IT in SCM and Logistics-2

Shruthi K Murthy[1], Chethan S R[2], H Rohith Singh[3], Srishti M Gowda[4]

BE, Department of IEM, BIT, Bangalore, India[1,2,3]

Student, BE, Department of IEM, BIT, Bangalore, India[4]

Abstract: Supply chain costs represent a significant portion of a company's sales; it isn't difficult to see why there is such a focus on it. This results in a "leveraging" effect, as any dollar (in terms of exchange value) saved on supply chain contributes as the same to the bottom line as a much larger and often unattainable increase in sales. Historically, supply chain and logistics functions were viewed primarily as cost centers to be controlled. It is only in the past 20 years or so that it has become clear that it can be used for a competitive advantage as well. The effective configuration and supply of global resources have become the focus of market competition under the circumstances of globalized economy and internationalized market. The supply chain management serves as the basis to enable the enterprises to win in the competition and it is the key to improving enterprises' core competitive power. In order to handle better in the heated competition and ever-changing market and take the upper hand of the competition, modern information technology is widely utilized in the supply chain management to strengthen the weakness of supply chain, improve operating efficiency, reduce operating costs and establish Quick Response strategies. [1]

Keywords: Supply Chain Management (SCM), Heated Competition, Ever-Changing Market, Modern Information Technology.

I.INTRODUCTION

The unceasing progress of science and technology promotes the unceasing development of the society and economy and brings forward the economy's globalization and market's internationalization, which lead to the resources' global optimization and configuration. The progress of science and technology and the diversification of demands make the product's life cycle continuously shortened. Therefore, the enterprises are under the pressure of shortening the delivery period, improving the product quality, reducing the product costs and bettering the services. All the situations demand the enterprises to make quick responses to the ever-changing living environment. The key point for the enterprises to establish the competitive advantages has upgraded from the first profit source (that is, to save raw and processed materials) and the second profit source (that is, to improve labour productivity) to the third profit source (that is, to establish effective logistics and supply chain system). Supply Chain Management (SCM) has become a scientific hot button since the concept came into being. Many efforts have been made in terms of the taxonomy of supply chain, the integration of software, key issues in the realization of SCM, and the major impact of SCM on modern enterprises. In this paper, much emphasis is put on the application of information technology, such as Bar Code Technology, Radio Frequency Identification (RFID), Electronic Data Interchange(EDI), Geographical Information System (GIS), Global Positioning System (GPS), Electronic Commerce (EC) based on Internet/Intranet, in logistics and SCM. Furthermore, the impact of Information Technology (IT) on SCM is also presented here. [2][3]

II.SCM

Under the drastic competitive mechanism of market, the traditional enterprise management pattern of Vertical Integration, which refers to the pattern to control the whole process of raw and processed materials, manufacture, distribution and sales transaction, has been replaced by Horizontal Integration. Making full use of external resources, enterprises put their main emphasis on their key business and the cultivation of their core competitive power while they give their non-core business to their partners. Horizontal Integration establishes a chain that links all the enterprises from suppliers, manufacturers and distributors. Since the relationships of adjacent node enterprises are demand-and-supply, all the adjacent enterprises are connected together to form a supply chain. Supply chain, with the core enterprises as the center and through the control of information flow, logistics (service flow) and cash flow, starts from purchasing raw and processed materials, producing semi-finished products and final products and ends by delivering the products to consumers through marketing networks. It is an overall function network chain structure pattern, which connects together suppliers, manufacturers, distributors, retailers and the final customers. It is an integrated enterprise network characterized by the external use of resources. The structure model of supply chain is demonstrated in Figure 1.Supply chain management is to plan, cooperate, control and optimize the logistics, information flow and cash flow of the whole supply chain system in order to deliver the Right Product of Right Quantity, Quality and Status in the Right

Time to Right Place, which minimizes the overall cost. Therefore, the competition of enterprises is that of the whole supply chain instead of that of a single enterprise. The enterprises' major concern is not the maximization of their own interests, but the maximization of the interests of all the supply chain members. In the supply chain management, the members of the supply chain widely utilize modern information technology in order to strengthen the weakness of supply chain, improve operating efficiency, reduce operating costs and establish Quick Response strategies. Therefore, they can handle better in the heated competition and ever-changing market and take the upper hand of the competition. The information technology concerned in the supply chain management is also included in Figure 1. [4][5][6]
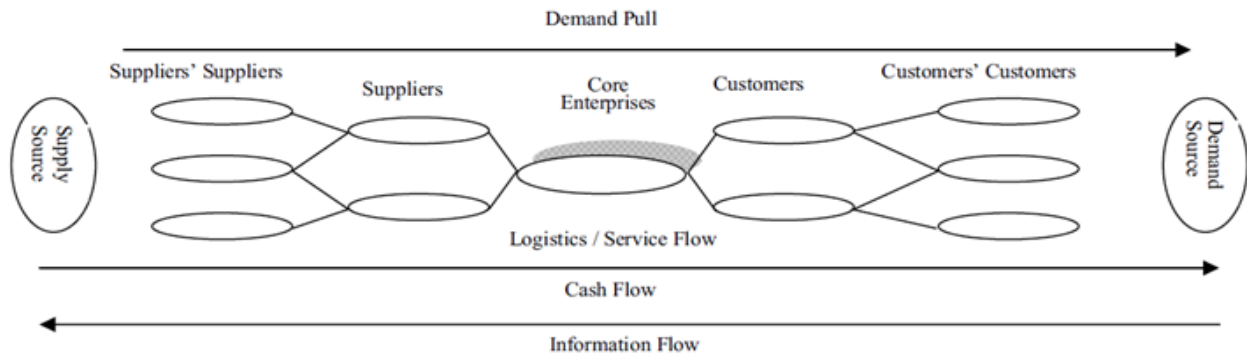

Figure 1 shows the diagram of cash flow against information flow in SCM.

III. APPLICATIONS OF IT IN SCM AND LOGISTICS

A. Bar Code Technology and Its Application

Bar code technology is a kind of automatic recognition technology which has been established and developed during the application practice of computers. It possesses such characteristics as high speed input, large quantity information, high accuracy, low cost and high reliability, therefore it has become one of the most efficient means of data acquisition. Bar code technology provides a whole set of reliable code authentication system for products worldwide, a universal digitalized "language" for manufacture and trade activities such as supply, manufacture and sales, value for all links of supply chain and logistics. It not only paves the way for the automatic acquisition of commercial circulation data and for the interchange of electronic data, but also provides advantageous technical guarantee for supply chain management and electronic commerce. Therefore, bar code technology is widely utilized in supply chain management fields such as Electronic Order System (EOS), Quick Response (QR), and Continuous Replenishment Planning (CRP), which greatly improves the accuracy and speed of data acquisition and data recognition, and achieves the highly efficient operation of logistics and supply chain management.[4][7]

B. Radio Frequency Identification and Its Application

The fundamental principle of Radio Frequency Identification (RFID) is electromagnet theory. RFID makes use of radio frequency to carry out non-contact two-way exchange of communication data in order to realize the identification purpose. RFID is characterized by quick and convenient reading, high speed recognition, large quantity of data, long service lifetime, dynamic modification of tag data, dynamic communication and its safe property and reliability. RFID includes the reader-writer, the electronic tag (or radio frequency card), the antenna and the host computer and so on. The basic data information such as the characteristics and properties of the merchandise is stored in the electronic tag. The reader-writer is used to receive or rewrite the data information in the electronic tag. RFID possesses two kinds of working modes, that is, Reader Talk First (RTF) and Tag Talk First (TTF).RFID is applied to the non-contact data acquisition and interchange fields such as material track and trace, delivery means and storage racks recognition. As a result of the RFID tags' readability and ability to write, RFID is especially utilized in the fields which demand the frequent changes on data.

C. EDI and Its Application

EDI refers to the interchange of information in a generally-accepted set of standardized electronic form between commercial or civil organizations in order to form structured business management pattern or information data structure. Through the communication networks, EDI canrealize the data interchange and automatic management between computer systems, improve the communication efficiency of all the members of supply chain and logistics management, quicken the response to the customers, reducethe operational costs, curtail the turnaround speed and strengthen enterprises competitive power.EDI includes such elements as data interchange standards, computer networks, data processing software, among which EDI standards is the most important part. The process of documents

transmission and management with theutilization of EDI system is illustrated in Figure 2.The retailers of chain retail enterprises based on POSsystem can acquire dynamic sales information. With the helpof EDI, sales information can be sent in time to manufacturersor wholesalers. Therefore, manufacturers can adjustproduction according to the changes of market demands inorder to avoid too much storage; retailers can also replenish intime their product from the wholesalers or manufacturers inorder to avoid the shortage of merchandise, which will benefitall the members of the whole supply chain.
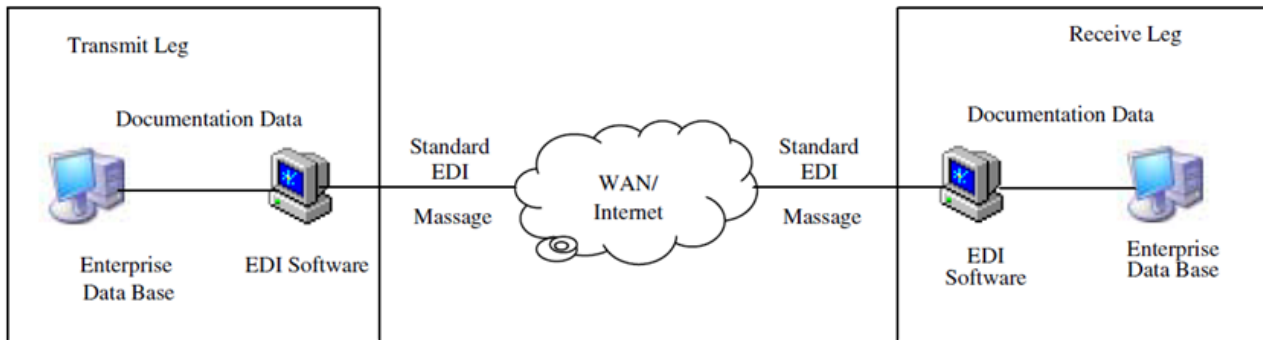

Figure 2 shows the process of documents transmission and management with the utilization of EDI system.

D. GIS, GPS and Their Applications

Based on geography spatial data, Geographical Information System (GIS), provide timely various spatial and dynamic geography spatial data with the help of geography model analysis. GIS is utilized in logistics analysis mainly because GIS's powerful function on geography data can process data information on suppliers, storehouses, customers and retailers by the chart stratification way, and can display the processing results by the graph with the help of the arithmetic of delivery receiving model. The application models based on GIS logistics analysis are the vehicles route model, the most short-path model, the network flow model, the assignment set model and the installation localization model and so on. Global Positioning System (GPS) developed by means of satellite communication technology possess real-time 3D navigation and localization capacities in the air, the land and the sea. GPS is finding its way into automobile self-location, follow & dispatch, railway transportation management and military logistics management.

IV.IT'S IMPACT ON LOGISTICS IN SCM

A. Establish New Types of Client Relationship and Be Better Acquainted with Clients and Markets

Enterprises establish the information flow and the knowledge flow between the upper suppliers and the lower clients through information technology in order to form new types of client relationships. Client relationship management makes it possible the two-way communication timely for integrated information on the whole supply chain from suppliers to customers. Information technology such as Internet is the efficient means for enterprises to gain clients and market demand information and enables the enterprises' business to cover every corner of the world. [8]

B. Develop and Broaden Further Efficient Marketing Channels and Expand Market Occupancy

Through the information technology, enterprises can collaborate with dealers to establish retailers' order and storage system in order to obtain retailers' sales information. Through analysing sales data, enterprises can provide guidance to retailers on continuous replenish planning and sales thus they can improve the marketing channel efficiency and increase customers' satisfaction together with retailers. Besides, enterprises can establish network commercial relationship with potential clients so as to occupy the market which, otherwise, can't be occupied by traditional channel, to increase their market opportunities and to expand the market occupancy.

C. Change the Formation of Supply Chain to Integrate Commercial Distribution and Logistics

In these days when Internet is widely utilized, the practical trends of products and service are changing their ways of circulation and utilization. The boundary between products and service are becoming increasingly vague. Nowadays, most digital merchandise such as music, movies, games and software are sold to the customers directly through Internet without the logistics processes of package and transportation, which integrate truly the commercial distribution and logistics.

D. BRP and Re-establish the Value Chain between Enterprises

Supply chain management emphasizes that enterprises should focus on their own key business (core competitive power), give full play to their advantages, and establish the strategic partnership with other suitable enterprises. Their

non-core businesses are completed by their partners. Through the Business Process Outsourcing (BPO), enterprises can integrate external resources for their own use to expand their development space, which results in reengineering all their original business process and re-establishing the value chain between enterprises through information technology. Nowadays the market competition has upgraded from competition between enterprises to that between supply chains, and from that between products to that between services. Information technology has become the important means for supply chains to enhance their competitive power and to provide better service for the customers.

V.GLOBAL SCM

Suffice it to say, the concept of "global" supply chain management (GSCM) is primarily a result of the globalization of business in general. As businesses search globally for sources of lower-cost materials and labour, someone has to manage these complex and intricate operations. The combination of globalization and emerging technologies is continuously changing the supply chain. Products that were once made domestically, such as apparel and computers, are now designed, assembled, and marketed worldwide by a conglomeration of organizations. As a result, there are many risks (disruptions, natural disasters, domestic job loss, and so on) and challenges (short product lifecycles, erratic demand, and so on) that are inherent to the process.

■ Globalization and outsourcing: Including the impact of China and India on supply chain structure and coordination
■ New information technologies: Such as radio frequency identification (RFID; a data collection technology that uses electronic tags for storing data) and tools that enable enterprise integration and collaboration
■ Economic forces: Within and between supply chains, from consumer pricing to supplier contract negotiation
■ Risk management: Includes risks rising from supply chain complexity and from security threats
■ Product lifecycle management: Including post-sale service and product recovery.
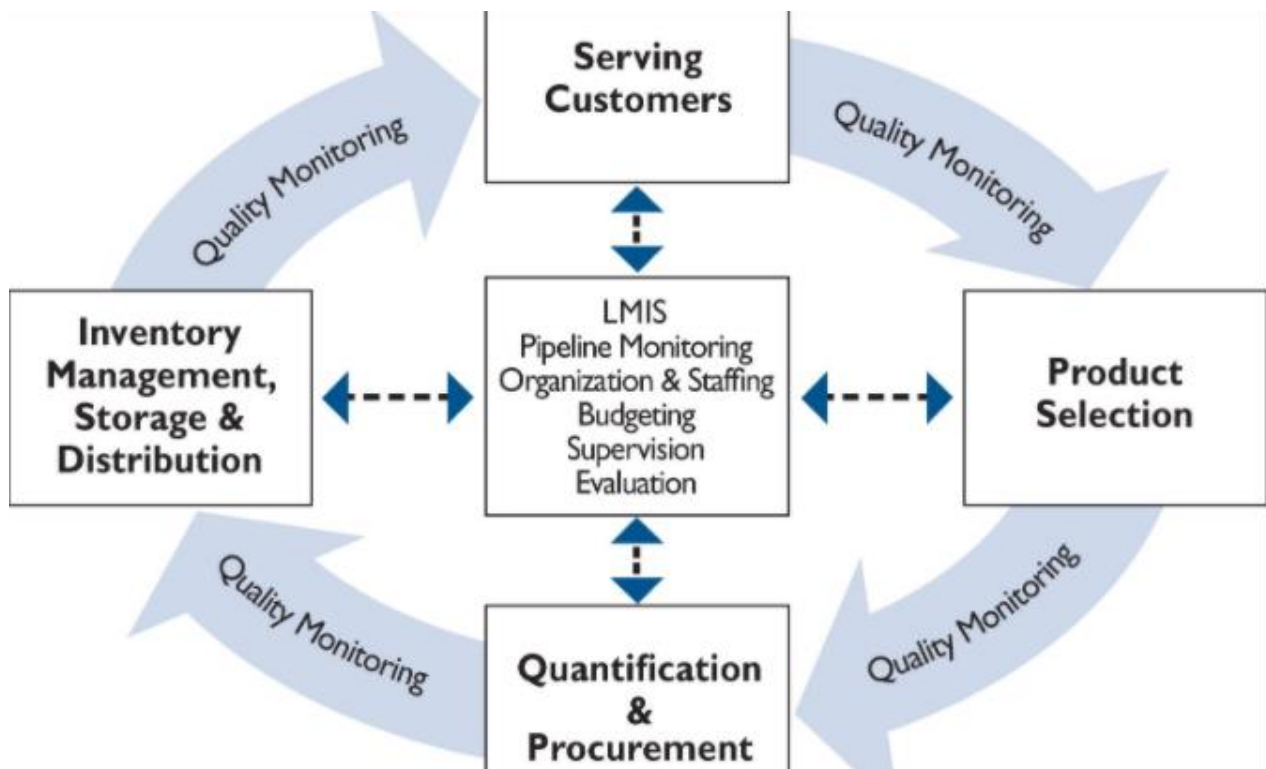
VI.SUPPLY CHAIN-LOGISTICS CYCLE

Figure 3 shows the Supply chain- Logistics cycle.

Serving customers-Everyone who works in logistics must remember that they select, procure, store, or distribute products to meet customer needs. Storekeepers do not store products just for the purpose of storing; they store products to ensure that commodity security exists for every customer to obtain and use commodities when they need them. In addition to serving the needs of the end customer—the customer seeking services—each person in the process is also serving the needs of more immediate customers. Storekeepers provide customer service when they need The logistics system ensures customer service by fulfilling the six rights. Each activity in the logistics cycle, therefore, contributes to excellent customer service and to ensuring commodity security.

*Product selection-*In any logistics system, programs must select products. In a logistics system, a national organization, Company selectors or other government-appointed group may be responsible for product selection. Products selected for use will impact the logistics system, so the logistics requirements must be considered during the product selection.

*Quantification-*After products have been selected, the required quantity and cost of each product must be determined. Quantification is the process of estimating the quantity and cost of the products required for a specific program (or service), and, to ensure an uninterrupted supply for the program, determining when the products should be procured and distributed. See the suggested reading list at the end of the handbook for sources of additional information about quantification of health commodities.

*Procurement-*After a supply plan has been developed as part of the quantification process, quantities of products must be procured. The systems or programs can procure from international, regional, or local sources of supply; or they can use a procurement agent for this logistics activity. In any case, procurement should follow a set of specific procedures that ensure an open and transparent process that supports the six rights.

*Inventory management: storage and distribution-*After an item has been procured and received by the health system or program, it must be transported to the service delivery level where the client will receive the products. During this process, the products must be stored until they are sent to the next lower level, or until the customer needs them. Almost all businesses store a quantity of stock for future customer needs.

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