must consciously develop collaboration to enhance agility for managing disruption risks and ensure uninterrupted service to customers. In the meantime, the strategic roles of supply chain

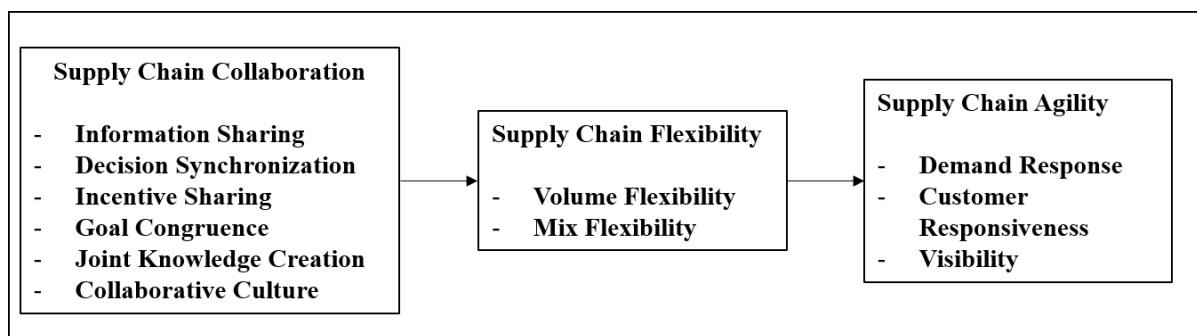
flexibility (SCF) in terms of mix flexibility and volume flexibility are vital to provision of the superior value creation to the customers, supply chain partners and organization itself. The SCF reflects flexibility in supply chains are capable to adapt effectively to changes in demand and disruptions in supply whilst maintaining customer service levels.[1],[2].

2. Theoretical Development

Focusing on enhancement of small and medium manufacturing firm's agility in supply chain, the organizational antecedents of agility form the central elements of interest. The theoretical model postulated is shown in Figure 1. Firstly, it is hypothesized that a firm's SCA is impacted, as direct antecedent by organizational practices of: (1) SCC and SCF. The rationale for the hypothesized model structure, definitions for various constructs, rationale for relating them and the resulting hypotheses are outlined below, starting with two organizational practices.

2.1 Supply Chain Collaboration

The concept of collaboration theoretically envisages that the supply chain members who become involved in collaborative efforts will outperform in term of low cost strategy, visibility of market demand in production and customer responsiveness. Simatupang *et al.*[3] concluded that three critical components of SCC such as information sharing, decision synchronization, and incentive alignment facilitate the improvement in meeting customer responsiveness. Specifically, the previous studies supported the finding that information sharing, decision synchronization and incentive alignment [4] able to facilitate the process of fulfilment due to the improvement in visibility of the inventory and

Table 1: Conceptual model

demand levels throughout the supply chain [5]. Hence, supply chain members were able to perceive the benefits of collaboration from the combination of decision synchronization and incentive alignment to support the agility of firm's supply chain.

The research findings by Evrard-Samuel [6] and Singh and Power [7] also agreed the need to shift from traditional dyadic relationships to joint knowledge creation and relationship building with both customers and suppliers. Therefore, collaborating using synchronizing decision making in operations and improvements within the supply chain is one of the essential elements of SCC[8]. Goal congruence incorporated the expectations and needs of the supply chain partners as the planning on strategies in SCC in order to raise the performance of the organization as well as the whole supply chain [9],[10] Fawcett *et al.*[11] reported the importance of a nurturing collaborative organizational culture in order to achieve great collaboration results in the supply chain. An organization with collaborative culture will help the organization to reduce cost, improve quality and expedite the time-to-market of new products. Similarly, collaborative organization culture encourages employees to learn new knowledge, stimulate new directions in their works and moves the organization forward to achieve supply chain goals[12].

2.2 Supply Chain Flexibility

SCF, in contrast, embraces a process-based view and also includes the core processes of procurement and distribution [13]. In supply chains, there are many sources of uncertainty arise from supplier lead time, market demand, information delay and also product quality. From the views of strategic perspective, SCF enables a company to respond more quickly to the changes in supply and demand [14]. Manufacturers adopt flexible practices in response to the uncertainty and turbulence in the marketplace and to meet customer expectations without excessive cost, time or disruption [15],[16],[17].

The mix and volume flexibility outlined by the work of Braunscheidel and Suresh¹⁸ intended to focus on how the external facing flexibility will impact the external facing collaboration relationship in an uncertain and volatility environment. Mix flexibility is the ability of an organization to produce different combinations of products economically and effectively given certain capacity. Volume flexibility can be defined as the ability of an organization to operate at a variety of different output levels without compromising the performance of the system from either a cost, quality or service perspective. Hence, for the means of being flexible, manufacturers need to recognize as important to reinvent and reconfigure the supply chain to provide more dynamic synergy effects between supply chain partners in focusing on mix and volume flexibility.

2.3 Supply Chain Agility

From the perspective of manufacturing, agility can be as a means of the successful adoption of competitive bases (flexibility, speed, quality, profitability and innovation proactivity) through the collaboration of reconfigurable resources and best practices in a knowledge rich environment to provide customer- driven product and services in an uncertain market setting. Firms with agile supply chain are better tuned in for demand response. Clearly, SCA enable firm's supply chain to respond quickly the changes in market demand without overstocks or lost sales by leveraging the competencies of supply chain partners. Hence, the visibility of the supply chain is improved and enables firms to sense market place changes in real time, thereby reducing the cost of demand uncertainty [18],[19] SCA also enables firms to coordinate with their partners with a shared vision on business processes. This coordination reduced the potential conflicts and opportunistic behaviors within the supply chain, and motivates the firms to pool and deploy resources with supply chain partners to enhance the efficiency of products and service delivery.

Hence, the visibility of demand and inventory levels are communicating well throughout the supply chain.

2.4 Effects of SCF on SCC and SCA

SCF is the capability of the firm, internally, and in conjunction with its key suppliers and customers, to adapt or respond in a speedy manner to a changing marketplace, contributing to agility of the extended supply chain [18]. Therefore, for this reason firms have given greater attention to the value of collaboration [3],[12],[22] While a number of studies emphasize that an organization's relationship with its partners is the cornerstone to effective supply chain management, this has proved to be problematic for some organizations in terms of time and cost. This highlights the importance of relationship dynamics to SCA[21],[22] Likewise, the study by Cao and Zhang[12] and Mandal [25] also showed that perhaps the advantages of SCC may not be fully recognized unless SCF has been adapted. Liu *et al.*[17] argued that without support and collaboration, such capabilities such as SCA cannot be harnessed to the full extent to emanate a positive and satisfactory performance. They further argued that collaboration is necessary in a supply chain for successful development of SCA as well as SCF. The importance of collaboration among the supply chain partners in developing capabilities and reaping maximum benefits have been stressed [23],[24] In a similar context, Gligor and Holcomb⁵ through an extensive literature review, argued that individual logistics capabilities of participating firms can be effectively integrated at a supply chain level to develop supply chain agility.

Li and Ogunmokun viewed the SCF of a firm as the "ability to provide a varied product mix in response to changes in market demand by taking on an increased range of tasks, obtaining timely suppliers, and rescheduling the order of production"; and they also viewed the response flexibility of a firm as the "ability to provide a quick response to changes in delivery requests by tracking inventory and sales, assuming carrying expenses, and speeding up container movements". However, not all the resources owned by SMEs bestow enduring value to the organizations and supply chain. The greater a firm's ability to differentiate itself and use its VRIN resources, the higher its chances of achieving superior performance. Consideration of these capabilities inspired SMEs should consider SCF as a critical mediating factor that enhances the relationship between SCC and SCA. Swafford *et al.*[26] questioned the direct effects of SCC on firm's SCA by contending that the effects are

mediated by other competencies or capabilities[18],[25],[27] Likewise, the greater the effort of the organization towards flexibility with supply chain partners, the stronger the relationship between SCC and SMEs SCA is[28].

3. CONCLUSION

Our study suggested a relationship exist between SCC, SCF and SCA in order to overcome the poor transparency of knowledge and information between downstream and upstream supply chain partners through a sustainable supply chain relationship. Consistent with RBV, Swafford *et al.*[26] characterize flexibility-agility association as a competence-capability relationship which can be formed as a source of competitive advantages. In this light, SCA may view as an externally focused capability, while flexibility is an internally focused competency that is its antecedent. As Swafford *et al.*[26] point out, a system can be flexible without being agile, but an agile system is also flexible. This further confirmed the role of SCF in SCA through a competence with the needs of an organization facing fast-changing demands in the marketplace. For the most part, SCF. Hopefully, this conceptual model will provide valuable insights to researchers and practitioners to reveal the potential advantages of SCF in supply chain relationship.

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