

# Influence of Supply Chain Management on Its Operational Performance

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## ABSTRACT

*This paper empirically confirmed a positive relationship between Supply Chain Management (SCM) and operational performance. A measurement model of the SCM construct was developed. Operational performance was conceptualized using competitive priorities literature with four dimensions: cost, quality, flexibility and delivery. Results showed positive effects of SCM on all performance dimensions, offering further support for the cumulative capabilities perspective. We also found evidence of an operational competence construct mediating the effect of SCM on performance, supported conceptually by the resource-based and relational views of strategy. The need for a suitable management and communication framework is thus becoming evident. We already have some examples showing that information sharing is a key-point at certain levels of a supply chain network. As there are several analogies between a company in a business network and an agent, the Multi-Agent System paradigm can be a valid approach for modeling supply chain networks.*

**Key words:** supply chain management, performance, competitive priorities, resource-based view

## I. INTRODUCTION

The Supply Chain Management (SCM) debate is central to the Operations Management field as demonstrated by the special issues of both Production and Operations Management Journal (POM) and International Journal of Operations & Production Management (IJOPM), in 2006, and the Journal of Operations Management (JOM), in 2007. It faces, however, two important and related challenges: its theoretical development is still at early stages and it lacks full empirical evidence of its benefits.

On the theoretical development, Harland et al. (2006) demonstrated that SCM is still an emerging discipline and there is no consensus about its definition and constructs resulting in a fragmented literature, with difficulties in knowledge advance (Burgess, Singh, & Koroglu, 2006; Chen & Paulraj 2004; Mentzer et al.2001: Gibson, Mentzer, & Cook, 2005).

On the other hand the relationship of SCM with performance cannot be regarded as conclusive (Cousins, Lawson, & Squire, 2006).Despite the increase of empirical research in the last decade, important surfaces. Differences in research design undermine comparability: lack of consensus about the definition and dimensionality of the SCM construct, use of different units of analysis, and different approaches to performance measurement. In addition, most studies used non-probabilistic samples, mainly of American and European companies, limiting generalization to emerging economies. We will present preliminary results from a supply chain study that sheds light on problem areas across a range of relevant supply chain management processes and practices. We begin with a brief discussion of supply chain management. Next, we discuss the principles on which successful implementation of supply chain management are based. Then, we discuss our preliminary findings taken from supply chain buyers and sellers. Finally, we suggest the conclusions of our exploratory study

## II. SUPPLY CHAIN MANAGEMENT

The traditional view of supply chain management is to leverage the supply chain to achieve the lowest initial purchase prices while assuring supply. Typical characteristics include: multiple partners; partner evaluations based on purchase price; cost-based information bases; arm's-length negotiations; formal short-term contracts; and centralized purchasing. Operating under these conditions encourages fierce competition among suppliers, often requiring playing one supplier against the others, and uses rewards or punishment based on performance. The fundamental assumption in this environment is that trading partners are interchangeable and that they will take advantage if they become too important. In addition, there is a belief that maximum competition, under the discipline of a free market, promotes a healthy and vigorous supply base which is predicated on the "survival of the fittest". Developing a supply chain strategy is predicated on understanding the elements of sourcing strategy, information flows (internal and external), new product co-ordination, procurement, teaming arrangements, commodity/component strategies, long term requirements planning, industry collaboration, and staff development.

### III. THEORY AND HYPOTHESES

The Supply Chain Management Construct Supply Chain Management, in its essence, assumes that firms set up alliances with members of the same chain to improve its competitive advantage revealed by superior operational performance of all chain members. Influenced by many different fields like purchasing and logistics, the concept of SCM evolved from a process integration perspective to a more recent systemic and strategic view. In the process integration perspective, different members of the same supply chain join efforts to coordinate specific business activities to improve final customer satisfaction. (Cooper, Lambert & Pagh, 1997). In the systemic and strategic view, firms assign resources and efforts to achieve a unique chain strategy that will lead to competitive advantage through lower costs and improved customer satisfaction (Mentzer et al., 2001).

### IV. LITERATURE REVIEW

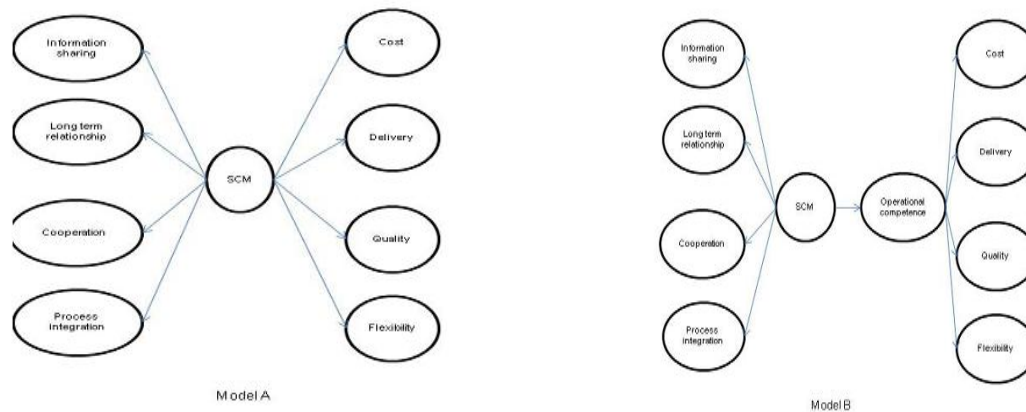
The positive impact of SCM on operational performance can manifest itself in all dimensions. Cooperation, process integration, long term relationship, information sharing allow processes improvement and inventories and lead time reduction (Cooper et al., 1997; Cooper & Ellram, 1993; Bechtel & Jayaram, 1997; Mentzer et al., 2001).

The information sharing reduces uncertainty in the whole chain, resulting in better planning and control processes (Lee et al., 1997).

Cooperation and processes integration between members of the same chain result in cost and time reduction and quality and flexibility improvements, as each organization can focus on its core competencies (Jarillo 1988) and an effective governance mechanism is chosen (Grover & Malhotra 2003).

It has been shown that cooperation and long-term relationship have positive effect on quality and delivery (Dyer, 1996; Shin et al., 2000)

As well as in time reduction (Salvador et al., 2001; Vickery et al., 2003). External integration also results in time improvements, as processes design, development and improvements are developed simultaneously (Droge et al., 2004). Min and Mentzer (2004) also concluded that SCM as a multidimensional construct impacts the firm performance as a whole.

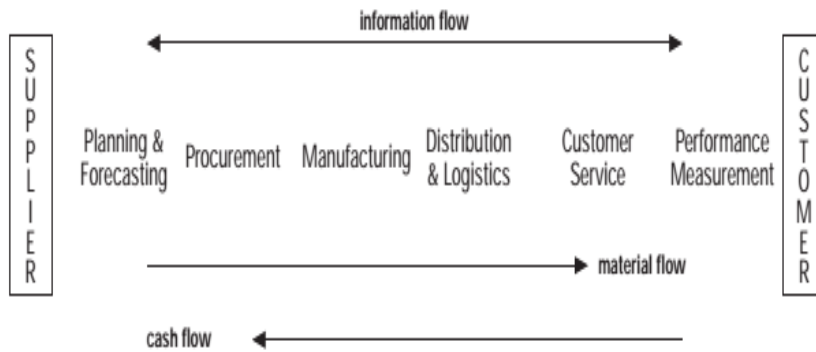


### V. SUPPLY CHAIN FACTORS

To begin, it is important to understand the flows of interaction among supply chain partners. Table II reflects the ranking of information flows along the supply chain and reflects both traditional workflow metrics related to inventory, delivery, and other forms of materials tracking. In addition, the section attempts to capture those information flows that relate to customer satisfaction and the degree to which suppliers and customers are linked. At the bare minimum, we believe that technology is an enabler that facilitates a firm's ability to partner with its suppliers and its customers. Table II summarizes the extent to which firms apply an array of practices in their supply chains. It can be seen that the data show somewhat inconsistent results. Three of the top ten items relate to tracking linkages between customers and suppliers (e.g. tight linkages between customers and suppliers, measures of satisfaction, and individual customers managed as accounts). Although measures of customer/supplier satisfaction scored relatively high, most of the informational considerations addressed were purchase order driven.

All but one of the remaining items relate to information tied to tracking the flow of product as it moves from raw material, to work-in-process, to finished goods. EDI and other more sophisticated processes for linking supply chain members were used very little. Interestingly, we begin to sense a difference between "what managers say" and "what managers do".

That is, respondents espouse the importance of the customer and the need to be market-focused but the results tend to reflect business as usual with a strong emphasis on measures that relate to more traditional purchasing or transactional focus.



Reasons to engage in supply chain management Respondents were asked the reasons they engaged in supply chain management.

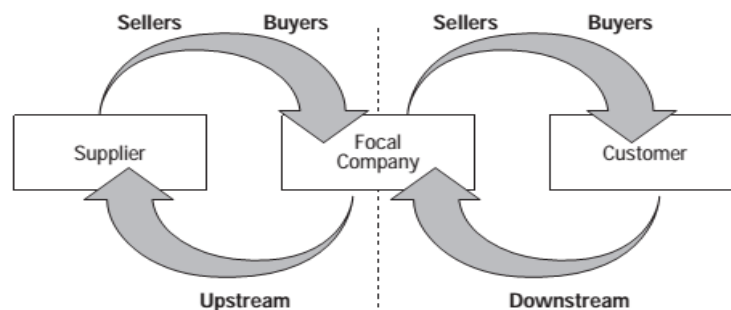
This list of questions was generated from conversations with practicing managers, trade publications, and academic publications (e.g. Schary and SkjottLarsen, 1995). Table III summarizes the results. The findings reflect many of the common mantras evoked for explaining the virtues of supply chain management, ranging from increased end-customer satisfaction, to gaining a strategic market position, to reduced costs and improved productivity. It is encouraging to see that the reasons reflect both the cost reduction and the revenue enhancement side of supply chain management. Nonetheless, when one examines the differences between buyers and sellers, one gains a better appreciation for the tension that exists within many supply chains. While not statistically significant in every case, the data suggest that buyers tend to focus more on the cost reduction aspects of supply chain management, and view securing a reliable source of supply, reduced lead time, and lower costs as key drivers of supply chain management. Conversely, sellers tend to highlight revenue enhancement and see profits, strategic market position, and customer satisfaction as prime drivers for supply chain management. If we were to focus on the overall means scores alone, we would not begin to develop an appreciation for what might be fundamental differences in “world views” between buyers and sellers.

## VI. SUPPLY CHAIN MANAGEMENT PROCESSES

Supply chain management processes explore what respondents say they do in their supply chain interactions. These items explore how the respondents describe their relationships with suppliers/customers and tend to reflect the range of behaviors that support close relationships between buyers and sellers. Interestingly, two major themes dominate this set of questions. Respondents tend to take a more long-term view and state that they expect the relationship to last; that sustaining the relationship is important; and that they have plans to continue the relationship into future. The respondents also highlight communications processes as an important second theme. They report that communications between the partner firms are frequent and that there is a high level of contact between trading parties. Partners have faith in each other and report that they share a sense of fair play. When we look at key differences between buyers and sellers, it appears that buyers are less willing to devote extra effort to their supply chain relationships.

## VII. SUPPLY CHAIN PRACTICES

Where the previous section examines what supply chain members say they do; this section examines what they actually do.



Is akin to “talking the talk and walking the walk”. Interesting differences between the two sections exist in that, from the previous section, one gets the strong impression that information is shared openly and that the boundary between firms is quite permeable. However, these findings addressing specific practices suggest that information sharing is less than open and that technical information is shared only when necessary. In addition, mixed signals surface about the importance of price in evaluating one’s partner.

## VIII. EFFECTS OF PERFORMANCE

In order to explore the effects of several of these variables on measures of performance, a series of exploratory OLS regression analyses were performed. Separate regression models were developed to explain the extent to which different measures of performance – cost reduction and revenue enhancement

(As measured by customer satisfaction) are affected by different supply chain processes and practices. Simply, we examined the extent to which elements of co-ordination, collaboration, and criticality affect two different measures of supply chain management performance. Traditional performance measures would reflect cost reduction while a more “enlightened” view should also deem revenue-enhancing elements as very important. Two different measures of performance were developed from the questionnaire. These findings imply that both trust and commitment contribute to satisfaction as the elements of collaboration reported here imply a willingness to share information without the concern for it being used against either trading partner or a longer-term focus to the trading relationship. While the results for sustaining the relationship are counter-intuitive, co-ordination cannot substitute for closer ties between trading partners. The data suggest that interdependence and information sharing become key ingredients in an integrated supply chain whose goal is customer satisfaction.

## IX. CONCLUSIONS

A number of conclusions can be drawn from this study. It is apparent from these findings that although we espouse the benefits of supply chain management and sing the virtues of closer ties throughout levels of the supply chain; the results suggest that business has not yet fully operationalized the concept of supply chain management. It appears that buyers tend to be reluctant players and are far more skeptical about the benefits afforded through such close integration. One can infer that buyers consider less favorably the benefits gained and are more likely to highlight the risks associated with heightened dependence on a smaller number of suppliers. We can infer also that buyers think about the gains afforded by an integrated supply chain and are more easily swayed by more traditional purchasing metrics related to cost or initial Performance – Performance – cost reduction customer satisfaction Collaboration – what is said Sustaining the relationship 0.532 ( $p < 0.00$ ) Joint planning Frequent interaction Sharing information 1.208 ( $p = 0.02$ )a 0.072 ( $p < 0.00$ ) Collaboration – what is done Sharing technical information Training is important 0.13 ( $p < 0.00$ ) Co-ordination Customer supplier linkages  $-0.096$  ( $p < 0.00$ ) Frequent monitoring Order entry and tracking  $-1.209$  ( $p < 0.00$ ) 0.331 ( $p < 0.00$ ) Raw material tracking Criticality 0.716 ( $p < 0.00$ )R20.27 0.29 Note:  $a = \beta = 1.208$  Regression results showing factors contributing to types of procurement performance An empirical investigation 647 purchase price. Buyers consistently view the cost-saving aspects of supply chain management as more important than the revenue-enhancing benefits.

They seem to understand, on one level, the importance of customer-driven supply chains; the need to focus on core competencies; and, the importance of leveraging the skills and capabilities of their suppliers.

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