



# The effects of an integrative supply chain strategy on customer service and financial performance: an analysis of direct versus indirect relationships

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## Abstract

This study examines the performance implications of an integrated supply chain strategy, with customer service performance followed by financial performance as performance constructs. Two major components of an integrated supply chain strategy are identified and defined: (1) integrative information technologies, which is modeled antecedent to (2) supply chain integration. The research model was tested using data from a sample ( $n = 57$ ) of the top 150 independent first tier automotive suppliers to the Big 3 in North America. The results showed positive *direct* relationships between (1) integrated information technologies and supply chain integration, (2) supply chain integration and customer service, and (3) customer service and firm performance. The relationship of supply chain integration to financial performance was *indirect*, through customer service; i.e., customer service was found to fully (as opposed to partially) mediate the relationship between supply chain integration and firm performance for first tier suppliers in the automotive industry.

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## 1. Introduction

Supply chain management takes a holistic perspective regarding the various activities, functions, and systems required to bring a product or service to market: it advocates that the supply chain be strategically managed as a single entity or system in contrast to individually optimizing fragmented segments or sub-systems. This requires the integration of activities,

functions, and systems throughout the supply chain. An integrative supply chain strategy recognizes that *integrated business processes* (not individual functions or systems) create value for the firm's customers and that these processes reach beyond the boundaries of the firm by drawing suppliers and customers into the value creation process (see e.g., Stevens, 1989; Tan et al., 1998).

The theoretical foundation for supply chain integration can be traced to the Value Chain Model (Porter, 1980, 1985), and specifically, its notion of linkages. A "linkage" is the relationship between the way in which one value activity is performed and the cost or

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performance of another. Porter advocated the identification and strategic exploitation of linkages *within* a firm's value chain (i.e., *horizontal* linkages) and *between* the firm's value chain and the value chains of its suppliers and customers (i.e., *vertical* linkages). Optimizing linkages amongst value activities, and in particular, optimizing vertical linkages, is the core purpose of supply chain integration. Such integration should engender superior performance (e.g., Tan et al., 1998; Frohlich and Westbrook, 2001).

A growing body of literature has suggested that the higher the degree of integration across the supply chain, the better a firm performs (see e.g., Stevens, 1989; Lee et al., 1997; Metters, 1997; Narasimhan and Jayaram, 1998; Lummus et al., 1998; Anderson and Katz, 1998; Hines et al., 1998; Johnson, 1999; Frohlich and Westbrook, 2001). At the same time, other literature has highlighted the dangers of not fully integrating suppliers and customers into a firm's business processes (Lee and Billington, 1992; Hammel and Kopczak, 1993; Armistead and Mapes, 1993; Frohlich and Westbrook, 2001). Most empirical studies have focused on either *upstream* integration or *downstream* integration, each to the exclusion of the other as pointed out by Eloranta and Hameri (1991). However, Frohlich and Westbrook (2001) recently examined upstream and downstream integration *simultaneously*. In this study, the widest "arc of integration" encompassing *both* suppliers and customers had the strongest association with performance improvement. While their findings add to the empirical support in the literature for a "supply chain integration–performance" link, their study tested for differences in mean levels of performance improvement for various levels of integration, and hence did not examine the specific form of the integration–performance relationship.

This research examines relationships existing among an integrative supply chain strategy, customer service, and overall firm performance. Two major dimensions of an integrative supply chain strategy are identified and defined from relevant literature: (1) integrative information technologies; and (2) supply chain integration. We view the use of integrative information technologies as a core enabler of supply chain integration and thus model it as antecedent to integration. The focus here is on *integrating* information technologies—technologies that facilitate the collection of vital information concerning key business

processes and the sharing of such information across functional areas *and* across firm boundaries. We define supply chain integration to include *both upstream* or *supplier integration* and *downstream* or *customer integration*, building upon the recent work of Frohlich and Westbrook (2001). However, our definition of supply chain integration also encompasses *horizontal integration within* the firm since the various internal functions comprising a company are as much a part of the supply chain as are the company's suppliers and customers. We test whether the effect of supply chain integration on firm performance is *direct*, *indirect through an intermediate performance outcome*, or *both*. We chose customer service to mediate the relationship between integration and firm performance because it is widely touted as an immediate outcome of supply chain integration (see e.g., Stevens, 1989).

This study focuses on the automotive supply industry—the sampling frame is the top 150 independently owned first tier suppliers to General Motors, Ford, and Chrysler. This highly competitive industry segment encompasses a wide variety of products such as stamped metal, seating systems, and steering assemblies and is known for its emphasis on supply chain integration. The auto industry is also known for its implementation of integrative information technologies such as computerized production systems, company-wide information systems, and electronic data interchange (EDI) (see e.g., Rassameethes et al., 2000).

The paper is organized as follows. First, relevant literature is reviewed to identify and define the key constructs of the research model: integrative information technologies, supply chain integration, customer service, and financial performance. Second, the research model and its key propositions are developed from the literature. The study's methodology is then discussed, including measurement issues. Finally, the results are presented and their managerial implications are explored.

## 2. Key dimensions of an integrative supply chain strategy

Our attempt to identify the attributes of an integrative supply chain strategy led us to focus on technologies and practices that facilitate integration

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