

A Review of Supply Chain Collaboration Practices for Small and Medium-sized Manufacturers

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Abstract. For the decades, organizations have endeavored to look for external sources for opportunities to achieve efficient and responsive supply chain with their partners especially for small and medium manufacturers (SMM). In this scenario, supply chain collaboration (SCC) is an interaction between supply chain members with the purpose of utilizes the knowledge and resources of customers and suppliers, and integrates the flows of products and information in order to achieve a common goal and obtain mutual benefit. The essential SCC dimensions for SMMs comprised of information sharing, joint knowledge creation, joint decision making, goal congruence and incentive sharing. The successful implementation of SCC can give SMMs an edge over their competitors. This paper aims to introduce a review of SCC practices for SMM. Overall, the findings provide managerial insights for the SMM in SCC implementation owing to resource scarcity and the need to draw SCC in order to ensure a sustainable competitive advantage.

1. Introduction

Supply chain collaboration (SCC) is defined as “the formation of close, long-term partnerships where supply chain members work together and share information, resources, and risk to accomplish shared objectives” (Cao and Zhang, 2011 pp.166). SCC is one of the most common norms for many companies around the world (Ramanathan and Gunasekaran, 2014). Collaboration encourages all members in the supply chain to participate in planning, information sharing, forecasting, replenishment, incentive sharing and resource sharing (Ramanathan, 2012; Hudnukar et al., 2014). Furthermore, the application of SCC able to cut down the operating costs (Adams et al., 2014), improve in decisions execution (Swink et al. 2007; Kim and Lee 2010), and strengthen the provision of time-and-place utility to the customer (Randall et al. 2010).

In a traditional supply chain, the flow of materials and information are linear and is limited in terms of collaboration and visibility (Qu and Yang, 2015). Each supply chain partner has limited information regarding each other. Therefore, the main focus of SCC is to manage resources and collaborative behavior across partnering organizations in a supply chain effectively (Hudnukar et al., 2014). Nowadays, more and more organizations have begun to coordinate their production and distribution channels and collaborate with supply chain partners instead of managing their internal resources alone (Baraldi et al., 2012).

In the context of small and medium-sized manufacturers (SMMs), cost-effective SCC strategy is critical for their survival and growth. There is a controversy surrounding the benefit which SMMs can



derive from SCC. However, studies evidence that SMMs can actually benefit from SCC (Rezaei et al., 2015). For instance, Zeng, et al. (2010) discovered that inter-organization partnership has the most significant positive effect on the firm performance in a study of Chinese manufacturing companies. Furthermore, SCC provides SMMs with access to comprehensive and external expertise that can guide them to resolve business problems and allow them to engage in learning networks. For instance, successful SCC can be shown by market share, market share (Mishra and Shah, 2009) and also the satisfaction of supply chain partners. Therefore, future collaboration projects will mainly based on the success of current collaborative partnership (Ramanathan and Gunasekaran, 2014). In a similar vein, Eyaa et al. (2010) conducted a study in SMMs in Uganda, a developing nation to reveal the perceived benefits of SCC to SMMs. The study shows that information sharing and incentive alignments were found significantly related to supply chain performance. Another study by Katunzi and Zheng (2010) on Tanzania's SMMs showed that collaboration with supply chain partners able to provide local SMMs the chance to make collective agreements in quantity planning, demand and delivery time to customers.

2. Supply Chain Collaboration Practices

Collaboration effort is the main ingredient of SCC that facilitates the flow of communication and cooperative efforts between departments (Flynn et al., 2010a). Hence, a highly collaborative of supply chain involves the collaboration efforts from functional departments, suppliers, customers as well as outbound and inbound logistics to connect and coordinate the flow of raw material supply to end customers. The essential SCC dimensions for SMMs include information sharing, joint decision making, incentive sharing, goal congruence and joint knowledge creation (Simaptung and Sridharan, 2008; Zacharia et al., 2009; Cao and Zhang, 2011; Hudnukar et al., 2014).

2.1. Information Sharing

Information sharing is described as the “nerve center” (Chopra and Meindl, 2007), “heart” (Lamming, 1996), “lifeblood” (Stuart and McCutcheon, 1996), , “essential ingredient” (Min et al., 2005), “foundation” (Lee and Whang, 2000) and “key requirement” (Sheu et al., 2006) of SCC. Therefore, information flow is the vital element in any relationship and is the primary flow in a supply chain (Chopra and Meindl, 2007). Information sharing determines the way and magnitude of the material flow such as finished product from suppliers to end user and also the product return and repairs from the end user. The information flow may include of the exchange of transactional data, from product manufacturing, customer feedbacks to products research and development matters.

Information sharing is seen as the “glue” that strengthen the business structure of supply chain partners which allow supply chain to be more agile in dealing with competitive advantages (Hudnukar et al., 2014). Furthermore, since the suppliers are located all over the world, it is essential for the organizations to exchange accurate and timely information between partner organizations in order to achieve mutual goals. Crook et al. (2008) suggested that when independent firms collaborate and share knowledge with others, they can achieve the advantages beyond what could achieve in arm's length exchange. However, organizations often alert of sharing sensitive information within the supply chain. They may concern about the leak of valuable information to their rivals such as demand forecasts, new technology acceptance and new products developments. Therefore, the collaborative supply chain relationship will be able to reduce the chance of information leak. Trust among supply chain partners plays an important role in information sharing through the supply chain (Fawcett et al., 2007).

Haji-Pakir and Alina (2010) discovered that the information sharing process in SMMs is top down which is from the manufacturer to the bottom of the supply chain, but the information is dedicated only to the relevant party. Due to the flat organizational structure of SMMs, the information is able to reach relevant parties more efficient than the highly structured organizations (Grant et al., 2010; Papastathopoulos and Beneki, 2010). In support, Eyaa et al. (2010) found that the SMMs in Uganda

easily share information with their supply chain partners by using emails to improve supply chain performance.

2.2. Joint Decision Making

Joint decision making refers to the process of supply chain partners synchronize their decisions making process in supply chain planning and operations with the purpose of supply chain benefit optimization (Simatupang and Sridharan, 2002; 2005). Besides, supply chain decisions include combining plans and information, resolving differences and conflicts and establishing routines, procedures, and rules (Cao and Zhang, 2011; 2013). Some problems occur in decision-making processes when information is widely dispersed or there is unclear authority structure on how the decision should be made with the concern for supply chain member benefits (Hudnukar et al., 2014; Ramanathan and Gunasekaran, 2014). Conventionally, organizations perform business processes individually, but Ding et al. (2011) raised concerns that independent decision-making tends to sub-optimal business performance such as bullwhip effect. Bullwhip effect can happen due to limited knowledge about market demand in each company of a supply chain (Mackelprang et al., 2015). Hence, bullwhip effect causes inaccurate inventory order which leads to unnecessary inventory and total costs (Ding et al., 2011). The activity of joint decision making includes of re-assign the decision rights to sync up supply chain planning and execution that try to fulfil the demand with supply. In addition, an effective decision making is based on supply chain profitability (Corbett et al., 2012) and the rapid response in fulfilling customer demand. The virtual discussion forums and face-to-face meetings are the examples of joint decision making process take part by supply chain partners.

Managers are very often the owners of the SMMs, and most of the decision making is dominated by them (Ghobakhloo et al., 2011). The competence of owner-manager is the most important determinant of an SMM's success (Cocca and Alberti, 2010). However, the studies by Wiengarten et al. (2010) and Eyaa et al. (2010) found that joint decision making may not necessarily lead to improved SMMs performance. Due to the visions, missions, and leadership style of SMMs, sometimes it is not easy to attain the balance of all supply chain members. Therefore, SMMs need align the supervision systems with joint decision making as well as organizational support (Eyaa et al., 2010).

2.3. Incentive Sharing

As highlighted by Simatupang and Sindhuan (2005), incentive sharing is a process of risks, costs and benefits sharing among supply chain partners. SCC is a relationship strategy between the supply chain members, development of short-term or long-term planning to achieve lower risk, higher quality, and greater product innovation to enhance performance (Lee and Whang, 2001; Manthou et al., 2004). In the view of successful partnership, the sharing of profits and losses should be equally distributed among the partners. Hence, the supply chain partners need to act in rational ways to achieve the mutually agreed objectives as a collective responsibility (Salmela et al., 2011).

Simatupang and Sridharan (2002) proposed that interdependency between supply chain members can develop in the forms of tasks and tasks, resources and resources, and tasks and resources. From organizational perspective, tasks are viewed as the main activities such as forecasting, planning, purchasing, distributing, replenishing, pricing, paying, and serving. The organizational resources can be referred as inventory, capacity, funds, and capabilities. Despite the fact that the collaboration is based on the collective agreement, but it is still perceived as a self-interest process where supply chain members seek to obtain individual advantages such as eliminating redundant functions, reducing transactional costs, increasing responsiveness, achieving lower inventory, and so forth (Cao et al., 2011).

In order to create an effective incentive sharing scheme, the supply chain partners need to consider three basic questions: how the incentive can be linked with overall performance, how the incentive is to be paid and what level of incentive is to be paid (Scholten, 2015). If the objective of the collaboration is to achieve lower total cost and enhance the profit structure, the partners should select a

performance measure based on their objective when determining the incentive (Simatupang and Sridharan, 2005). In fact, the design of incentive sharing scheme should be able to draw attention, encourage, and maintain participating partners in achieving the common outcomes by linking a portion of participating partner's compensation to common outcomes. Jap (2001) discovered that fairness is particularly essential in the allocation of collaboration's outcomes in order to maintain the relationship between supply chain members. The incentive distributed to the supply chain partners should commensurate with the respective investment and risk (Hui et al., 2015).

2.4. Goal Congruence

Nowadays, most of the supply chains are integrated with individual preferences (Prajogo et al., 2012; Wang et al., 2016). Goal congruence refers to the extent in which supply chain members perceive their objectives to be satisfied by the fulfilment of the supply chain objectives (Kohli and Jensen, 2010; Hudnurkar et al., 2014). Goal congruence includes the defining roles and responsibilities of each partner, development of objectives, common goals, performance measures, standardization of information technology, formalization of shared information, and jointly implement the plan (Min et al., 2005).

As highlighted by Poirier and Houser (1993, p.201), "True supplier partnering requires an understanding of each party's needs and capabilities to establish a clear vision for focusing the efforts of people who work for buyer and supplier". A clear strategic goal leads to accomplishment of collaborative agreements. Supply chain members need collectively design the collaboration implementation plans in order to achieve the desire goals (Cao and Zhang, 2011). Additionally, Lambert et al. (1998) raised several concerns about the importance of strategic direction and the business vision of the participating organizations. The study suggested that supply chain partners need to be in line with the SCM vision and key business processes. Supply chain members need to focus on the collaborative relationship to gain the greatest inter-firm improvements and rewards (Krishnapriya and Rupashree, 2014). Hence, without such a roadmap, optimal collaborative results cannot be achieved (Cao and Zhang, 2011). Also, the expectations and needs of the supply chain members need to be taking account into the supply chain strategies and operations to enhance member's profit, cash flow, and return-on-investment (Ramanathan and Gunasekaran, 2012).

2.5. Joint Knowledge Creation

Joint knowledge creation occurs when supply chain members perceived the need for interrelated skills and assets. Generally, there are two types of knowledge creation which are knowledge exploration and knowledge exploitation. Knowledge exploration refers to the search and acquires of new and relevant knowledge. Moreover, knowledge exploitation refers to assimilate and apply relevant knowledge (Bhatt and Grover, 2005). Identify, communicate, and assimilation of knowledge in process, technology, or market knowledge between supply chain members can trigger innovation and long-term competitiveness of the supply chain. It is important to realize that supply chain partners need to identify jointly customer needs. Also, supply chain partners need to build a knowledge base together such as disseminating and sharing interpretation that enable organizations to create new values such as responding to customer's needs, building brand image, developing new products and establishing channel relationship (Slater and Naver, 1995; Johnson and Sohi, 2003; Luo et al., 2009).

Managing dependency in a collaborative partnership has become a critical process. Organizations and its supply chain partners need to learn jointly the intentions and capabilities of their competitors (Cao and Zhang, 2011). The learning-based relationship between supply chain partners can maintain supply chain relationships and achieve the firm's goals. Scholten (2015) found that the jointly created knowledge contributes to more supply chain resilience. The importance of shared learning among the supply chain members can increase the search and acquire suitable knowledge, which in turns enhance the visibility of shared information, avoid disruptions in downstream and upstream of a supply chain.

3. Conclusion

An integrated SCC is needed to form in the supply chain network in order to reduce the perennial supply chain challenges such as functional silos, poor transparency of knowledge and information and the inadequate formation of appropriate upstream and downstream relationships. For the most part, SCC plays a key role in stimulating organizational performance (Cao and Zhang, 2011; Ha *et al.*, 2011). SMMs are encouraged to utilize information sharing on defining mutual objectives and associated performance measures and link their performance systems with incentive sharing scheme to compensate the partners fairly. The clear linkage between SMMs will encourage their partners to improve shared supply chain processes that benefit the supply chain. Hopefully this paper will provide insight to researchers and practitioners to have better understanding towards the effectiveness and efficiency of SCC.

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