Impact of Supply Chain Management on Productivity In Manufacturing Industry

Mr. Tinku Joy [1]
Assistant Professor
Marian International Institute of Management, kuttikkanam.

Abstract- *Globalization of businesses, infrastructural bottlenecks, increasing uncertainty of supply chain networks, shortening of product life cycles and proliferation of product variety have forced firms to look beyond their four walls. As companies move towards increased global competitiveness, the strategic issues surrounding supply management increasingly demands the attention of firms for cost reduction, increased quality, improved customer service and continuity of supply which significantly elevates supply management stature within organizations. The importance of supply chain management and its effectiveness is becoming more crucial for the survival of world class enterprise.*

Organizations across the globe are applying value innovations for managing the enterprise strategically & operationally so as to retain and gain competitive edge in the market place. Supply chain concerns organizational aspects of integrating legally separated firms as well as coordinating materials and information flows within a procurement-production- distribution network.

This paper primarily identifies the supply chain problems commonly faced by manufacturing firms and their impacts on pricing strategy to the entire supply chain. A range of solutions are suggested to address these problems, furthermore the applicability of each of these solutions significantly depends on their social ramifications that are systematically evaluated.

Keywords- Globalization, systematic planning, coordinating, supply chain

I. INTRODUCTION

Your business' supply chain is the system you use to get your product to end consumers, from obtaining raw materials to delivering the final product. Supply chain management involves optimizing your operations to maximize both speed and efficiency. Speed is important because customers value fast service. Increasing speed, however, can cause costs to skyrocket, so maximizing efficiency is equally important. The most effective supply chains deliver products as fast and as cheaply as possible without sacrificing quality. Top companies accomplish this by using complicated logistics tools, such as computer algorithms that choose optimal routes for product shipping and large company databases that allow distant employees to pool order information and coordinate their efforts in real time.

How Does Supply Chain Management Affect Manufacturing Companies?

Supply chain management is a systematic approach to managing the distribution of goods from producers of raw materials, through manufacturers and eventually down to end users. Supply chain management affects manufacturing companies in a variety of ways, including the availability of inputs needed for production processes, costs and profitability of manufactured items, company infrastructure and ways in which companies interact with their suppliers and customers. Understanding the ways that supply chain management affects manufacturers from both a daily operational perspective and a strategic viewpoint is Important for all managers and entrepreneurs in the industry.

Supply Chain management constitutes the series of interdependent upstream, manufacturing and downstream processes targeted at transforming raw materials into products to meet customer demand.

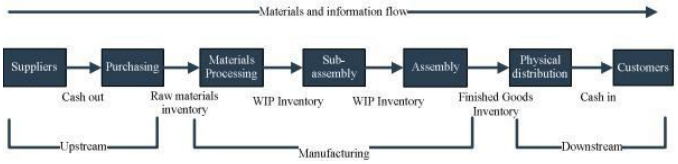

Figure 1: Illustration of the upstream, manufacturing and downstream activities within the SC

In the backdrop of global markets, increased competition and extended SCs manufacturing firms are now confronting new challenges. The need to eliminate waste, embrace new technologies, improve on supplier/ customer relations, better manage inventory, comply with regulation, and be more cost efficient is becoming more apparent in the quest to achieve operational excellence.

II. LITERATURE REVIEW

Literature portrays logistics and SCM practices from a variety of different perspectives with a common goal of ultimately improving performance and competitiveness. Based on literature, we find that the important supply chain practices concerns are mainly related to:

1. Supply Chain Collaboration and Partnership with various stakeholders such as the product developers, suppliers, channel partners and end-users.
2. Supply Chain Structure including facilities network design taking into account related transportation and logistics.
3. Forecasting and Demand Management to cope with supply chain complexity in a cost- effective and delivery-efficient way.
4. Use of Information and Communication Technologies (ICT) to facilitate the above.

While there is plenty of published literature that explains or espouses SCM, there is a dearth of empirical studies examining logistics and SCM practices. Galt and Dale (1991) study ten organizations in the UK and find that they are working to reduce their supplier base and to improve their communications with the suppliers. Fernie (1995) carries out an international comparison of SCM in the grocery retailing industry. He finds significant differences in inventory held in the supply chain by the US and European grocery retailers, which could be explained by difference in degrees of their SCM adoption. Tan and Wisner (2000) compare SCM in the US and Europe. Tan (2002) relates SCM practices and concerns to firm's performance based on data from US companies. He lists nine important supply chain concerns such as lack of sophisticated ICT infra-structure, insufficient integration due to lack of trust and collaboration among the supply chain stakeholders and thereby lack of supply chain effectiveness and efficiencies. Basnet et al. (2003) report the current status of SCM in New Zealand, while Sahay et al. (2003) discuss supply chain strategies and structures in India. These surveys rank the perceived importance of some SCM activities, types of hindrances and management tools on the success of SCM using representative samples mostly from manufacturing. Quayle (2003) surveys supply chain management practice in UK industrial SMEs (Small Manufacturing Enterprises) while Kemppainen and Vepsalainen (2003) probe current SCM practices in Finnish industrial supply chains through interviews of managers in six supply chains. They analyze the change of SCM both in terms of operational practices and organizational capabilities. Chin et al. (2004) conduct a survey that examines the success factors in developing and implementing supply chain management strategies for Hong Kong manufacturers. Moberg et al. (2002) state that there is little literature on information exchange. Feldmann and Muller (2003) examine the problem of how to establish an incentive scheme to furnish reliable and truthful information in supply chains.

There is little literature on logistics and SCM practices in India. Available literature focuses either on the best practices (Joshi and Chopra, 2004) or on re-engineering of internal operations of the firms (Deshmukh and Mohanty, 2004, Kankal and Pund, 2004). In context of ICT, Saxena and Sahay (2000) compare the manufacturing intent to be an agile manufacturer and their Information Technology (IT) infrastructure in terms of scope of use, extent of use and integration of IT-based systems. The more recent studies are mainly based on questionnaire surveys and secondary data sources (Sahay and Mohan, 2003, www.etintelligence.com, Sahay et al., 2006). Vrat (2004) discusses some issues and challenges as well as the potential of SCM in India. All these studies find Indian firms generally lagging behind their counterparts in the developed countries.

The Ways in which Big Data Is Revolutionizing Supply Chain Management

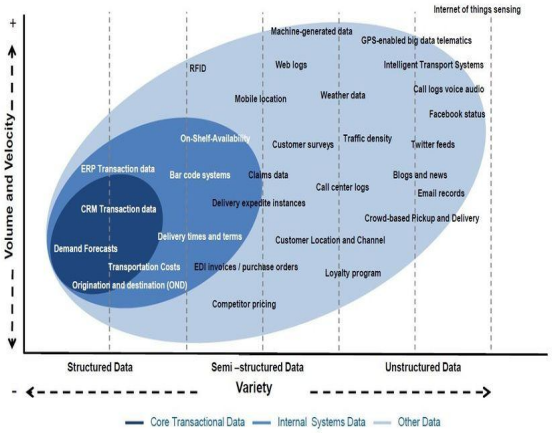

Figure 1. SCM Data Volume and Velocity vs. Variety

5. Big data is providing supplier networks with greater data accuracy, clarity, and insights, leading to more contextual intelligence shared across supply chains.
6. Forward-thinking manufacturers are orchestrating 80% or more of their supplier network activity outside their four walls, using big data and cloud-based technologies to get beyond the constraints of legacy Enterprise Resource Planning (ERP) and Supply Chain Management (SCM) systems. For manufacturers whose business models are based on rapid product lifecycles and speed, legacy ERP systems are a bottleneck.

III. OBJECTIVE

This paper primarily identifies both positive impact of supply chain management on manufacturing firms. A range of solutions are suggested to address these problems, furthermore the applicability of each of these solutions significantly depends on their social ramifications that are systematically evaluated.

IV. RESEARCH METHODOLOGY

The information presented in the entire paper is abstracted from a variety of authoritative data sources, namely, scientific and practitioner literature, and survey-based reports.

V. TASKS AND ISSUES IN SCM

- Understand the business reasons e.g. compliance with legislation, marketing opportunities, security of supply, costs and benefits review and understand the environmental issues, including identification of the scope for alternative materials or suppliers
- Understand your supply chain - which suppliers are linked to sensitive issues?
- -which can be grouped?
- -which are of strategic importance?
- develop assessment/ranking criteria for main suppliers and action plan and guidelines e.g. for low concern communicate policy, for high concern require information on harmful materials, train purchasers in requirements and procedures
- identify suppliers where a partnership style could be adopted and work with these directly on addressing issues, providing support where appropriate integrate into existing purchasing processes including supplier evaluation for pre-selection, tender specification, vendor rating, supplier auditing and quality programmes
- define what additional information is needed to support these processes and meet objectives; do not send indiscriminate requests for large quantities of information to suppliers
- Obtain information by appropriate methods including meetings, seminars, site visits and questionnaires
- Validate suppliers' performance by appropriate methods including review of documentation, site visits and audits, set timetables for performance improvement, including targets which are achievable by suppliers and acceptable to buyers.

Where a company is involved in manufacturing and design, SCM needs to be closely integrated with product design and production planning eg. The purchasing function should be involved in product decision-making. It will need to implement an eco-design management process alongside SCM.

Where it is at the end of the supply chain, the marketing and purchasing functions, in consultation with environmental specialists, are likely to have a relatively greater role. The emphasis is likely to be on SCM, especially LCA, specification and establishing purchasing criteria.

Where a company is subject to eco-design requirements from customers it needs to decide how to respond. These requirements may not be clear so the first stage may be to seek clarification. It may be simply a request for information which can be readily supplied or obtained. If significant improvements are required and the customer/markets are sufficiently important then the company may decide to improve relevant aspects of its environmental management, or implement a full environmental management system. As a result the supplier may decide to implement eco-design processes of its own.

VI. POSITIVE IMPACT OF SUPPLY CHAIN MANAGEMENT

Firms that achieved a successful integration in their supply chains have fewer inventories, shorter cash flow cycle times, reduced logistics, reduced material purchasing costs, increased workforce efficiency and improved customer responsiveness.

The SCM concerns with issues and characteristic features of several interrelated factors and activities of an organization such as demand forecasting, procurement, manufacturing, and distribution, inventory, transportation and customer service.

The main dimensions covered by SCM are inventory, information sharing & technology, transportation, warehousing, trust, commitment, cooperation between partners, quality management etc.

1) Inventory Management

Management of inventory has received considerable attention over the years due to improving customer service, hedging against price changes & contingencies, achieving production, purchase & transportation economies, protecting against demand & lead time uncertainties and balancing

supply & demand. Stock holding of seasonal products, which are slow moving, critical, perishable and whose peaks are relatively predictable are to be minimized, building them only during peak demand period. Fad products with highly unpredictable level of demand, high criticality and long lead times, essentially must hold high level of stocks thereby allowing safety margin for delivery, lead times and demand fluctuations.

2) Information Sharing and Technology

Adjusting to changing environmental conditions requires effective information acquisition and processing. The hard data generated by modern information technology in combination with the "qualitative" information collected by SCM provides the means for cross functional teams to respond resourcefully to the environment.

Modern information systems are based on material flows and logisticians are well positioned to collect, act on and disseminate information concerning customer needs across the supply chain.

Information is a driver whose importance has grown as organizations have used it to become more efficient, responsive and profitable. It serves as a connection between the various stages of supply chain allowing them to coordinate their actions and schedule daily operations. However, the choice of IT system needs to make the trade – off between the cost of information (a reduction in efficiency) and the responsiveness that information creates in the supply chain.

3) Transportation Management

Many companies found that production improvements in quality, flexibility and throughput time do not have their full impact in the market place without the corresponding development of logistics/transportation systems. Companies today requires excellent inside-out logistics/transportation processes for keeping promises to customers and maintaining acceptable inventory levels & expenses.

Transportation is defined as managing the movement of goods (i.e components, raw- materials, supplies, equipment) from the point of origin (the supplier) to the manufacturer (inbound transportation) via truck, air, rail, water, pipeline or some combination thereof and maintaining the flow of finished goods from plant, through the distribution, concluding with delivery to the final customers.

In all, transportation has a meaningful impact on production schedules, the effectiveness of distribution and ultimately on customer satisfaction & firm performance.

4) Warehousing Management

Warehousing management is defined as "the direct control of handling equipment producing movement and storage of loads without the need for operators or drivers". It includes equipments such as automated storage & a retrieval system (AS/RS), automated guided vehicles (AGVs) and conveyorised sortation systems, but excludes technology where warehouse operators are still necessary. Warehousing as a critical activity in supply chain outperforms competitors on customer service, lead times, costs include processing and inventory costs and helps in smooth movement of goods. Sound warehousing methodology in operations results in the distribution of goods from the production line to the customers economically and punctually, using a shorter path philosophy and avoiding unnecessary waiting time. Warehousing management in SC attributes for general sales growth by potential improvements in productivity, order accuracy, reduced space requirements, increased volume capacity, control of inventory and increased customer service.

With the arrival of supply chain management, warehouses serve a strategic role of achieving the logistics objectives of reduced cycle times, inventories & costs and increased customer service levels.

5) Quality Management

Quality is an important factor in the value adding process involved in the production and delivery of products along the supply chain. In addition, by making quality management an integral element of the supply chain, companies can avoid being simply reactive to the requirements of their supply chain customers and can strive to meet their demands more proactively. Quality management in SC assists in building relationship with the customers for improvements in profitability, serviceability, reduced costs in the supply chain and improvement in business performance by enhancing customer satisfaction & customer loyalty.

6) Customer Satisfaction

Developing customer satisfaction with product quality is a valuable and profitable way for competitive advantage. Customer expectations have ascended to very high standards and it becomes crucial for the marketer to retain & build long term relations with customers. Companies through effective supply chain management are focusing on revenue

increasing methods, cost reduction and improving customer satisfaction. The supply chain management assists in fulfilling the demand and place needs of its customers and builds relationships between channel members with focus on their long term retention.

VII. CONCLUSION

Supply Chain Management (SCM) focuses on sourcing, producing, delivering goods & services to end customers for gaining competitive advantage, cost reduction, increased quality, improved customer service etc. Its success is dependent on adopters developing specific capabilities, supply chain collaboration, open communication and outsourcing non-core competencies. The dimensions covered by SCM are inventory, information sharing & technology, transportation, warehousing, trust, commitment & cooperation among partners and customer satisfaction. Firms that achieved a successful integration in their supply chains have fewer inventories, shorter cash flow cycle times, reduced logistics, reduced material purchasing costs, increased workforce efficiency and improved customer responsiveness.

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