

Four C's in Supply Chain Management: Research Issues and Challenges

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Abstract - Today's business environments are dynamic where one supply chain is competing with another. These supply chains come across different types of interactions at various levels in order to get benefitted. These interactions are helpful in establishing alliances. Further, the interactions also called interrelationships are stated as Coordination (C), Cooperation (C), Collaboration (C) and Co-opetition (C). We call these alliances as various C's used for the typology of supply chain configuration. In this paper we have come up with major research issues and factors affecting an alliance interaction and challenges that appear to restrict the partners to get benefit through various C's. Also, in this paper, we address the important role played by C's in complex supply chains. This paper also discusses the benefits associated with the 4 C's and provides a platform for the organizations to establish alliances.

Keywords - Alliance, Cooperation, Coordination, Collaboration, Co-opetition, Supply Chain Management

1. Introduction

With the increased globalization, shrinking product life cycles, pressure of saving costs; it is important for the companies to look for newer ways to combat the current challenges. Today supply chains are receiving more attention than past few decades. The uncertainty and the competition are inherent in the business processes. With the pressure of providing faster delivery, reduced cost and that all with a high quality, an improvement in supply chain performance, suppliers, manufacturers, distributors and retailers intent to develop inter-firm relationships. The keystone of supply chain management (SCM) is to strengthen the competitive power by integrating the business processes, technology and management abilities existing in the supply chain echelons. This integration is more viable using cooperation, coordination, collaboration and co-opetition among the firms. There are already a variety of information systems and networks working within and between chain members to facilitate the flows of materials, information, and funds. However, there is lack of coordination and integration between these systems [9].

This paper focuses on 4 C's (Cooperation, Coordination, Collaboration and Co-opetition) of SCM. In doing so, this paper provides an understanding on the important role played by the 4C's and discusses the benefits associated. Rest of the paper is arranged as follows. Factors affecting a particular interactive alliance are also discussed. Various issues in any alliance have been stated at the end of the respective section. Finally we

end up with some concluding remarks and scope of further research. Each 'C' is a building block for the next. Here, we start with 'Cooperation'.

2. Cooperation

At a manufacturer retailer linkage, the cooperative activity pays the benefit to both manufacturers and retailers in the same supply chain. However, the goal of the participating enterprises is to earn more and more profit. If the cooperative activity is able to generate distributed profits at both ends of the manufacturer and retailers linkage then its called a 'win-win situation'. Cooperation is important for utilizing the supply chain's limited resources in the most efficient way [1]. It is a dynamic process by including the willingness of individuals to continue in cooperative relationships [15].

Cooperative relationships involve three basic processes. These are selection process, a set of activities carried out by the firms with the purpose of evaluating the competence, reliability, and trustworthiness of the potential partners and choosing whom to start cooperating with [6].

The benefits of the cooperation are: For developing new products, the cost is divided among the cooperating supply chains. Each supply chain can compete with its core competence and the lead times become shorter [1]. The inherent benefit of cooperation is that the large supply chain can promote the development of smaller supply chain through establishing cooperative relationships among them.

2.1 Factors affecting supply chain cooperative relationships

Various factors (external and internal) that affect establishing cooperative relationships among the supply chain partners are presented in Fig. 1. External factors such as competition are those which are outside to the enterprise where as the internal factors are of the participative enterprise itself like involving nature of a partner. Both factors affect the cooperative relationships positively/negatively and affect the stability of the cooperative relationship among the partners.

2.2 Issues in establishing supply chain cooperative relationships

The supply chains are becoming more complex and have posed a couple of questions in front of practitioners and academicians so as to gain the respective goals of the enterprises. Some of the issues are as follows.

- Transaction costs and uncertainty are two main issues. How can we develop mechanisms so as to protect and distribute over gains generated by the pooled resources?
- How to establish a reasonable mechanism for benefit distribution?
- How to establish sharing rents when decisions are made regarding specific, long-term investments?
- How the changing and unstable environmental conditions affect the cooperative relationships among the firms? [10]
- What role do the competitive factors play in establishing cooperative relationships among supply chains?
- How the knowledge profile of the partner affects positively and negatively in framing the cooperative relationships?

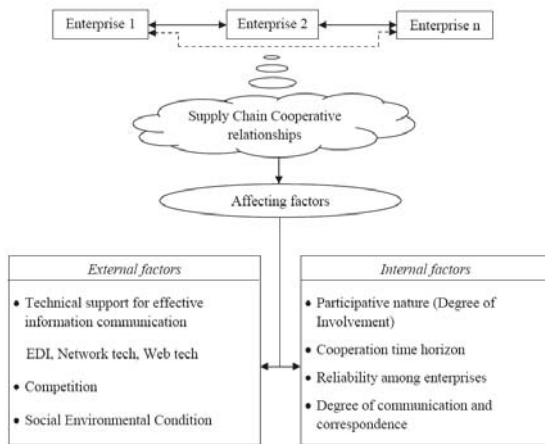


Figure 1: Factors affecting cooperative relationships among enterprises

3. Coordination

In a competitive and highly uncertain business environment coordination is a dominant strategy in supply chains and this pays better to the customers. When we talk about the uncertainty, the associated risks are automatically involved. Here, we come across two situations i.e. when the supply risk is low and another when the supply risk is high. If it is low then the coordination may decrease the supply chain profits and end up in a dilemma. If it is high then coordination always increases the profit [12].

As the uncertainty increases, it makes the decision making process tough being the increased deviation between demand and supply. These deviations called “*bullwhip effect*” change at various nodes of a supply

chain. At such times the supplier needs to come up with some options likely by adjusting the production plan and making the goods available to retailers. Here, the supply chain information of the enterprise is integrated and at the same time the flexibility of the supply chain is increased resulting in reduced market risk. Hence, the coordination mechanism with the shared risks and shared interests comes in to the picture [8].

3.1 Issues in supply chain coordination relationships

Some issues are as follows:-

- How to secure cooperation in order to achieve coordination at low cost without losing advantages of decentralized decisions? [5]
- How to develop a coordination mechanism in uncertain market demand environment with an option of price change? [12].
- How to develop supply chain coordination Mechanism with the option under market demand Indefinite? [8].
- How to determine the effect of different external forces in inter-firm relationship?

4. Collaboration

The concept of collaboration is derived from the latin word *collaborate* means ‘to work together’. It is a demanding process in which the entities share resources, responsibilities and information so as to jointly plan and execute a group of activities for shared goals that generates value jointly [3].

Supply chain collaboration has been defined in numerous ways in the literature. It is a growing field of study for the researchers and is a hot topic for supply chain enterprises.

It refers to long-term, win-win, open information exchange types of agreements in which both parties engage in joint efforts to improve supplier performance and commit to quality, cooperation, and dispute resolution [14]. A collaborative configuration is characterized by shallow interdependence [16]. Moreover, in collaboration we share risk, losses and rewards so as to reflect an image of a joint identity.

Collaboration in a supply chain can be defined in many dimensions as shown in Table 1.

Table 1: Collaboration in different dimensions and their inference

Collaboration Dimension	Inference
• Data	Data base, data structure, data exchange may vary
• Process	Business process can be changed, rationalized or made strict
• Systems	System can be common or may be different among the supply chains
• Policies	Policies related to a supply chain's operation
• Decisions	Supply chains may be fully independent or may agree for joint decisions (e.g. price)

The question is: *Why firms engage in collaboration?* The simple answer to this is to develop, maintain, and even enhance supply chain capabilities that contribute to enhancing firm performance and, ultimately, competitive advantage [7].

Expected outcomes of the supply chain collaboration as defined in the literature are: supply chain capabilities including inventory visibility, better demand planning. Supply chain efficiency measured in reduced cost as well as inventory and supply chain effectiveness including better response time and faster access to target market [11].

Collaboration requires the mutual engagement of entities to solve problems and demands trust which further requires time and dedication to become fruitful.

4.1 Factors affecting a supply chain collaborative relationships

Many factors that affect building collaborative relationships among the firms are stated in Fig.2.

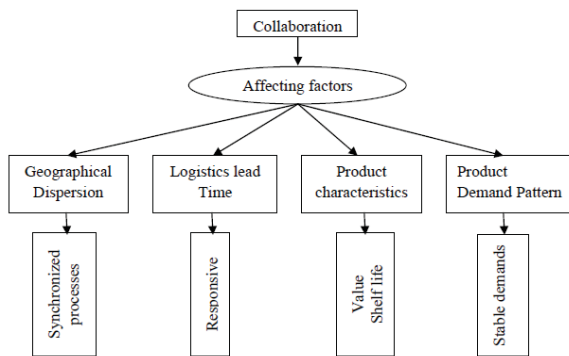


Figure 2: Affecting factors in supply chain collaborative relationships

4.2 Issues in establishing supply chain collaboration

The following are the issues in supply chain collaboration:-

- What will be the organization's benefit if embarking in a collaborative alliance?
- What will be the individual's participation share?
- How to evaluate trust and whether the initial level of trust in establishing a collaborative alliance will remain same in the future?
- How to develop mechanisms for distributing profits in a justified way in a collaborative alliance?
- Will the benefits compensate for extra overheads, losing some control and even taking the risks that collaboration implies?
- Applicability of existing systems for the performance measurement of the collaborative enterprises is questionable. Hence, Can we devise some more viable measurement methods?

- Study of contractual mechanisms, relationship duration or the level of inter-organizational trust in a collaborative relationship. How can we meet this? [13].

5. Co-opetition

The concept of co-opetition can be presented as a combination of cooperation and competition [2]. This concept is based on the fact that if the competitors work together, they will get benefitted. Here, in the case of a supply chain the competitors are those who manufacture and market the similar products.

Co-opetition creates value through cooperation between competing organizations, aligning different interests toward a common objective and helping to create opportunities for competitive advantage by removing external obstacles and neutralizing threats [4].

To maintain the competitive advantage, the firms perform all core functions in house whereas partnering with other firms on some non core functions. None core functions called weak business activities can be outsourced to a competing firm so as to gain efficiency. Hence there are even collaborations among competing business firms called "Co-opetition". Such business firms have double effect on other firms in the market and this effect is seen in terms of efficiency and cooperative behavior.

5.1 Factors affecting a supply chain co-opetitive relationship

Many factors affect building co-opetitive relationship among the firms. Some of them are stated in Fig. 3.

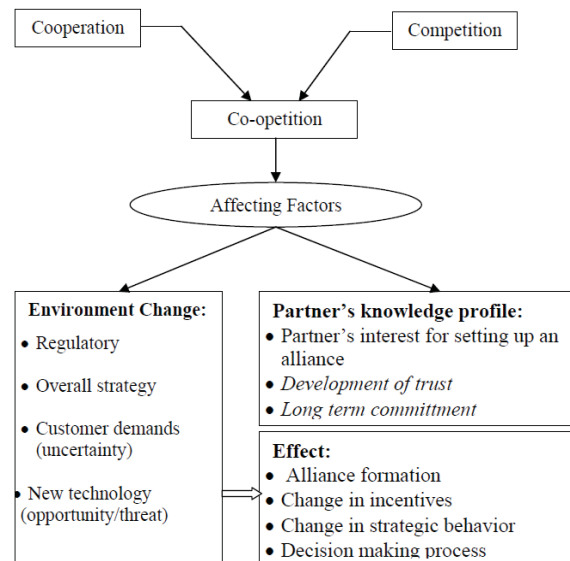


Figure 3: Factors affecting co-opetitive relationships

5.2 Issues in supply chain co-opetitive relationships

The following issues require attention in developing co-opetitive relationships among the firms.

- How to divide and manage the cooperative and competitive part in co-opetition?
- How to establish the alliance when the relationships are consisting of mix of both competition and cooperation with overlapping parameters?
- What if a change in one relationship will cause changes in other relationship?
- What if some relationships consist of pure competition and others of pure cooperation?
- What if some business units compete with the competitor's corresponding business units while other business units compete in a traditional way?
- Whether the preparedness to cooperate and compete is the same in different lines of business, or if some specific industries alone can benefit most from co-opetitive relationships?

6. Conclusion

This study has taken a broad look on various types of alliances in supply chain management. Going through a plethora of literature many research issues have emerged out. Basic concepts of different alliances called 4 C's such as Cooperation, Coordination, Collaboration and Co-opetition have been presented which is helpful for the beginners. Moreover, the study shows various factors that affect the interactive relations in establishing alliances and the role they play at individual level. These alliances are gaining importance due to their inherent capability to make the supply chains more efficient, responsive and generating profits. Benefits associated with different C's and their importance in establishing interactive relationships has been discussed.

Future work can be extended by taking any of the alliance where the current study will work as a building block. The issues can be solved out using different approaches and techniques so that the benefit can be provided to the industry as well as imparting a significant contribution to the academic world.

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