

Supply Chain Collaboration – What’s an outcome?

: A Theoretical Model

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Abstract. This paper proposes a supply chain collaboration (SCC) concept. Previous research reported that SCC can affect organizational performance. The object of this article was therefore to examine the consequent of SCC on organizational performance. The research question was how SCC affects firm outcomes. The concept proposed was that SCC has positive effect (such as cost reduction and operational flexibility) on firms and that the effect is a long-term effect. In addition, variable measurement scales were subsequently developed. Contribution and suggestion for future research also discussed.

Keywords: Supply Chain Collaboration, Competitive Advantage, Organizational performance

1. Introduction

Today almost all organizations are in the process of adopting the supply chain activities. Organizations began to perceive that it is not enough to improve efficiencies within an organization. Likewise, supply chain of organization has to be made competitive. Collaboration is one of the most talked about topics in business today [1][2]. Many collaboration dynamics have been identified as being important in improving supply chain performance. Collaboration may share large investments, pool risks, and share resources, reasoning growth and return on investments [3]. Collaboration has been referred to as the driving force behind effective supply chain management [4][5] and, as such, may be considered as a core capability [1][2]. Collaborative relationships can help firms to share risks [7] and to access complementary resources [8].

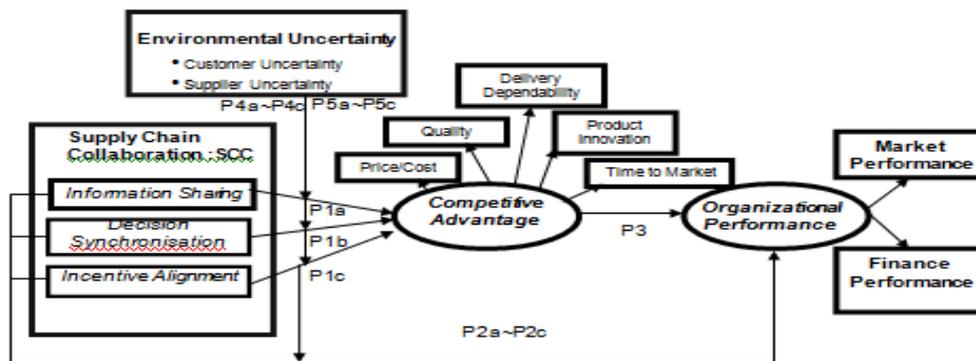
Therefore, collaboration of supply chain facilitates the cooperation of participating members along the supply chain to improve performance [9]. The benefits of collaboration include revenue improve, cost reductions, and operational flexibility to cope with high demand uncertainties [10][11]. Thus, an understanding of supply chain collaboration (SCC) has become an essential for staying competitive in the global competitors and for advantageous improvement.

In addition, the research studies on the collaboration in the context of supply chain are still sparse. However, earlier study on SCC has paid little attention to conceptualizing prominent collaborative practices that help the chain members to understand performance drivers. It is, therefore, worth investigating the consequent of SCC on organizational performance. The research question was how SCC affects firm’s outcomes.

2. Conceptual Model and Proposition Development

A conceptual model is shown in Figure 1. In this model, the relationships among SCC, competitive advantage and operational performance under environmental uncertainty as moderators are indicated. In addition, variables measurement scales are subsequently developed.

Fig. 1: “A conceptual model of supply chain collaboration”



3. Research Model and Propositions Development

3.1. Supply Chain Collaboration

Supply chain management (SCM), based on collaboration between supply chain [12][13][14], has been especially impacted. Several collaboration initiatives have been identified as being important in enhancing supply chain performance. Managers may talk about collaboration and collaboration potential benefits as if collaboration were part of their organization’s value structure, yet collaboration seems that few companies are actually engaged in the level of integration that collaboration propose [15]. The collaboration requires a rational amount of effect from all participating members to ensure the attainment of potential benefits [16][17]. The advent of SCC creates the need, at the intercompany level, to pay special attention to the understanding of collaboration in order to provide the chain members to create collaborative efforts successfully [18].

Collaboration has been widely examined in recent years so that the current study examined collaboration within a supply chain context. SCC is often defined as two or more chain members working together to create a competitive advantage through sharing information, making joint decisions, and sharing benefits which result from greater profitability of satisfying end customer needs than acting alone [19]. The concept of collaboration can be categorized into three dimensions [20] [21].

- Information sharing refers to the act of capturing and disseminating timely and relevant information for decision makers to plan and control supply chain operations.
- Decision synchronisation refers to joint decision-making in planning and operational contexts.
- Incentive alignment refers to the degree to which chain members share costs, risks, and benefits.

Besides the above-mentioned category, the dimensions of the SCC used in this study were information sharing, decision synchronization, and incentive alignment.

3.2. Competitive Advantage

Competitive advantage of firms can stimulate and support collaboration. Competitive advantage is the extent to which an organization is able to create a protectable position over its competitors [22][23]. [24] described a research framework for competitive capabilities and defined the following five dimensions; competitive pricing, premium pricing, value-to-customer quality, dependable delivery, and production innovation. [25] has measured viewpoint of competitive advantage such as; price/cost, quality, delivery dependability, product innovation, and time to market. The viewpoint of [25] was adopted and used in this study.

3.3. Environmental Uncertainty

Environmental uncertainty is a significant external force driving information sharing in SCM. In today’s competitive environment, markets are becoming more international, dynamic, and customer driven;

customers are demanding more variety, better quality, higher reliability and faster delivery [26]. Previous research [27] studied information sharing and information quality in SCM within environmental uncertainty.

In this paper, environmental uncertainty can be categorized into two dimensions as follows;

- Customer uncertainty is defined as the extent of the change and unpredictability of the customer's demands and tastes.

- Supplier uncertainty is defined as the extent of change and unpredictability of the suppliers' product quality and delivery performance.

3.4. Supply Chain Collaboration, Competitive Advantage, Environmental Uncertainty and Organizational Performance

3.4.1. Supply Chain Collaboration and Competitive Advantage

SCC is the involvement of the chain members in coordinating activities that span boundaries of their organization in order to fulfill end customer need [9]. It is a new necessary strategy for firms to create competitive advantage [5][28]. Moreover, it is important in achieving competitive advantage [29]. Supply chain partnering involves collaborative activities such as sharing information, synchronizing decisions, sharing complementary resources, and aligning incentives with partners' cost and risks. Collaboration can increase joint competitive advantage [30]. Therefore, a positive relation between SCC and competitive advantage can be proposed as follows.

P_{1a} : Firms with high levels of information sharing will have high competitive advantage.

P_{1b} : Firms with high levels of decision synchronisation will have high competitive advantage.

P_{1c} : Firms with high levels of incentive alignment will have high competitive advantage.

3.4.2. Supply Chain Collaboration and Organizational Performance

Previous research also supported the finding that information sharing [31], joint decision-making [9], and incentive alignment [32] facilitate the process of fulfillment improvement. It appeared that the chain members would be able to perceive the benefits of collaboration if there was a link between joint decision-making and incentive alignment. This finding strongly supports the idea of combining decision synchronisation and incentive alignment to support improvement in fulfillment performance. This is in agreement with [33] who described that the chain members need to joint decisions to associate costs-to-serve in order to avoid misaligned encouraging that inhibit them from improving fulfillment performance. Therefore, a positive relation between SCC and organizational performance can be proposed as follows.

P_{2a} : Firms with high levels of information sharing will have high organizational performance.

P_{2b} : Firms with high levels of decision synchronisation will have high organizational performance.

P_{2c} : Firms with high levels of incentive alignment will have high organizational performance.

3.4.3. Competitive Advantage and Organizational Performance

If the organizations have competitive advantage, it generally suggests that an organization can have one or more of the following capabilities when compared to its competitors; competitive pricing, premium pricing, value-to-customer quality, dependable delivery, and production innovation. These capabilities will lead to enhance the organization's overall performance [34]. Competitive advantage can lead to high levels of economic performance.

Therefore, a positive relation between competitive advantage and organizational performance can be proposed as follows.

P₃: The higher the level of competitive advantage, the higher the level of organizational performance.

3.4.4. Supply Chain Collaboration and Environmental Uncertainty

Many researchers have considered environmental uncertainty as an important driver for information sharing and information quality [35][36]. Previous research [28] suggests that uncertain industry structure

and market environment encourage the construction of strategic partnership. Previous research also suggests that environmental uncertainty is an important factor influencing information sharing and cooperation within supply chain partners. Consistent with this perspective, environmental uncertainty in this study is referred to the uncertainty from customer and supplier as customers today want more choices, better services, higher quality and faster delivery [37] [38]. Besides, a manufacturer with key supplies that have poor quality and delivery records will find it very difficult to provide high levels of customer service even in a stable environment. Thus, if there is any change of environment in markets, this manufacturer will be eliminated from participation in the competitive game [39]. The above arguments lead to the following proposes:

P_{4a}: The higher the level of customer uncertainty, the higher the relationship between information sharing and competitive advantage.

P_{4b}: The higher the level of customer uncertainty, the higher the relationship between decision synchronisation and competitive advantage.

P_{4c}: The higher the level of customer uncertainty the higher the relationship between incentive alignment and competitive advantage.

P_{5a}: The higher the level of supplier uncertainty the higher the relationship between information sharing and organizational performance.

P_{5b}: The higher the level of supplier uncertainty the higher the relationship between decision and organizational performance.

P_{5c}: The higher the level of supplier uncertainty the higher the relationship between incentive alignment and organizational performance.

4. Variables Measurement

The measurement items for each variable were developed as follows:

4.1. Supply Chain Collaboration

This construct was measured by twenty five items adopted from [20] [21] including; information sharing measured by ten items, decision synchronisation measured by nine items and incentive alignment measured by six items. Table I shows the scales items of SCC.

4.2. Competitive Advantage

This construct was measured by sixteen items adopted from [25] including five phases; (1) Price/Cost measured by two items, (2) Quality measured by four items, (3) Delivery dependability measured by three items, (4) Product innovation measured by three items, and (5) Time to market measured by four items. The items for these competitive advantages are listed in Table II.

4.3. Organizational Performance

Seven items of organizational performance were identified through the review of previous studies [27] and by the panel of expert. Table III lists the proposed scales items of organizational performance in this study.

4.4. Environmental Uncertainty

There were six items of environmental uncertainty identified in this study based on the literature review and adopted from [27] including two factors; (1) customer uncertainty measured by two items and (2) Supplier uncertainty measured by four items. Table IV lists the proposed scales items of environmental uncertainty.

Table1 Proposed Scale for Supply Chain Collaboration

Factors	Scale Items
Information-Sharing	Promotional events, Demand forecast, Point-of sale (POS) data, Price changes, Inventory-holding costs, On-hand inventory levels, Inventory policy, Supply disruptions, Order status or order tracking, Delivery schedules
Decision Synchronisation	Joint plan on product assortment, Joint plan on promotional events, Joint development of demand forecast, Joint resolution on forecast exceptions, Consultation on pricing

	policy, Joint decision on availability level, Joint decision on inventory requirements, Joint decision on optimal order quantity, Joint resolution on order exceptions
Incentive Alignment	Joint frequent shopper programmers, Shared saving on reduced inventory costs, Delivery guarantee for a peak demand, Allowance for product defects, Subsidies for retail price markdowns, Agreements on order changes

Table 2. Proposed Scale for Competitive Advantage

Factors	Scale Items
Price/Cost	We offer competitive prices, We are able to offer prices as low or lower than our competitors
Quality	We are able to compete based on quality, We offer products that are highly reliable, We offer products that are very durable, We offer high quality products to our customer
Delivery dependability	We deliver the kind of products needed, We deliver customer order on time, We provide dependable delivery
Product innovation	We provide customized products, We alter our product offerings to meet client needs, We respond well to customer demand for “new” features
Time to market	We deliver product to market quickly, We are the first in the market producing new products, We have time-to-market lower than industry average, We have fast product development

Table 3. Proposed Scale for Organizational Performance

Factors	Scale Items
Organizational Performance	Market share, Return on investment, The growth of market share, The growth of sales, Growth in return on investment, Profit margin on sales, Overall competitive position

Table 4. Proposed Scale for Environmental Uncertainty

Factors	Scale Items
Customer Uncertainty	Customers order different product combinations over the year, Customers’ product preferences change over the year
Supplier Uncertainty	The properties of materials from suppliers can vary greatly within the same batch, Suppliers’ engineering level is unpredictable, Suppliers’ product quality is unpredictable, Suppliers’ delivery time can easily go wrong

5. Future Research Implications

This study proposed the concept of collaboration that can be categorized into three dimension levels of SCC (information sharing, decision synchronisation, incentive alignment). The results show that SCC has positive effect (such as cost reduction and operational flexibility) on firms and that the effect is a long-term effect.

Three contributions to SCC appear from the results of the study. First, the study has developed a reliable and valid instrument to measure the extent of collaboration that incorporates information sharing, decision synchronisation, and incentive alignment. The item statements can be tailored to the specific relationship to gauge the levels of collaboration practices and used to identify the gaps that need to be eliminated. Second, the study shows that there is a significant correlation between collaboration index and operational performance. It suggested that the chain members build collaborative efforts to seek opportunities to improve overall performance. Third, the study also shows that three dimensions of collaboration significantly affect competitive advantage and organizational performance. It is advised that chain members should develop a dialogue to carefully discuss initiatives for improving the practice, which makes the greater contribution to better performance.

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