

Supply Chain Management-A Quality Improving Tool in Process Industries

Dr Dharamvir Mangal

Mechanical Engineering Department, The Technological Institute of Textile and Sciences, Bhiwani (127021), Haryana, India

ABSTRACT

The present paper discusses the Supply Chain Management as a tool for improving the total quality management in process industries (Sugar Plant). Sugar plant is a complex and repairable engineering unit, which comprises of various systems namely feeding, crushing, steam generation, crystallization and refining etc. Supply chain management is a central and important area of academic research due to its impact on process industries competing in today's global economy. In today's competitive environment, it is extremely difficult to successfully produce high quality, low cost products without considering a satisfactory set of suppliers. Suppliers form the first link in the supply chain of any organization. Suppliers selection is a multi criteria problem, which includes both qualitative and quantitative factors, Intelligent supply chain results in reduction of inventory, production and distribution costs, when production of sugar is high, consumption of sugar in domestic market is increasing, and their potential for industries are to perform well. This paper represents the ways to achieve Total Quality Management using Supply Chain Management principles in process industries.

Keywords: Total Quality Management, Supply Chain Management

1. INTRODUCTION

The development in industrial automation and resulting complexity of systems involved, have made the reliability of machines and other equipment, even more important. This is especially true in the process industries, which is characterized by the expansive specialized equipment and stringent environmental considerations. The sugar industry is a very large engineering unit having continuous sugar production for 24 hours in a day during crushing season. To meet the current challenges, it has become for sugar plant to introduce the Supply Chain Management for improving Total Quality Management [1]. Supply Chain Management is network of facilities and activities that perform the functions of product development and procurement of material from vendors, the movement of materials between facilities, the manufacturing of products and distribution of finished goods to customers. It is a total system approach to managing the entire flow of information, materials and services from raw materials suppliers through factories to the end customer.

In order to survive and grow an appropriate philosophy of Total Quality Management needs to be adopted. The concept of Total Quality Management is capable to withstand the competition, brings stability and achieves development with the need of the time.

2. SUPPLY CHAIN MANAGEMENT (SCM)

The concept of Supply Chain Management (SCM) was developed in production management as the stream related to customer service, demand, flow, and distribution for making an improvement in process [2]. It is an integration and coordination of business process that manages the flow of material distribution from supplier to customer. Supply Chain system deals with analysis of information from different points on the Supply Chain to reduce operational cost. SCM has traces from history like In 1776 Adam Smith suggested improvement in production methods by specializing workers in certain tasks. During 1859 to 1915 F. W. Taylor gave the concept of "Functional Management" which leads to Value Engineering technique developed by L.D. Miles in 1950 to solve resource allocation, inventory, Scheduling processing; location layout and control problems. In future introduction of Management Information System (MIS) and Decision Support System (DSS) will provide further impetus in Production Management. The processes involved in supply chain are shown in figure.1.

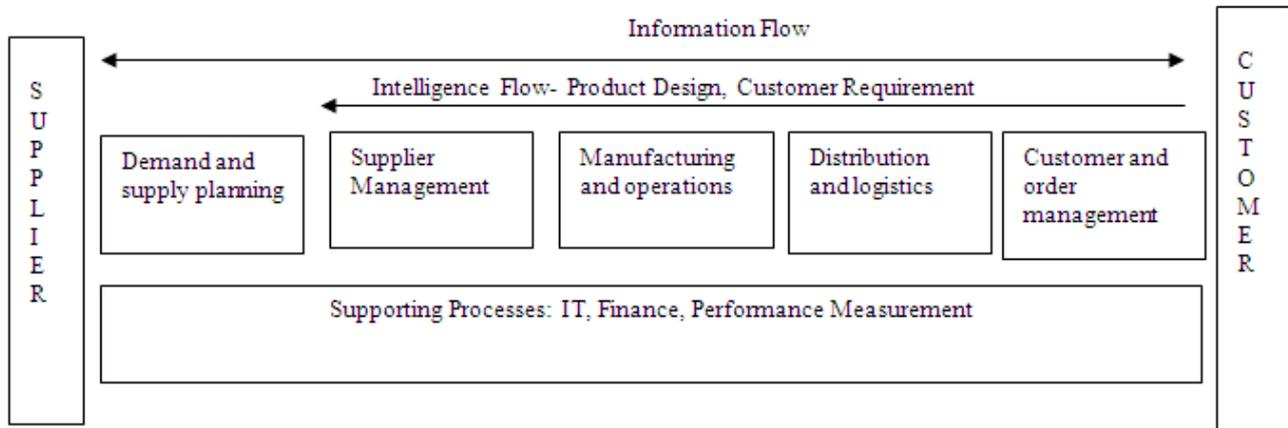


Figure1 Supply chain process

Before 1970 SCM was known as "Distribution" that categorized itself the Sales Management organization, which is aimed at reducing inventories, managing efficient distribution and movement of inventories. But at the same time other departments related to same tasks were working autonomously that had only functional relationship. Also from 1980s the Japanese management technique was introduced to improve the productivity.

At the same time rising cost of transportation and competition had compelled to reduce supply chain operating cost. In 1990 effect of globalization and decontrol brought in huge competition, which changed the dimension of SCM [4]. Improvement of customer service became a new task of Supply Chain Management. The complete Supply Chain Management process is shown in figure 1 and it can also be defined as "the systematic, strategic coordination of the traditional business functions within a particular company and across business within the supply chain, for the purpose of improving the long-term performance of the individual companies and the supply chain as a whole.

3. PRESENT SCENARIO OF SUGAR INDUSTRY

The sugar industry faces co-ordination problems, especially when large number of cane suppliers are involved Sugar industries are the units, which are established on the principle of supplier partnership. Especially in co-operative sugar industries the shareholders are from the small landholdings. More than 60% amount is spending for the payment of cane suppliers. Customer and supplier have the same goal to satisfy the end user. The better the supplier's quality, the better the supplier's long term position because the customer is satisfied with better quality. As customer and supplier have limited resources, they must work together as partners to maximize their return on investment.

Computerized harvesting schedules is the way to get the maximum recovery using matured cane, plantation of latest variety of cane, Transportation of cane from field to factory within the minimum time, minimizing in process inventory, byproduct utilization up to its micro level, delivery of finished sugar to customer can be achieved by developing intelligent supply chain in and around the industry.

Survival of the fittest is the new definition of the globalization and liberalization policy. Many companies are coming to standstill as a result of this. In the field of supply chain there are large changes. Information technology with supply chain becomes an effective tool towards the success of business. Every organization is moving towards self-sustaining goals, strategy for retaining in competition. Supply chain management is an area, which can provide clear perspective about the future of business and defending against the competitive forces. In developed countries companies have discovered their ability to manage the entire supply chain from raw material to delivery of finished product to the customer with web-enabled services.

Indian sugar industry has mainly spread over in rural areas. Taking review of present scenario of sugar industries many industries come under the sick unit category and wait for relief from Government.

No doubt, to be competitive the productivity of sugar per acre per year, which is 2.4 tones as against 5-6 tones in other part of world, has to be raised. Our home consumption is likely to go up to 24 million tones per year by 2006; so this could be opportunity for the industry. In the scenario of increasing cost of production of sugar, decreasing product prices, Release control mechanisms fixed by Government, result of which Factory management is helpless and are not able to use their skills in their business. As sugar comes under essential commodity factories are not free to plan their strategies.

Under the circumstances the only alternative to have continuous improvement, Arranging cane supplier training, reducing transportation cost by using Web based digital technology, e-business the traditional market transformed into "competitive market", ensuring distribution of product to consumer effectively. All the problems are related to intelligent supply chain, which will provide unique solution.

4. SCM OBJECTIVES

- Eliminate communication gap between functional departments to avoid delays in deliveries and avoid quality complaints.
- Consolidate the industry wise product range by strengthening the customer base and formulate product as core business.
- Reduce all raw material cost by 5% to be competitive in the market.
- Minimize the inventory levels.
- Reduce delays in export documentation and custom clearance.

SCM should be adopted for the continuous improvement in every part of industry. As SCM exists in purchasing, manufacturing, planning, marketing, distribution within and beyond the company borders [3]. SCM shows a way to cost optimization all along the chain and it is an integration of facilities and distribution options that performs the procurement and transformation of materials into finished products. The supply chain not only includes manufacturers and suppliers, but also transporters, - warehouses, retailers, and customers themselves. The SCM mindset should be changed, it should be way of thinking - not techniques and should be culture- not the latest of management tool.

5. SCM PROCESS RELATED TO SUGAR INDUSTRY

A typical flow of material in a sugarcane supply chain is shown in figure 2.

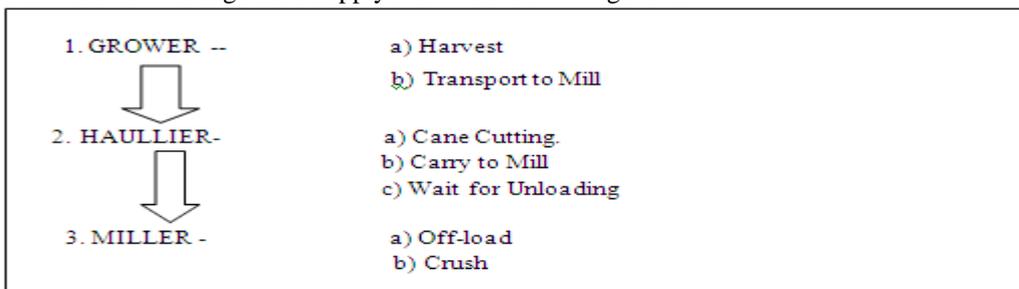


Figure 2 Material flow in sugarcane supply chain process

In sugar industry legislation growers are responsible for the delivery of cane to mills weighbridge for cane payment purposes. But it is the usual practice to transfer responsibility to contractors. A mill IS responsible for ensuring availability of suitable offloading facilities and that any delay inside the mill is kept minimum [5]. The functionality of logistics chain members is interdependent as the interaction between logistics chains in mill area influences the overall effectiveness of the chains. A cycle view of the supply chain clearly defines the processes involved and the owner of each process. This is very useful when considering operational decisions, because it specifies the role and responsibilities of each member of the supply chain and desired outcome for each process. The drivers considered for the performance of supply chain are as follows

- a. Inventory
- b. Transportation
- c. Facilities
- d. Information

The following diagram shows the scenario in the industry before and after implementation of SCM. Before implementation of SCM each department working in isolation, there is no interconnectivity.

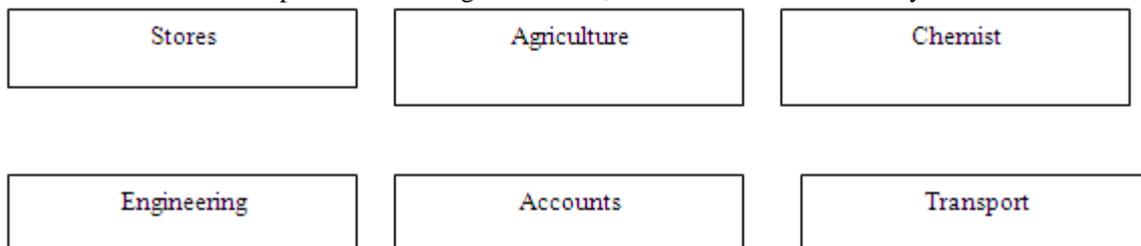


Figure 3 Before implementation of SCM

The scenario in the industry after implementation of SCM is interlinked with the introduction of logistics and material management; there is logical relationship to share the information.



Figure 4 After implementation of SCM

With the Change in organization behavior Sugar factories can attain Quality consciousness and motivate all elements in achieving the world-class manufacturing concept.

6. TOTAL QUALITY MANAGEMENT (TQM) ISSUE

SCM is brief form of TQM philosophy and both tools are activated for the business progress with customer satisfaction. TQM conceptual definition suggests that the efforts carried out to enhance the traditional business to achieve complete excellence for satisfaction of customer [6]. SCM is also customer-centered business process that links manufacturer, distributor, retailer, and customers to reduce operational cost. It is undertaken at various stages of production. It is a science of movement of materials, intermediates and finished products from the producer to customer effectively and efficiently.

The overall view indicating requirements of TQM and SCM are as follows:

6.1. TQM REQUIREMENTS

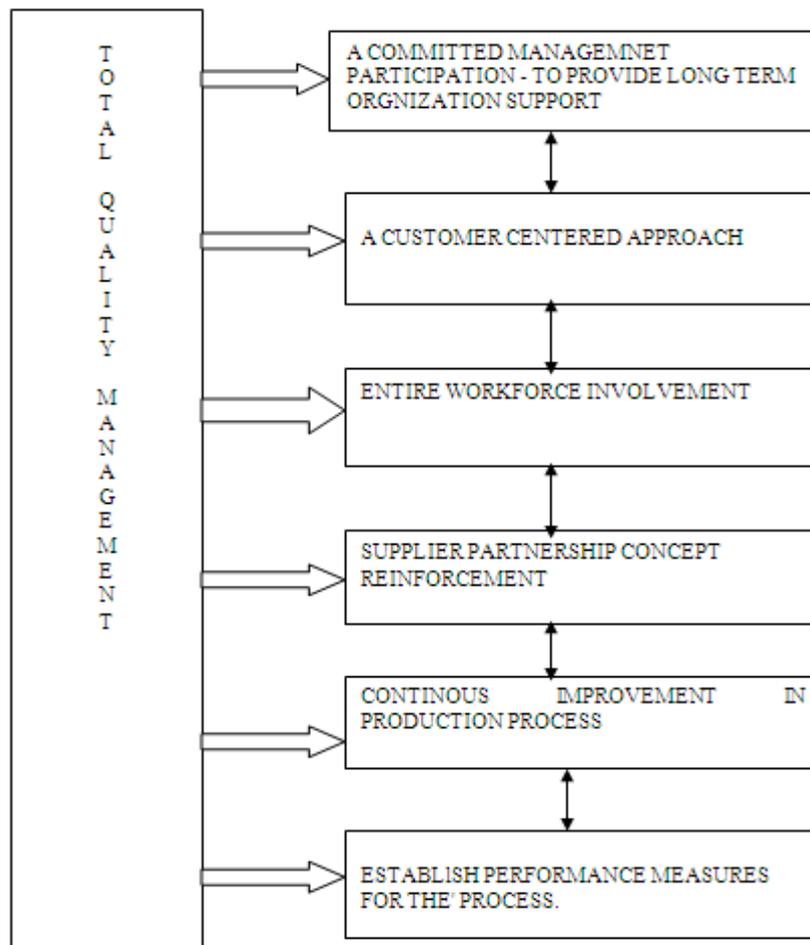


Figure 5 TQM Requirements

6.2. SCM REQUIREMENTS

The diagrammatic view represents in brief the requirements for ideal supply chain management.

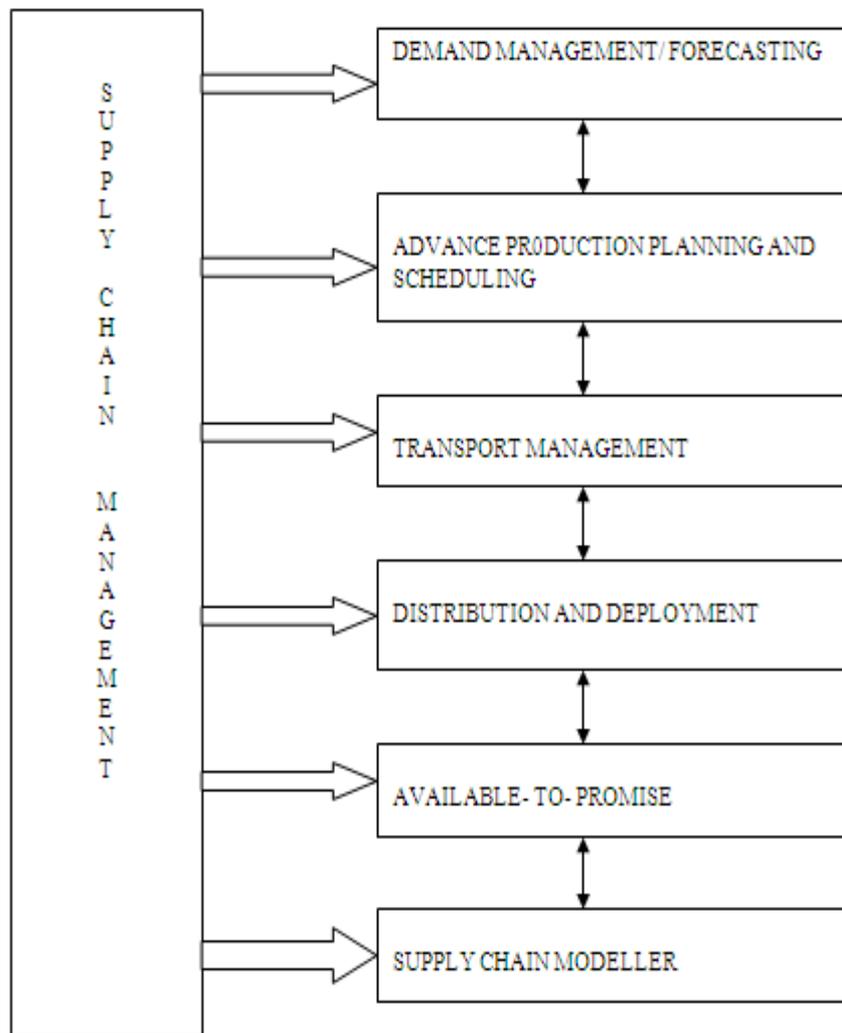


Figure 6 SCM Requirements

7. CONCLUSION

Supply Chain Management is a systematic approach to improve the total productivity of the sugar industries by optimizing the timing, location and quantity of material flow from sugar cane to sugar at consumer's site using IT infrastructure and interacting with all the related intermediates and that is expected approach for implementing TQM philosophy to improve organization. SCM and TQM are the ways to cost optimization one all along the chain while other related to total business, but both starting from customer order to the delivery of goods to him.

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Dr Dharamvir Mangal Born on April 24, 1975 at Karnal, Haryana, India, the land of Karna, Dr Dharamvir Mangal received his B.E. (Hons.), M.E. (Gold Medallist) and Ph.D. degrees from DCRUST, Murthal, P.U. Chandigarh and NIT, Kurukshetra respectively in the field of Mechanical Engineering. As a teacher he dedicatedly contributed his services at various colleges and Institutes of Haryana. He has served HPGCL (Govt. Of Haryana) in the capacity of A.E. for one year. Presently he is working as an Assistant Professor, Department of Mechanical Engineering, at The Technological Institute of Textile and Sciences, Bhiwani, Haryana, India. He has attended various National and International seminars and conferences. He presented/published several papers in the Journals of International/National repute.