

Importance of IT in Supply Chain Management Improvement

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Abstract - Now a day's information technology (IT) plays very important role in each and every industry. Supply chain management (SCM) is also an essential part of industry. Information technology plays an important role in supply chain management. Information technologies (IT) are vital to Company operations and leveraging information technology for business success. Companies rely on IT for fast communications, data processing and market intelligence. IT plays an integral role in every industry helping companies improve business processes, achieve cost efficiencies.

Key Words: Information Technology, Supply Chain Management,

1. INTRODUCTION

Information technology is a modern phenomenon that has dramatically changed the daily lives of individuals and businesses throughout the world. Information technologies (IT) are vital to Company operations and leveraging information technology for business success is a key to survival in the modern business world. Companies rely on IT for fast communications, data processing and market intelligence. IT plays an integral role in every industry, helping companies improve business processes, achieve cost efficiencies, drive revenue growth and maintain a competitive advantage in the marketplace.

In short, they are the repositories for critical and sometimes highly proprietary corporate information. The improper access to or the destruction of these resources will have serious consequences for the Company. The strategic use of information technology can help organizations increase their competitive advantage and make considerable improvements in operating performance. Bok, Grossmann, and Park (2000) present an application to the optimization of continuous flexible process networks, developing a business strategy with an IT component that is aligned with business objectives, and is supported by sound business justification, will enable organizations to improve performance, increase productivity, and serve customers more effectively. It will also help mitigate the risks involved with technology decisions.

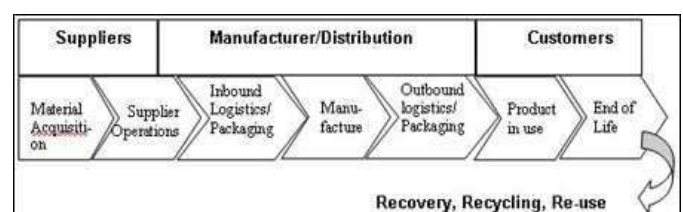
1.1 Importance of Supply Chain Management

Supply chain management is an essential element to the operational efficiency. SCM can be applied to customer satisfaction and company success as well as within social settings including medical missions, disaster relief operations and other kind of emergencies. Basically, the world is one big supply chain. Supply Chain Management touches major issues including rapid growth of Multinational Corporation, Global

expansion and Sourcing, etc. The term SCM has its historical roots in the control of fulfillment activities that support the linear physical flow of goods from suppliers to manufacturers to distributors to retailers (Shanker, 2005).

1.2 Historical background of SCM

In the 1980s, the term supply chain management (SCM) was developed to express the need to integrate the key business processes, from end user through original suppliers. Original suppliers are those that provide products, services, and information that add value for customers and other stakeholders. The basic idea behind SCM is that companies and corporations involve themselves in a supply chain by exchanging information about market fluctuations and production capabilities. Keith Oliver, a consultant at Booz Allen Hamilton, is credited with the term's invention after using it in an interview in 1982. Traditionally the flow of material has been considered only at an operational level, but this approach is no longer adequate (Stevens, 2009). A supply chain can be analyzed as a network of production processes which can be localized within and outside a given geographic area. Each process can be defined as a system that produces output flows in consequence of input flows. Supply chain management activities cover almost everything such as from product and its development, sourcing, logistics and even information system also (Ref. Dundee.ac.uk). The role of IT for the same cannot be under estimated. In this era of information a firm's supply chain should operate at speed of thought and this is possible only by enhanced e- speed communications and information sharing with the critical partners (Suresh, 2004).



2. Enhancing need of IT

The broad strategic directions which need to be supported by IT strategy are increasing of frequency of receipts, holding materials for further supply chain and crashing the various lead times. Fundamental changes have occurred in today's economy. These changes may alter the relationship which we have with our customers, suppliers and, business partners and our colleagues. In the development and maintenance of supply chain information both software and hardware must be addressed. Hardware includes computer's input/output device and storage media. Software includes

the entire system and application programme used for processing transaction management control, decision making and strategic planning. In the recent years conducting business has become increasingly important (Geetha, 2001). Recent development in software used by the company is Introduction of SAP (System Application and Product Software), Indosoft Software used by the Agency, Centralized SMS Booking facility availed to LPG Customers and Introduction of Direct Bank Subsidiary Transfer System to the Consumer.

3. INFORMATION AND ENABLING TECHNOLOGIES

Information affects every part of the supply chain. Information serves as the connections between various stages of the supply chain, allowing them to coordinate, maximize the supply chain profitability. Information is also important to the day today operation of each stage in supply chain. To become more responsive and efficient, companies need to consider information as an important driver, information plays vital role in competitive strategy. Timely and accurate information is more critical now that at any time. Three factors have strongly impacted this change in the importance of information.

- Customer expectations have to be fulfilled.
- To reduce human resource requirements and inventory to a competitive level.
- Information is important in strategic planning and deployment of resource.

4. OBJECTIVES AND BENEFITS OF INFORMATION TECHNOLOGY IN SUPPLY CHAIN MANAGEMENT

The objectives of IT in SCM are:

1. Reduction of the costs of operational processes (manual work).
2. Information quality enhanced by eliminating human errors.
3. Rapid transfer of information between organizations IT is key in supporting companies creating strategic advantage by enabling centralized strategic-planning with day-to-day centralized operations. Actually supply chain become more market-oriented because of IT usage. Cisco reported savings of \$500 million by restructuring its internal operations and integrating processes with suppliers and customers with the help of web-based tools. The Wal-Mart & P&G experiences demonstrate how information sharing can be utilized for mutual advantage. Through IT, Wal-Mart shares sale information from its many retail outlet directly with P&G and other major suppliers Anderson et al (1996).

5. CHALLENGES IN IMPLEMENTING INFORMATION TECHNOLOGY IN SUPPLY CHAIN MANAGEMENT

Any company that has undertaken the mission of implementing an integrated supply chain management strategy with the use of IT tools knows that one of the greatest challenges it faces is the significant change in

internal culture that is required to make the supply chain redesign successful. It is difficult to re-condition people to accept change where a certain mindset has prevailed for many years. However it may be difficult to accomplish, change can be success fully implemented when directed by a knowledgeable and strong leader, who knows the tools available for achieving positive change, as well as their contribution in initiating and sustaining these changes.

Integrating new applications with existing and legacy systems could also pose problems. Incompatible systems at buyer and vendor facilities are another management challenge to tackle. Data sharing with diverse stakeholders like suppliers and customers, filtering and mining data generated and finding "business" value of the data are other issues. Disconnected enterprise systems create data redundancy, errors and can lead to costly business inefficiencies. Poor coordination between enterprise systems leads to flawed production plans, increased supply chain pressure and poor customer service. Lack of visibility of orders, schedules and shipments can lead to costly administrative decision making processes.

According to Macleod (1994), supply chain managers increasingly want to automate all of the supply chain, from forecasting to distribution, and to link every element of the chain. More and more companies want an integrated solution to enable them to see the entire supply chain at once. For example, they want to know that if they drill down to forecast, they can see the demand history, which is a combination of data which have come from sales order processing, inventory management and the warehousing system.

Van Oldenburg (1994) says that the ability to reduce human intervention yet oversee minutely the flow of parts and products along the entire length of the supply chain can help dramatically in cutting logistics costs and boosting customer satisfaction. Unfortunately for many midsize companies in these times of economic recession, such clarity in global distribution remains largely restricted to major multinationals with deep pockets and volumes large enough to justify the hefty initial investment in IT that can run into millions of dollars.

Towill (1997) sums up "To survive, let alone win, a company must be part of one or more supply chains producing world class performance". Hence companies need to work together and optimize the complete pipeline by establishing a seamless supply chain to maximize their market share. Only with this holistic chain concept can further significant and radical improvements in individual business performance be realized. Process manufacturers and IT system vendors are working to develop a filter to sift through the barrage of data from process control systems to move important information to higher level IT systems.

6. EXISTING INFORMATION TECHNOLOGY TOOLS AND APPLICATIONS INSUPPLY CHAIN MANAGEMENT

6.1 Electronic Data Interchange

Introduced in the 1970s and popularized in the 1980s, Electronic Data Interchange (EDI) technology has been widely used by firms in supply chains to facilitate transactions and information exchanges. EDI is defined as computer to computer exchange of structured data for automatic processing. EDI is used by supply chain partners to exchange essential information necessary for the effective running of their businesses. These structural links are usually set up between organizations that have a long-term trading relationship.

For example, some multiple retailers will supply electronic point of sale (EPOS) data directly to suppliers, which in turn triggers replenishment of the item sold. Therefore, the consequence of this type of strong link those suppliers will be able to build a historical sales pattern that will assist their own demand forecasting activities. Because there is no need for employees to collate the information manually, EDI has many benefits, for examples, it is providing timely information about its customers' sales as well as highly accurate and very efficient. Moreover, it is utilized for sending invoices, bills of lading, confirmation of dispatch, shipping details and any information that the linked organizations choose to exchange (Rushton et al., 2000).

The main advantages of using EDI are to enter only informative needs on the computer system once, and then it is able to speed of transaction and to reduce cost and error rates. Other benefits of EDI are quick process to information, good customer service, less paper work, increased productivity, improved tracing and expediting, cost efficiency and improved billing. Through the use of EDI supply chain partners can overcome the distortions and exaggeration in supply and demand information by improving technologies to facilitate real time sharing of actual demand and supply information.

6.2 Bar coding and Scanners

Bar Codes are the representation of a number or code in a form suitable for reading by machines (Rushton et al., 2000). Bar codes are widely used throughout the supply chain to identify and track goods at all stages in the process. Bar codes are a series of different width lines that may be presented in a horizontal order, called ladder orientation, or a vertical order, called picket fence orientation. For example, goods received in a warehouse may be identified by the warehouse management system and added to stock held in the warehouse. When put away, the bar code is used to associate the storage location with the bar-coded stock, and on dispatch the stock record is amended. The use of bar codes can speed up operations significantly. On the other hand, the problems can occur if bar codes are defaced or the labels fall off in transit. The maintenance management must be applied for extending the long-life period of this

equipment. Bar code scanners are most visible in the checkout counter of super markets and hyper markets. This code specifies name of product and its manufacturer. In 1983, with barcodes printed on most goods, Wal-Mart started using checkout scanners in all its stores. They enabled headquarters to easily aggregate sales and inventory data at its centralized IT department. Later in 1987, a satellite communications network installation linked all the stores with the headquarters with real-time inventory data.

6.3 Enterprise Resource Planning (ERP) Systems

Enterprise Resource Planning (ERP) Systems are Enterprise-wide Information Systems used for automating all activities and functions of a business. These are transaction-based information systems that are integrated across the whole business. Basically, they allow for data capture for the whole business into a single computer package which gives a single source for all the key information activities of business, such as inventory, customer orders and financials. Many companies now view ERP systems from vendors like Baan, SAP and People soft as the core of their IT infrastructure. ERP systems are enterprise-wide transaction processing tools which capture the data and reduce the manual activities and task associated with processing inventory, financial and information regarding customer order. ERP system gain a high level of integration by utilizing a single data model, developing a common understanding of what the shared data represents and establishing a set of rules for accessing data.

In addition to the huge costs that are involved in procuring an ERP application, installation of such systems will entail widespread change within the organization. It will have implications in terms of Business Process Reengineering (BPR), changes in organizational structure, people and change management. Many companies have benefited from using this system whilst some have experienced severe problems with their application. Generally, they also require a lot of customization and training for each user.

6.4 Warehouse Management Systems

Warehouse management systems are systems that control all the traditional activities of warehouse operations. Areas covered usually include receipt of goods, allocation or recording of storage locations, replenishment of picking locations, production of picking instructions orlists, order picking, order assembly and stock rotation. Some systems are used in conjunction with radio frequency (RF) communication equipment. This equipment can be mounted on fork-lift trucks. The warehouse management system communicates with the RF system and directs the activities of the warehouse staff (Thongchattu et al, 2007). For example, when picking that it will provide the tasks for the operative to carry out. Once the task is complete the operative updates the system and is directed to the next task. This has the advantage of updating the stock holding in real time.

There are highly sophisticated systems that control the operations of fully automated warehouses. This may include automated storage and retrieval systems (AS/RS), automated guided vehicles (AGVs), and the many other devices that are relatively common in today's modern warehouse such as, conveyors, carousels, sortation systems, etc. A number of computer models have now been developed to assist in the planning of warehouse design and configuration. These are very complicated 3D simulation models that provide a graphic, moving illustration on the computer screen of the layout of the warehouse.

6.5 Transportation Management Systems

Transportation Management Systems provide more visibility into shipments and orders. Scheduling issues are also addressed on time. Multiple transportation options can be explored as a result of earlier visibility into the supply chain. Timely communication and status reports can also be obtained. By having control on its supply chain, businesses can make efficient routing decisions.

An example of such a system is developed by Target Corporation and NTE. Initially Target was making transportation requests manually for inbound shipments. There was limited visibility for shipments and as a result of this; there were more number of less-than-truckloads, which was not cost-effective. Implementation of the new system resulted in target vendors submitting the relevant freight information electronically with increased speed and efficiency. The new system resulted in improved cost controls, reduced administrative overheads and better labor planning.

7.6 Inventory Management Systems

During the mid to late 1990s, retailers began implementing modern inventory management systems, made possible by advances in computer and software technology. The systems work in a circular fashion, from purchase tracking to inventory monitoring to re-ordering and back around again. Retailers such as Target, Lowe's and Best Buy stock tens of thousands of items from all over the world. Wal-Mart stocks items made in more than 70 countries, according to its corporate Web site. It is found that at any given time, the Arkansas-based retailer manages an average of \$32 billion in inventory. With those kinds of numbers, having an efficient inventory control system or inventory management system is imperative. System of Wal-Mart enables it maintain its signature "everyday low prices" by telling store managers which products are selling and which are taking up shelf and warehouse space.

Inventory management systems are the rule for such enterprises, but smaller vendors and businesses use them, too. The systems ascertain customers always have enough of what they want and balance that goal against a retailer's financial need to maintain as little stock as possible. Mismanagement of inventory means disappointed customers, slower sales and too much cash tied up in

warehouses. Factors like quicker production cycles, multi-national production contracts, a proliferation of products and the nature of the big-box store make them a necessity. Modern inventory management systems must have the ability to track sales and communicate with suppliers in real-time, available inventory and receive and incorporate other data, such as seasonal demand. They must be flexible, allowing for a merchant's intuition. And, they want and balance that goal against a retailer's financial need to maintain as little stock as possible. Mismanagement of inventory means disappointed customers, slower sales and too much cash tied up in warehouses. Factors like quicker production cycles, multi-national production contracts, a proliferation of products and the nature of the big-box store make them a necessity. Modern inventory management systems must have the ability to track sales and communicate with suppliers in real-time, available inventory and receive and incorporate other data, such as seasonal demand. They must be flexible, allowing for a merchant's intuition. And, they must tell a storeowner how much to purchase and when it's time to reorder. They must tell a storeowner how much to purchase and when it's time to reorder.

7. CONCLUSION

It is confirmed that the importance of IT and quality of information are complementary to each other because manual filtering might disappear. Although automated information processing prevents manual mistakes, it also makes the process less transparent and therefore, wrong information or information of low value might be generated if the information input is already of bad quality and not properly checked. A difference can be noticed between the volume of information and the richness of information exchange. The sharing of information in systematic language involves more action and commitments support to enhance the quality of any organization which is beneficial in the light of supply chain network. This paper discusses the role of IT as an enabler in Supply Chain Management and also highlights the vast benefits to companies with a comprehensive IT strategy. An overview and deployment of the present alignments of widely deployed IT tools like EDI, ERP, bar codes, management of inventory, and management of transportation and warehouse management systems is provided. Several successful IT implementations in SCM like Wal-Mart, Target, NASA, Best Buy, Intel etc. are described.

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