



Exploring supply chain flexibility in a FMCG food supply chain



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ABSTRACT

Empirical studies about supply chain flexibility have mainly focused on one (manufacturing) company, occasionally incorporating the adjoining view from a supplier, distributor, or retailer. The present paper argues that a dyadic perspective is not sufficient and that an integrated perspective is required. In-depth case study data was collected and analyzed. The data covers eight organizations in a fast-moving consumer goods (FMCG) food supply chain, including suppliers, the main manufacturer, the logistics service provider, and retailers. Drawing on network theory and stakeholder theory, the study analyzed how these eight organizations experience flexibility across the supply chain. The findings show that each chain member implements flexibility to fulfill the direct needs of the next-tier chain member. Organizations at different positions in the supply chain prioritize other flexibilities. There is no support for overall supply chain flexibility.

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1. Introduction

Supply chain flexibility is crucial in today's business environment, which is characterized by complexity, continuous change, and uncertainty. Organizations must be flexible to cope with globalization, technological change and innovation, as well as changing customer needs and expectations (Pujawan, 2004; Tachizawa and Thomsen, 2007; Marley et al., 2014). The literature presents many different definitions of flexibility and no uniform concept is broadly accepted.

The challenge of developing and maintaining flexibility does not stop at the boundaries of the firm (Bessant et al., 2003). Firms operate within value streams involving many firms that are organized in supply chains (Volberda, 2009). Several studies have argued that in order for a firm to achieve a level of flexibility that adds value to customers, it must look beyond manufacturing flexibility and include a supply chain or value chain perspective (Krajewski et al., 2005; Schmenner and Tatikonda, 2005). This reasoning implies that supply chain flexibility should be broadly defined and should include all types of flexibility that have a direct impact on a firm's customers (Kumar et al., 2006). However, there is no consensus about the dimensions underlying supply chain flexibility (Soon and Udin, 2011).

Most empirical studies have focused on a single manufacturing company, occasionally incorporating the adjoining view from a supplier, distributor, or retailer and, at best, taking a dyadic perspective. Few studies on supply chain flexibility have included three or more tiered organizations. To date, only four studies have investigated three or four tiers (Reichart, 2007; Yi et al., 2011; Schütz and Tomasgard, 2011; Singh and Sharma, 2013). Even these studies still overlook that, for flexibility across the supply chain, it is not sufficient to investigate the dyadic perspective of several supply chain members. It is also necessary to study the relationships between all these parties from an integral point of view. Following stakeholder theory and network theory, the present study emphasizes the importance of investigating the role of supply chain members in decision making about flexibility-oriented activities and processes in the supply chain.

The aim of this study is to address the above-mentioned research gap by examining supply chain flexibility from an integrated viewpoint of multiple supply chain members. The study's key assumption is that, for supply chain flexibility, the organizations within the supply chain should be integrated to act collectively to enhance supply chain flexibility in their supply chain. The research questions are:

- How do supply chain members experience flexibility, and in particular, supply chain flexibility? What are their reasons for being flexible?
- Which flexibility dimensions are prioritized as the supply chain

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Table 1
An overview of flexibility dimensions.

Business area	Flexibility dimension	Description	Source
Product development	Product development flexibility	The ability to respond to changing customer needs with new products and modifications to existing products	Zhang et al. (2002b)
	New product design flexibility	The ability to design and introduce new products into the system	Stevenson and Spring (2007)
	Product modification flexibility	The ability to customize (standard) products to meet customer specifications	Vickery et al. (1999); Lummus et al. (2003)
Procurement	Procurement flexibility	The ability to respond to changing requirements regarding the sourcing, purchasing and supply of goods	Manders ^a
	Sourcing flexibility	The ability to find more suppliers for each specific material, component or service	Sánchez and Pérez Pérez (2005)
	Supply flexibility	The ability to respond to changing requirements in terms of location and/or delivery date	Based on Tachizawa and Thomsen (2007)
	Purchasing flexibility	The ability to respond to changing needs in the ordering, delivery and receipt of supplied goods	Manders ^a
Manufacturing	Manufacturing flexibility	The ability to manage production resources to meet customer requests	Nair (2005)
	Volume flexibility	The ability to adjust (increase or decrease) capacity, batch sizes, output levels and/or quantities in response to customer demand	Based on Beamon (1999); Lummus et al. (2003); Sánchez and Pérez Pérez (2005)
	Mix flexibility	The ability to change the variety or combination of produced or delivered products and/or performed activities	Based on Beamon (1999); Zhang et al. (2003)
	Operations flexibility	The ability in which an activity can be done in different ways using alternative process plans, processes and available assets	Based on Sethi and Sethi (1990); Vokurka and O'Leary Kelly (2000)
	Process flexibility	The ability to produce a range of different (types of) products or fulfill different activities in a certain fixed situation	Based on Sánchez and Pérez Pérez (2005); Stevenson and Spring (2007); Hopp et al. (2010)
	Expansion flexibility	The ability to easy add capacity to the system	Stevenson and Spring (2007)
Logistics	Logistics flexibility	The ability to align, adapt and adjust the process of the goods flow including the inbound and outbound activities and the storage of the goods to the changing customers' needs	Swafford et al. (2000); Nair (2005); Soon and Udin (2011)
	Inbound logistics flexibility	The ability to transport and produce products by different paths throughout the processing centers of the system	Based on Stevenson and Spring (2007)
	Routing flexibility	The ability to have a number of alternative paths a part or product can take through the system in order to be completed	Vokurka and O'Leary-Kelly (2000); Stevenson and Spring (2007)
	Material handling flexibility	The ability to move the different products between processing centers throughout the system using multiple paths	Koste and Malhotra (1999); Stevenson and Spring (2007)
	Physical distribution flexibility	The ability to adjust inventory and transport to provide a wide-spread access to products and meet customers' needs	Based on Lummus et al. (2003); Zhang et al. (2005); Singh et al. (2011)
	Delivery flexibility	The ability to respond to changes in the delivery requests regarding location and/or delivery date	Based on Stevenson and Spring (2007); Skintzi (2007)
Marketing	Storage flexibility	The ability to adjust the storage capacity and/or move the stock between locations to transfer the goods/products in time	Based on Schütz and Tomasgard 2011; Sánchez and Pérez Pérez (2005)
	Marketing flexibility	The ability to adapt to changes in the market environment and/or in customer needs by customization and build close relationships with customers	Based on Vokurka and O'Leary-Kelly (2000); Lummus et al. 2003; Stevenson and Spring (2007)
	Launch flexibility	The ability to rapidly introduce new products and/or product varieties to the market	Vickery et al. (1999); Sánchez and Pérez Pérez (2005)
Organization	Responsive flexibility	The ability to respond to target market needs	Lummus et al. (2003)
	Network flexibility	The ability to respond to changing circumstances by managing the organizations relationships, structures and controlling its capacity	Based on Yi et al. (2011)
	Organizational flexibility	The ability to align the organization management and labor force to meet customer demand/service requirements	Lummus et al. (2005)
	Labor flexibility	The ability to change the number of workers	Based on Gong (2008)
	Worker flexibility	The ability of a worker to perform a number of different tasks with different responsibilities	Based on Stevenson and Spring (2007)
(Financial) information	Inter-organizational relationship flexibility	The ability to build and maintain collaborative relationships up and/or downstream to adapt to changing circumstances	Based on Stevenson and Spring (2007)
	Information systems flexibility	The ability to align the information system architectures and systems with the changing information needs of the organization as it responds to changing customer demand	Lummus et al. (2005)
	Spanning flexibility	The ability of the organizations to collect, store and disseminate information in horizontal information connections across the supply chain to increase value to customers	Zhang et al. (2006); Nair (2005)

^a In the literature, flexibility dimensions found in the fields of procurement, sourcing, supply and purchasing overlap. Based on the procurement literature, purchasing flexibility is defined as flexibility focused on the ordering, delivery and receipt of goods. Procurement flexibility is defined to incorporate the whole procurement process including supply, sourcing and purchasing flexibility.

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