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# The link between supply chain fit and financial performance of the firm☆

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ABSTRACT

The bottom-line financial impact of supply chain management has been of continuing interest. Building on the operations strategy literature, Fisher's (1997) conceptual framework, a survey of 259 U.S. and European manufacturing firms, and secondary financial data, we investigate the relationship between supply chain fit (i.e., strategic consistencies between the products' supply and demand uncertainty and the underlying supply chain design) and the financial performance of the firm. The findings indicate that the higher the supply chain fit, the higher the Return on Assets (ROA) of the firm, and that firms with a negative misfit show a lower performance than firms with a positive misfit.



## 1. Introduction

Although it is intuitive that supply chain management is likely to have a positive impact on firm performance, most of the evidence that we have seen in the literature is either anecdotal or based on case studies. There is neither much large-scale empirical proof of this impact nor systematic analysis and documentation of its magnitude. Furthermore, the supply chain management literature has focused more on efficiency improvement and cost reduction in supply chain operations and less on the phenomenon of strategic consistencies between the characteristics of a product and its underlying supply chain, i.e., *supply chain fit*.

The concept of supply chain fit has been popularized by Fisher's (1997) conceptual supply chain–product match/mismatch framework and has its roots in the manufacturing and operations strategy literature. Forty years ago, Skinner (1969) called for a more integrated view of a firm's strategy and its manufacturing function. Over the years the research on competitive priorities in operations management, configurations of operations and manufacturing strategy, the successful alignment of product characteristics and competitive strategy with a firm's operations strategy, and performance implication thereof has grown considerably (e.g., Boyer et al., 2000; Hayes and Pisano, 1996; Joshi et al., 2003; Ward et al., 1996). The extension of this research in the supply chain management literature just began to emerge (e.g., Qi et al., 2009, 2011).

In this article we augment this research in three important ways. First, we further extend the operations and manufacturing strategy perspective towards the more recent supply chain thinking (Chen and Paulraj, 2004; Kouvelis et al., 2006). We achieve this by assessing whether the firms' supply chain priorities are in line with their products and business strategies. Second, we conceptualize supply chain fit as "fit as matching" (Venkatraman, 1989). As a consequence, deviation score analysis allows us to go beyond a 1:1 ('all or nothing') association between product characteristics and supply chain design. Furthermore, we can distinguish between positive and negative misfit. Third, we assess supply chain management's bottom-line financial impact and the magnitude of this impact by measuring performance with objective financial metrics from secondary data (Boyer and Swink, 2008; Roth, 2007).

From a managerial perspective, achieving supply chain fit is challenging[1] and supply chain misfits may be consequential. For example, Hensley and Knupfer (2005) estimate that the cost of supply chain misfit among carmakers and parts suppliers in the U.S. automotive industry is in excess of USD 10 billion each year. Hence, guidelines that help firms understand how to achieve supply chain fit would be valuable. By developing an understanding of the impact of supply chain fit on performance, firms will be well on their way to build such guidelines and their own models for supply chain excellence. By using a financial performance measure (i.e.,

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[1] In addition to the evidence in the literature (e.g., Chopra and Meindl, 2010;

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Return on Assets, ROA) as an outcome of supply chain fit (or misfit) – as we do in this research – we speak in the language of managers who are more familiar with such measures than with subjective, perceptual performance measures. Relating supply chain fit to ROA will result in a higher impact of our research in corporate practice.

The rest of the paper is organized as follows. In Section 2, we begin by providing the theoretical and conceptual background from the operations strategy literature in support of our hypothesis. We then present our study's methodology, introduce the measures used in our study, and describe the sample in Section 3. Section 4 assesses the reliability and validity of our measures, followed by regression analyses in Section 5, and two post hoc analyses in Section 6. In Section 7 we discuss our results and provide theoretical and managerial implications. Finally, we conclude in Section 8 with limitations and suggestions for future research.

## 2. Background and hypothesis

The operations strategy literature is an important starting point for this study's main argument that an alignment of product and supply chain priorities will be positively related to performance. Therefore, we briefly discuss the operations management/strategy literature which is relevant for our study.

### 2.1. Competitive priorities of the supply chain

A fundamental element of operations strategy is the definition of the firm's competitive priorities. These may include the basic priorities cost, quality, delivery, and flexibility (Boyer and Lewis, 2002; Ward et al., 1998), as well as additional ones such as innovation (Hayes and Pisano, 1996; Krause et al., 2001; Kroes and Ghosh, 2010). A firm has to make trade-offs between these priorities while allocating its limited resources (Skinner, 1969), at least with respect to the relative rates of improvement of the different priorities (Hayes and Pisano, 1996). In their study of 110 manufacturing plants, Boyer and Lewis (2002) found that trade-offs between cost and flexibility, delivery and flexibility, and delivery and quality exist. This trade-off is also reflected in the distinction between lean vs. agile manufacturing (e.g., Inman et al., 2011; Narasimhan et al., 2006) and supply chain strategies (Qi et al., 2009, 2011), as well as the efficiency–responsiveness dichotomy in supply chain priorities, where efficient supply chains aim for the cost-efficient fulfillment of predictable demand, and responsive supply chains for the quick response to unpredictable demand (Fisher, 1997; Parmigiani et al., 2011; Randall et al., 2003) (Table 1).

### 2.2. Product characteristics

There is a common understanding that the nature of products and product demand are related to operational processes and supply chains (Skinner, 1969; Utterback and Abernathy, 1975). Hayes and Wheelwright (1979) proposed a product–process matrix suggesting a link between a firm's products and its process life-cycle stages. Based on the product–process matrix, Hayes and Wheelwright (1979, p. 134) argued that process choice should support the firm's products and conclude that "a certain kind of product structure is matched with its 'natural' process structure. On one end, firms with highly standardized, high volume commodity products should rely on efficient continuous flow shop processes; on the other end, firms with unstandardized, low volume customer-specific products should rely on flexible job shop processes. The concept that a match between product structures and manufacturing process structures is related to performance found also empirical support (e.g., Miller and Roth, 1994; Safizadeh et al., 1996).

From a supply chain perspective and based on characteristics such as product life-cycle, margin, product variety, forecasting error, stock-out rate, markdown or distribution intensity, products can be characterized as being either certain/predictable (also called 'functional') or uncertain/unpredictable (also called 'innovative') (Table 2) (Fisher, 1997; Qi et al., 2009; Selldin and Olhager, 2007).

### 2.3. Supply chain fit

In general, firms are expected to achieve better performance with environmental and internal consistency, or *fit*, among strategic, structural, and contextual variables (Alexander and Randolph, 1985; Burton et al., 2002; Gresov, 1989; He and Wong, 2004). In the operations management literature, there is also a long history of studying internal fit, environmental fit, and equifinality (Boyer et al., 2000; Bozarth and McDermott, 1998). For example, Skinner (1969) advocated the alignment of a firm's strategy with its manufacturing function. The product–process matrix research argues that a firm's processes must match the characteristics of its products (Hayes and Wheelwright, 1979). Ward et al. (1996, p. 602) observed that "manufacturing strategy, competitive strategy, environment, and structure are configured or interlinked such that there are natural congruences between these elements" and hypothesized "that business units which conform to one of the configurations will be more likely to perform well than those which are not aligned." (Ward et al., 1996, p. 623)

Extending the concept of fit to the supply chain strategy context, we conceptualize supply chain fit based on the framework of Fisher (1997) who formalizes fit by characterizing products as being either certain/predictable or uncertain/unpredictable (Table 2), and supply chains as being either efficient or responsive (Table 1). In our research, supply chain fit is defined as the perfect strategic consistency between a product's supply and demand characteristics (such as demand predictability, life-cycle length, product variety, service, lead-times, and specific market requirements) and supply chain design characteristics (such as inventory strategy, product design strategy, and supplier selection aspects). For certain/predictable [uncertain/unpredictable] products the perfect strategic consistency is achieved with an efficient [responsive] supply chain (Chopra and Meindl, 2010; Fisher, 1997; Lee, 2002) (Fig. 1).

In summary, based on the arguments that firms' competitive priorities and processes must support and match its product structures and characteristics (Hayes and Wheelwright, 1979; Ward et al., 1996), and the above discussion that firms achieving a high degree of supply chain fit excel firms with a low degree of supply chain fit through higher supply chain and financial performance (Chopra and Meindl, 2010; Fisher, 1997), we hypothesize the following:

**Hypothesis.** Supply chain fit is positively associated with financial performance of the firm.

Fisher, 1997; Lee, 2002), our survey respondents, supply chain executives and board members from leading manufacturing firms around the globe, also emphasize this fact:

- "The integrated oil & gas supply chain shows two characteristics. Upstream is driven by flexibility, downstream by efficiency and flexibility. We face big problems as a leading oil company to find the optimal fit."
- "We have worked with our customers to align production and sales demand. We have also extended this to our critical suppliers to gain cost reductions, however we are still far away from a high degree of fit."
- "We have increased our supply chain awareness as an integrated approach, being more than the sum of individual activities, but supply chain excellence in terms of matching products and supply chain design is challenging."