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## A STUDY ON THE CONFIGURATION OF SUPPLY CHAIN

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### ABSTRACT

In supply chain configuration, the selection of different components such as suppliers, items, procedures and mode of transportation is done at each and every stage of the supply chain where the variation in the measurement of cost and time is observed in most of the cases.

Generally, the decision regarding the configuration of the supply chain is done keeping the factors like supplier, inventory and total cost of the whole process. Hence, various models are used by the companies to avail the services of the supply chain configuration. Out of all the available options, the management selects that method of configuration which seems to be more feasible in nature. The decision regarding the placement of the inventory is also taken under this configuration. The current paper highlights the significance of supply chain configuration.

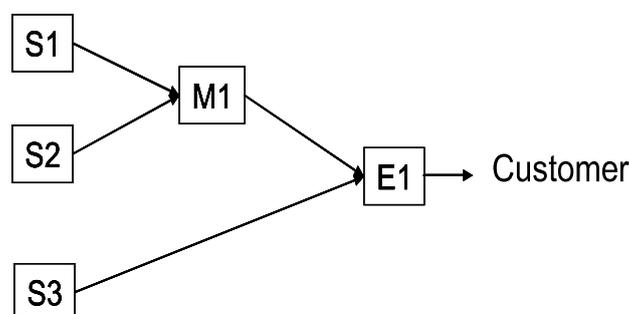
**KEYWORDS:**Supply chain, Configuration, Inventory, cost, Supplier

### INTRODUCTION

In a supply chain network, there are generally three nodes which are used in order to perform the all activities regarding the supplying procedure. There are three procurement nodes, one inter-mediate node and last is end note which is a customer to whom the inventory is to be supplied.

Some procurement nodes use some intermediate nodes in order to communicate with the customers i.e. the intermediate node is responsible for the implementation of the supply procedure between source node to the end node.

There are some cases as well where the source node directly communicates with the customer and no kind of intermediate node is used in this procedure.



S1, S2, S3 = Procurement nodes; M1 = Intermediate node; E1 = End node

**Figure 1. Typical supply chain network**



In supply chain, the activities related to the inbound logistics are concerned with the relationship between the suppliers where the activities like receiving, storing of inputs are performed. Then, various operations are performed in order to convert all the input into outputs i.e. products and services.

The activities like accumulating and distributing the final products are managed under the outbound logistics. Then, marketing of the products is done and various strategies are made to promote the products on the larger scale.

After that, the task of selling the final products is performed. The last stage comprises the maintenance of the delivered products so that the trust of the consumers can be gained.

Hence, supply chain is an integral part of an organization where all the activities regarding the product is managed properly starting from the making of these products to the marketing and selling these final products.

The whole process of the supply chain configuration should be cost-effective so that there should be no loss to the company as far as all kinds of risk factors are concerned. Feasibility level of the chosen method plays an important role in the cost and benefits of the supply chain configuration.

Besides the cost factor, there is another big factor of quality of the products which is very important for the companies to maintain so as to survive in this competitive market.

### **CONFIGURATION OF SUPPLY CHAIN**

Supply chain configuration involves selection of suppliers, parts, processes and transportation modes at each stage of the supply chain out of several alternatives that vary in cost, lead-time and other measures. Traditionally, the supply chain configuration decision has been done based on costs (inventory, procurement, transportation costs, etc) and other quantitative measures. However, experience has shown that other subjective criteria such as alignment of business practices of partners in the supply chain network also influence the configuration and stability/reliability of the supply chain. This study presents a multi-objective goal programming approach to supply chain configuration during new product development. In addition to using various production and inventory costs, the model also includes compatibility of firms in configuring the supply chain.

Supply chain configuration involves selection of suppliers, parts, processes and transportation modes at each stage of the supply chain. The selection decisions are made out of several alternatives that vary in cost, lead-time and other measures. Traditionally, the scope of the supply chain configuration problem has been limited to inventory placement decisions at various nodes of a supply network. It has been assumed that at each stage planners would already have an option before making inventory placement decisions. However, this severely limits the opportunity to optimize the overall cost of the supply chain (SC) because the option selected at a particular node may not be the best given a firm's business practices. Therefore, the current approach is to simultaneously consider the supplier (or process) selection decision and the inventory (safety stock) placement decision.

Inventory placement decisions are just one part of the global supply chain management equation. In addition to these hard numerical metrics, there are other factors (such as alignment of business culture and management practice of parties in the supply chain network) that equally influence the sustainability of the supply chain but are difficult to quantify.



Therefore in order to meet the challenges of globalized marketplace, manufacturers are currently pursuing strategic partnership with few key suppliers for long-term growth. As companies are under tremendous pressure to reduce the product development time and cost and improve the quality and functionality, their supplier selection criteria have changed significantly in recent years. Instead of selecting the lowest cost bidder as that used to be the standard industry practice in the past, companies are now considering total cost of ownership as a new paradigm for supplier selection methodologies. Furthermore, as firms have increased their level of outsourcing, they are becoming more dependent on their suppliers. However, the challenge facing most firms is how to build the right alliance in order to improve their overall performance, innovation, competitiveness, and long-term growth. As reported in, Chrysler had to shut down four plants in 2008 because of cash-flow problems of its supplier Plastech.

While the benefits of configuring the supply chain at an early stage of product development (PD) have been well documented in both the PD and supply chain literature, the existing supply chain configuration models are centered around inventory/safety stock placement decisions and focus only on minimization of total supply chain costs. Prior models do not consider soft or intangible variables like the alignment of business practices among supply chain partners. Arguably, such supply chain configurations may not be stable and thus may witness early failures.

The objective of this study is to develop a multi-objective optimization model for supply chain configuration during product development. Unlike the existing literature, the study includes both hard (supply chain costs) and soft (compatibility of firms) variables in the optimization model. Since the soft variables that determine alignment between supply chain partners are subjective in nature, we use fuzzy logic to quantify those variables. A case study is presented from the existing literature to show the advantages of the proposed multi- objective approach over the single objective approach used in the benchmarked case study.

## DISCUSSION

Supply chain integration (SCI) is, to a great extent, concerned with the development of more integrated approaches that hold out the prospect of eliminating many of the inefficiencies directly attributable to supply chain fragmentation. A plethora of supply chain management (SCM) definitions have been developed in recent years. There is evidence of differences in emphasis and approach between different industrial sectors, geographical areas and functional backgrounds. Furthermore, a variety of associated terminologies have also been developed which has added to the complexity.

The structure of the international economic and business environment has changed significantly in recent years. The growth of trade blocs throughout the world has resulted in increasing global economic integration. This evolution, largely based on the reduction of barriers to the movement of capital, goods, services, people and information internationally, has facilitated increased international trade and foreign direct investment (FDI).

Customer service is becoming a key source of differentiation or an order-winning criterion in many sectors. An order winning criterion (or 'order winner') is a feature of the product or service offering which differentiates it from the competition and is, therefore, likely to be a source of increased market share; an order qualifier, on the other hand, is a feature which must exist to ensure that a product or service gets into the market in the first instance and stays there. The latter tend to have order losing rather than order winning characteristics. In many sectors the importance of customer service relative to product quality (now largely an order qualifier)



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and price (largely determined by the dynamics of supply and demand in the market and subject to downward pressure in many sectors) has increased. The supply chain delivers customer service. In this way, the supply chain itself has become a key factor in the development of a differentiation strategy.

As pointed out earlier, a focus strategy concentrates on a narrow segment and within that segment attempts to achieve advantage through either cost leadership or differentiation. The points made above in relation to the role of SCM in strategy formulation and implementation are, therefore, equally relevant in the context of a focus approach.

Economic and business globalization is happening. Companies are increasingly focusing on their core competencies and as a result, vertical disintegration is happening. Finally, more and more companies are coming to regard the supply chain as a source of strategic leverage. In short, supply chains have become more global and more virtual (and, therefore, their management has become more complex) and SCM – with the concept of integration at its core - is becoming a more integral and integrated part of overall corporate strategy. Simultaneously, customers have become more discerning and are demanding better quality products, higher levels of service and reduced prices. This increasingly competitive business environment has sharpened the focus on the need for more robust approaches to supply chain design and management.

## CONCLUSION

One well-known approach to strategic thinking and strategy formulation, based on the concept of the value chain, was introduced a quarter of a century ago by Michael Porter. The idea of the value chain is based on the process view of organizations, the idea of seeing a manufacturing (or service) organization as a system, made up of subsystems each with inputs, transformation processes and outputs. Inputs, transformation processes and outputs involve the acquisition and consumption of resources, such as money, labor, materials, equipment, buildings, land, administration and management. How value chain activities are carried out determines costs and affects profits.

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