# Supply Chain Relationships Among Strategy, Flexibility And Performance: A Theoretical Framework

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**Abstract**

*In today's global business environment, concepts are moving towards inter-national contrary to yester years. This has made companies to explore the new ways to leverage their supply chain and to develop a strategic approach. A strategic approach with flexibility is helpful to increase the overall performance of the organization and to respond customer requirements.*

*Consequently, in order to maintain cut-throat competition in the market and to be able to satisfy end customers, supply chain strategy (SCS) must be aligned with the supply chain flexibility (SCF). With a large number of SCS dimensions and SCF dimensions, it is not feasible to practice each dimensions. The study aims to classify them in a suitable manner, which is helpful to the organizations to select a correct mix of SCS and SCF dimensions to increase supply chain performance (SCP).*

*The purpose of this study is to identify all the dimensions of SCS and SCF. In addition, this study also aims to identify SCP dimensions. Later on, the relationships among SCS, SCF and SCP are identified through a theoretical model. The findings from various literatures are compared and analyzed. Thus guidelines are developed.*

**1. Introduction:** In today's highly competitive business environment, organizations are concerned about minting profits (long term and short term) by searching and applying new ways to cut the cost. Supply Chain Management (SCM) plays a vital role to do so. SCM is the streamlining of supply chain activities, providing linkages between internal and external partners (Lummus et al., 1999). According to Harland (1996) "SCM is the management of the network of interconnected businesses involved in the ultimate provision of product and service packages required by end customers." Lembert (2008) defined SCM as "the integration of key business processes across the supply chain for the purpose of creating value for customers and stakeholders."

In early 1990s, SCM started earning interest of organizations due to three basic reasons. Firstly, companies have been moving from vertical integration to horizontal integration. Thus they have been more concern about outsourcing some or all the activities carried out for production. Secondly, globalization increased competition nationally and internationally both. This leaves a scope for customer to have more choices. Finally, organizations realized that the management of supply chain as a whole can increased the performance. Integration of all the nodes in supply chain requires better coordination among their activities. This enforces organizations to focus on intra-organizational supply chain activities and to practice improved and stronger supply chain strategy with flexibility to enhance supply chain performance.

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**2. Supply Chain Strategy:** Supply chain strategy can be defined as a process of planning and designing of end to end supply chain to maximize the potential to meet customer demand at the lowest possible cost. The effectiveness and efficiency of supply chain depend upon the type of strategy, an organization selects for implementation. Sometimes an organization might have multiple supply chain strategies. However a good supply chain strategy can broadly be defined as one that aligns with an organization's business strategy.

Katz et al. (2003) identified four kinds of supply chain strategy dimensions such as modularizing, appending, innovating, and follower strategy. Modularizing strategy (MOS) leads to selling bundle of services instead of individual inputs, Appending strategy (APS) helps to gain additional profit from the end customers by appending the existing products or services, Innovating strategy (INS) used to introduce new products or services. It also helps to create values in the customers' mind, like the goods or services are unique and not offered previously, Follower strategy(FOS) is just following others' or existing strategies. But research findings of various researcher show that their can never be a single one size fits all the supply chain strategy.

Fantazy (2007) proved empirically another dimension of SCS called Customer oriented business strategy (COS), conceptualized by Christopher et al. (2006). Thus following five dimensions have been identified yet.

1. Modularizing Strategy
2. Appending Strategy
3. Innovating Strategy
4. Follower Strategy
5. Customer-oriented Strategy

**3. Supply Chain Flexibility:** Flexibility is an essential part of any organizational activity to respond to the ever changing and challenging business environment. Russell and Taylor (2009) defined supply chain flexibility as an ability to adjust with changes in product mix, production volume or design. It is the ability to produce a wide variety of products, to introduce new product and modify existing once quickly, and to respond customer needs.

In last few decades, studies focused on manufacturing flexibility and these studies confined the study of flexibility to intra-organizational components. Understanding supply chain flexibility is important for following reasons:

- Trends, such as mass customization requires supply chains to meet individual customer requirements without adding significant cost (Gilmore and Pine, 1997).
- In certain industries-particularly High-Tech, require upside and downside flexibility (Hausman, 2003).
- Uncertainty of demand is a fact of life and creating a responsive supply chain is one of the methods of avoiding uncertainty (Fisher 1997).
- The ever changing environment, in which companies find themselves, requires rapid new product innovation, quick response to consumer requirements in all parts of the world, and fast turn-around on consumer orders. With increasing competition in the supply chain and the importance of time conservation, the flexibility of the supply chain become a critical issue in modern organization.

Supply chain flexibility to encompass those flexibilities that directly impact a firm's customer (flexibilities that add value in the customer's eyes) and shared responsibilities of two or more

functions along the supply chain, whether internal (e.g., marketing, manufacturing) or external (e.g., suppliers, channel members to the firm) Vickery et al. (1999). Duclos et al. (2003) defined supply chain flexibility as the capabilities of promptness and the degree to which the supply chain can adjust its speed, destinations and volume in line with hangs in customer demand. Supply chain flexibility enables an organization to react quickly and more effectively to marketplace volatility and other uncertainties, so allowing the organization to establish a superior competitive position. According to Tummala et al. (2006) flexibility is the ability of an organization to efficiently and effectively adapt to foreseen and unforeseen changes.

Zhang et al. (2006) identified spanning flexibility as one of the dimensions of flexibility, which is the ability of a firm to provide horizontal information connections across the value chain to meet a variety of customer needs. Spanning flexibility allows a firm to respond quickly to various customer needs by synchronizing product creation and delivery through the efficient and effective flow and storage of information along the value chain.

A wide variety of dimensions of flexibilities have been identified by various researchers, are as follows:

1. New Product Flexibility (NPF): An ability of an organization to produce new products on market demand.
2. Sourcing Flexibility (SOF): An ability to respond promptly and in a cost effective way to changing requirements of purchased components.
3. Product Flexibility (PRF): An ability to develop and to modify products according to customer needs and demand.
4. Delivery Flexibility (DLF):An ability to distribute and deliver the products to the final customers.
5. Information Systems Flexibility (ISF): An ability to share and disseminate the information internally and externally both.
6. Responsiveness Flexibility (RPF): An ability to deal with lead time accordingly.
7. Operations System Flexibility (OSF): Ability to be flexible with changing needs of labor, materials or capacity.
8. Market Flexibility (MKF): It helps the organizations to mass customatize & build close relationship with customer, (Duclose et al.,2003).
9. Production Flexibility (PDF): An ability of an organization to produce number of different products in a given period simultaneously of required volume.
10. Trans-shipment Flexibility (TSF): It helps organizations to be flexible with moment of stock between locations in the same echelon where physical distance between demand location are small (Barad & Sapir, 2003)
11. Manufacturing Flexibility (MNF): It is a capability of an organization to quickly & economically respond to various types of environmental uncertainty (Chung & Chen, 1990).
12. Organizational Flexibility (ORF): It's a capability of an organization to remove internal rigidity.

In last few decades manufacturing and supply chain strategy have been earning greater attention in researches. Flexibility in the supply chain puts in the requirement of flexibility within and between all partners in the chain: internally and externally both (Duclos et al., 2003).Hence flexibility to gather information about market demands, exchange information among the channel partners and organizations.

**4. Supply Chain Performance:** Performances are the measure to benchmark and evaluate the effectiveness and efficiency of any organization. Hence organizations set their supply chain performance measures to address, evaluate and benchmark their supply chain, those are needed be evaluated periodically. Kaplan and Norton (1996) stated that organizations must introduce an effective performance measurement system which ought to cover all the aspects to achieve success and growth. Their intention was to cover other dimensions apart of financial measurements. According to Gupta and Somers (1996) the criterion of performance measures typically include return on investment, return on sales and return on equity.

Kaplan and Norton (1996) stated that organizations must introduce an effective performance measurement system which ought to cover all the aspects to achieve success and growth. Their intention was to cover other dimensions apart of financial measurements. Fantasy et al. (2009) classified performance measures into two dimensions: financial and non-financial. Selection of performance measurements criterion ensures companies to attain predetermined objectives but this requires continuous monitoring and periodically evaluation. Tummala et al. (2006) stated that the criterion for performance measurements set by the organization should be forced, specific, measurable and evaluated periodically. According to Gupta and Somers (1996) the criterion of performance measures typically include return on investment, return on sales and return on equity.

Fantazy et al. (2009) broadly classified performance measures into two parts; financial and non-financial. Financial performance indicators include; Net Profit Performance (NPP), and Sales Growth Performance (SGP). Non-financial performance indicators include: Customer Satisfaction Performance (CSP) and Lead-Time Performance (LTP).

**5. Relationship among Supply Chain Strategy, Flexibility and Performance:** During 80s, researchers found the relationship between environmental uncertainty, manufacturing strategy and business performance. They found that greater flexibility leads to better performance and strategic decision making improves the organizational performance. Gupta and Somers (1996) found that business strategy has direct effect on the adoption of manufacturing flexibility, manufacturing flexibility has direct effect on organization's performance and manufacturing strategy indirectly affects organization's performance. Later on, the term supply chain was used instead of manufacturing because the strategy is a part of overall business activities like marketing, HR, production, R&D etc Fantazy et al. (2006).

Fantazy et al. (2009) represented a conceptual model on relationships among supply chain strategy, supply chain flexibility and supply chain performance (Fig.1).It is based on various models in the literature (Gerwin, 1993 and Gupta and Somers, 1996)

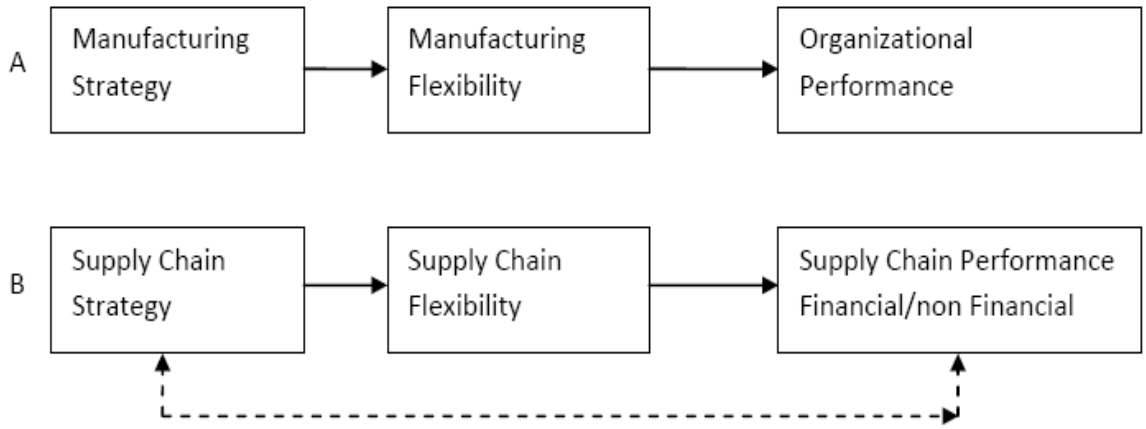



**Figure1: Basic Conceptual Model (Fantazy et al., 2009)**

From this model, it can be understood that supply chain strategy directly affects supply chain flexibility, supply chain flexibility directly affects supply chain performance and supply chain strategy indirectly affects supply chain performance.

Sanchez and Perez (2005) identified a positive relationship between supply chain flexibility and performance but it doesn't mean that every flexibility dimensions has equal contribution. Adler et al., (1999) stated that flexibility in one dimension can be increased on requirement but on the cost of reduction of flexibility in other directions.

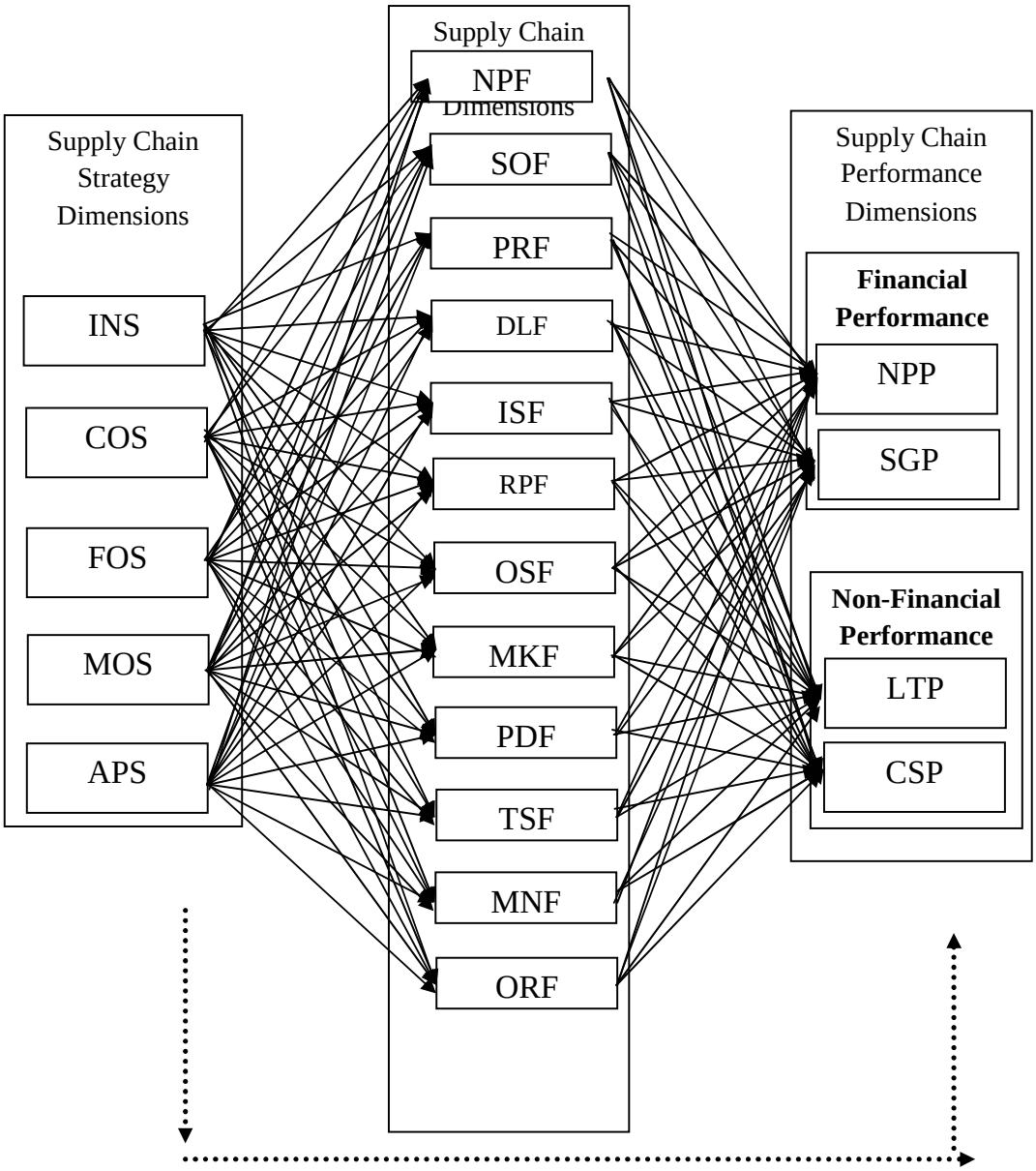
From the above discussion, it can be conceptualized that SCS dimensions directly affect SCF dimensions, SCF dimensions directly affect SCP dimensions and SCS dimensions indirectly affect SCP dimensions as shown in fig. 2, which is closely related with the model developed by Canadian researchers.

The model represents all the dimensions of SCS, SCF and SCP with the relationship among them. In addition, review of literatures proves that dimension of SCS, SCF and SCP effects each other internally. It is helpful to the researcher and managers to study all the dimensions of SCS, SCF and SCP and to select appropriate dimensions out of all the dimensions, according to their requirements or limitations.

**Discussion:** Various researchers have identified a number of dimensions of SCS, SCF and SCP and relationship among them. Swamidas and Newell (1987) found that grater flexibility leads to better performance and strategic decision making improves organizational performance. Gupta and Somers(1996) identified that business strategy has direct affect on organization's performance and manufacturing strategy indirectly affects organization's performance. Fantazy et al. (2007) and Fantazy et al. (2009) worked on selected dimensions of SCS, SCF and SCP and found positive relationships among SCS, SCF and SCP. Roll (2010) worked on the same taxonomy but in different region. He found variations in the results due to various factors such as geographical, economic etc.

Sanchez and Perez (2005) identified a positive relationship between supply chain flexibility and performance but it doesn't mean that every flexibility dimensions has equal contribution. Organizations need to identify the key dimensions of SCS and SCF which have maximum

contribution towards SCP and the dimension of SCS and SCF having less contribution towards SCP should be ignored.




The simplified model presented by Canadian researchers has limited applicability due to three basic reasons; firstly, it is found that all the researchers worked on selected dimensions of SCS, SCF and SCP. Hence, on the basic conceptual model and their research findings they proposed a simplified model. Secondly, Most of the studies took place in Canada, Netherlands and Belgium, thus studies are restricted to a particular region. Finally, researchers researched on small and medium size organization and result may vary as the size of the organization increased.

A simplified model, represented in this study includes all the dimensions of SCS, SCF and SCP (as shown in figure2). It also highlights the relationships among SCS, SCF and SCP. Practicing all the dimensions of SCS and SCF is not feasible approach. Hence there is a need to study all the dimensions of SCS, SCF and SCP. Moreover, it is helpful to the researcher and managers to

select appropriate dimensions out of all the dimensions, according to their requirements or limitations.

**6. Conclusion:** There is a need arises to respond today's highly competitive business environment and ever changing business scenario. Organization cannot ignore the critical role of supply chain to do so. These requirements can be fulfilled only if the inter-relationship among the different parts of supply chain such as SCS, SCF and SCP, recognized, aligned and coordinated as well. The integration of SCS and SCF will help companies to gear up of their SCP, ultimately to increase organizational efficiency and effectiveness.

Researches prove that key dimensions of SCS and SCP vary due to various factors such as region, type and size of the organization etc. Identification of key dimensions of SCS and SCF can help the organization to increase SCP. Hence it is a theoretical framework and it needs to be proved empirically.

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