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Study of SCM and Other Technologies for Productivity Enhancement

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ABSTRACT: The opening of Indian economy for global competition has forced Indian entrepreneur to utilize advance technologies for productivity enhancement, so that they are not forced to shut down their enterprises. In this paper the advance methodologies for product life cycle cost reduction have been explained so that the customers are not only satisfied but delighted and astonished to get such good product and services. It also briefly discusses the outcomes of the relationships that Japanese and US automakers have with their suppliers to develop superior lean supply chains.

I. INTRODUCTION

The opening of the Indian for global competition has given opportunity to Indian consumers to choose from a wide of goods as pre one's liking and taste. The market researchers have shown that consumers are looking beyond the acquisition cost of the product and are considering other costs, which appertain throughout its life, that is its life cycle costs. Besides the first costs, the customers are considering the product's likely operating, maintenance/repair costs, coupled with the inconvenience caused by its partial or complete breakdown due to unreliability. The once common attitude "let the customer find the defective product and we will replace it free of charge" is now sifting to guaranteeing that customer's needs and desires are anticipated and met.

The nature of the current competition is forcing Indian corporations to develop and sharpen following abilities (by acquiring advanced technologies from the global market):

(i) To understand the customer requirements and to provide these to the customer at the earliest possible (commensurate with the techno-commercial and managerial ability of the company) at the lowest price.
(i) To market product and services of high quality and reliability consistently.
(i) To take care of the fast changing technological political and social scenario and
(i) Futuristic approach i.e. to predict what the customer will demand one year or ten years from now.

However for the corporations, which are not able, to take care of the above mentioned criteria for improvement Deming (the modern age management guru) say, "You do not have to do this, survival is not compulsory!" That is a fact that any company which falls behind in terms of any of the above characteristics will eventually be overtaken by a competitor. It has been observed that Concurrent Engineering (CE) helps in reducing the cost and time from the concept stage to the market.

Concurrent Engineering (CE) is a manufacturing philosophy, which involves managing product development process with the aim of getting new products with the highest quality at the best competitive price in the least time to the market. In other words, concurrent engineering is a systematic approach towards iterated, concurrent design of products and their related process, including manufacturing and support. This approach is intended to cause development from the outset, to consider all elements of the product life cycle from conception through disposal, including quality, cost, schedule, and user requirements. This definition places team values at the centerpiece and recognizes that CE will fail if the organization, at all levels, does not embrace the norms of team working and does not learn to live by them each day. The next important value that is embedded in the definition is the focus on the customer.

Many large companies have designed programs for satisfying customers need utilizing various problem definition and solution techniques (such as Ishikawa fishbone diagram and Pareto charts) to quality consideration in product design (Quality Function Deployment), to statistical methods for quality design and improvement. Until recently, most quality efforts were targeted at "on-line" quality activity. In fact, the term "quality" is synonymous with quality control" for many manufacturing engineers. On-line quality control refers activities that monitor quality characteristics during or after production and define statistical rules for determining whether action should be taken to correct for changes in the underlying process.

However, the planning and improvement aspects of the quality engineering offer the greatest potential for high-quality technology for production of high quality goods. "quality can be designed into the product prior to manufacturing phase, rather than simply screened before shipping the product to the market place. A major realization of this refocusing is that opportunities to improve quality are greatest early in the design process. When confronted with superior Japanese quality automobiles, the U.S. Auto markets found it hard to add quality to a designed product and an established manufacturing process. (The term quality is being used more and more to reflect what is desired in a product by the consumers who use it).
In the "off-line" methods are used to determine the design configurations that meet the customer's needs and are "robust". It is meant that product performance characteristics are insensitive to variation in the manufacturing and operating environments. Robustness by design reduces the need of the company.
(a) To rely on extensive monitoring and control and
(b) To use expensive raw materials and component parts.
Another very successful approach for attaining "off-line" quality is called Quality Function Deployment (QFD), which is a structured process for taking into consideration the needs and desires of the customers and translating them into technical engineering requirements. It assists interdepartmental teams in product planning and carrying these activities through manufacturing planning. QFD also serves an important function as a communication system. The "voice of the customer" is not easy to identify and often may be at variance with what the marketing organization regard as customer requirement (Table 1).

Table 1: QFD System Design summary.

Step	Description
1.Voice of customer	Qualifying the needs and wants of the customers
2.Competitive analysis	Opinion of the customers regarding performance of your company with respect
3. Voice of the engineer	Quantification of the technical measures to satisfy the customer's needs.
4. Correlation	To establish the relationship between the voice of the customers and the voice of the engineer.
5. Technical Comparison	Comparison of your company product performance with your competitor using competitior's technical specification literature and if required testing I simulated conditions your product and Competitor's product to find if any pitfall exists.
6. Trade-offs	To find potential trade-offs for reduction of cost and enhancement of quality and reliability of the product for customer's acceptance, using current engineering techniques.

Japanese put considerable efforts and take great pains to identify the "voice of the customer". For example, when Honda was embarking on the design of small trucks for the American consumer market they wanted to be sure to get true customer's requirements. To do this they did not go to the marketing and sales organizations, but actually took steps to get a more direct contact with real customers. They sent the teams to get first hand information and requirements by interviewing the truck drivers and owners. At that time the U.S. automobile industry had a virtual monopoly on the production of these vehicles. However, the exercise of getting the "opinion and perception" of the real customers enabled Honda to produce their first Honda truck, which was a winner as soon as it was produced.
Thus it can be inferred that proper market survey taking into consideration of "voice of customer", social-political, weather and geographical conditions, etc., is a must to find out the appropriate technology and the technology which has flourished in the environment and work cultural of a foreign county needs to be modified to suit the recipient company [1-2]. Table 1 shows the six basic steps of QFD with description for building a house of quality for technology transfer.

II. THE STRATEGIC OF INFORMATION MANAGEMENT IN SCM

Supply Chain Management (SCM) involves [3] managing the flow of products, services and information from the supplier's supplier to the customer's customer. Evidently, much of the focus of SCM is on inventory, from raw material suppliers to any number of processes and on to the final consumer. The ultimate fulfillment of this strategic chain is reached only when the customer can be delighted by delivery of goods on time and desired quantity. Thus, the supply chain is inextricably linked to linked to logistics and the management system. In other words, logistics can be termed as the execution part of the supply chain agendas. In today's typically constructed value-chain, 80% of the value addition is done not by the manufacture and the marketer, but by those who supply the components and raw material.

III. OBJECTIVES OF SCM

1. To fulfill the demand at the right time to the right place with right quantity
2. To maximize customer service
3. To minimize procurement and distribution cost
4. To maintain and speed up the flow of information and
5. To establish long-term relationship among all members right from suppliers to the end user.

Supply chain may [4] consist of five fundamental elements. In general, most manufacturers attempt to integrate two or more of these processes in order to provide the best value to customers. The five elements are:
1. The process of introducing new products
2. The process of procuring raw materials components
3. The process of transforming physical materials
4. The process of fulfilling customer's order, and
5. The process of providing product support and services.

SCM is, to large extent, about the management [5] of information flow. Therefore, information technology has had a key role in the transformation of the logistic function at leading edge companies. Information management (IM) has a critical role as an enabler and contributor to successful business strategy implementation. A simplified framework of integrated supply chain management [6] is proposed to highlight the benefits out of the effective use of information technology as shown in Fig. 1.

Traditionally, the focus and scope [5] in SCM has been the flow of materials and goods from suppliers through manufacturing and distribution chain to the customer. Improvement considerations are materials requirements planning (MRO), capacity management, production planning and scheduling, inventory levels and supply allocation. In many cases the information flow from customer to the chain including supplier is narrow. The traditional view of SCM is illustrated in Fig. 2. In demand chain management (DCM) the key focus is the continuous flow of the demand information from customers and end users through distribution and manufacturing to suppliers.

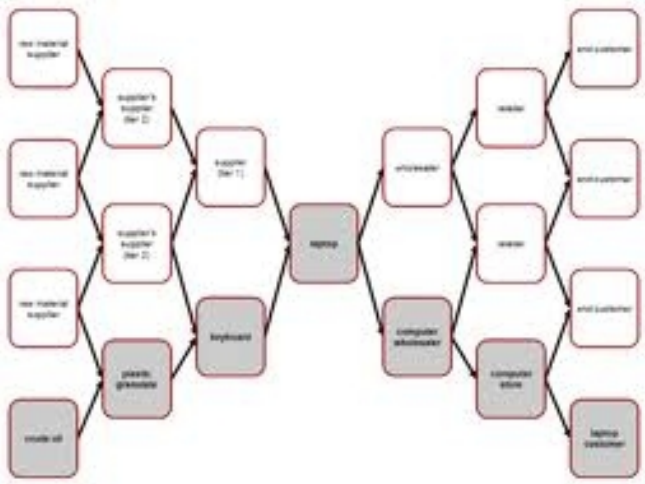

Fig 1. Model of integrated supply chain management.

The shared objective of the chain is fulfilling customer demand. The most important controlling inputs are rolling forecasts and plans, point of sales data, daily orders, management decision, and performance feedback. The controlling trigger of the chain is the customer order. This view of DCM is illustrated in Fig. 3.

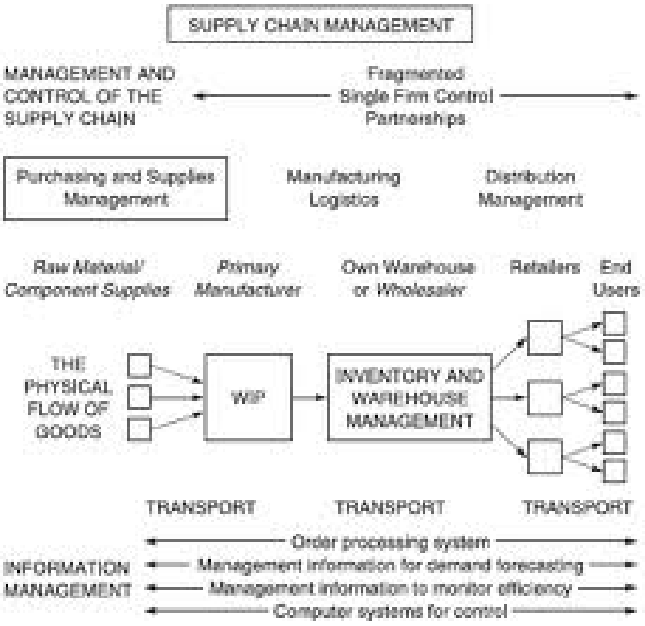

Fig. 2. Supply Chain Management.

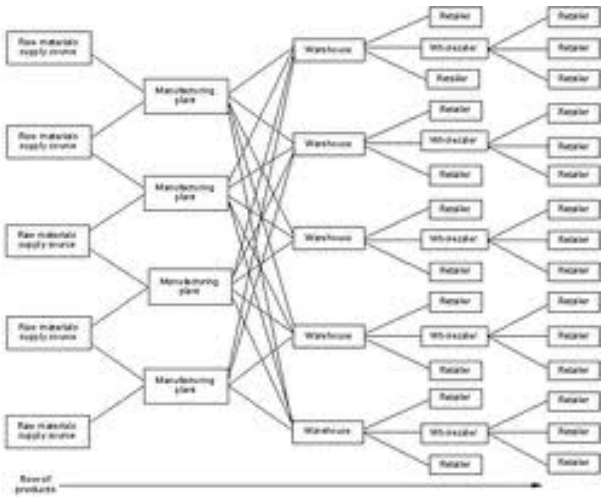

Fig. 3. Demand Chain Management.

The benefits of applying SCM are

- . Reduced operational cost
- Improved flow of supplies
- Improved delivery performance
- Increased flexibility and responsiveness to customer demand.

The benefits of SCM can further enhanced by increasing speed and flexibility, and the ability to create entirely new supply chain operations using Internet technology. In addition to the above, the further advantages gained due to the effective use of Internet in SCM can summarized as quick access to information, accuracy of data, speed, reduced paper work, saving clerical staff, flexible buying strategy, better inventory level control and improved customer service [4].

IV. THE IMPACT OF E-COMMERCE

Ever-increasing supply capabilities, ever-increasing global competition, and ever-increasing customer expectations characterize modern business. In response, business throughout the world is changing both their organizations and their operations. They are lowering the barriers between the company its customers and suppliers. It allows to select the best supplies regardless of their geographical location and to sell into a global market.

The distinct categories [7] of e-commerce are Business (B-B), Business to Consumer (B-C), Business-to-Administration (B-A) and Consumer-to-Administration (C-A).An example in the B-B category would be a company that uses a network for ordering from its suppliers, receiving invoices and making payments. This category of e-commerce has been well established for several gears, particularly using electronic-data-interchange (EDI). The next category B-C largely equates to electronic retailing, which has expanded greatly with the advent of the World Wide Web.

V. CUNCLUSION

The opening of Indian economy for global competition has thrown tremendous challenges to Indian industrialists and entrepreneurs they have to cope hereafter on their own with the traumas of the competition never experienced before. The free market economy is like the sea and one has to equip oneself to swim in it and survive. Hence, advanced technological and managerial techniques are required to be used by Indian industries so that they can produce products at competitive cost and compete with the products. In this, the use of QFD and CE help in reducing the time to market as well as the cost of the product.

SCM also helps in managing the quick and smooth flow of materials at reduced cost. The final capability crucial to success lies in updating the physical aspects of the supply chain to match the speed of the virtual world. Finally, the key requirements for the survival and growth of the Indian industries are integration of various advanced technologies along with proper information management.

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