

Role of IT in Supply Chain Management

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Abstract

Supply chain management (SCM) is the 21st century global operations strategy for achieving organizational competitiveness. Companies are attempting to find ways to improve their flexibility and responsiveness and in turn competitiveness by changing their operations strategy, methods and technologies that include the implementation of SCM paradigm and information technology (IT). However, a thorough and critical review of literature is yet to be carried out with the objective of bringing out pertinent factors and useful insights into the role and implications of IT in SCM. In this paper, the literature available on IT in SCM have been classified using suitable criteria and then critically reviewed to develop a framework for studying the applications of IT in SCM. Based on this review and analysis, recommendations have been made regarding the application of IT in SCM and some future research directions are indicated.

1. INTRODUCTION

Nowadays, companies are in the race for improving their organizational competitiveness in order to compete in the 21st century global market. This market is electronically connected and dynamic in nature.

Therefore, companies are trying to improve their agility level with the objective of being flexible and responsive to meet the changing market requirements. In an effort to achieve this, many companies have decentralized their value-adding activities by outsourcing and developing virtual enterprise (VE). All these highlight the importance of information technology (IT) in integrating suppliers/partnering firms in virtual enterprise and supply chain.

Supply chain management (SCM) is an approach that has evolved out of the integration of these considerations. Supply chain management (SCM) is the management of a network of interconnected businesses involved in the ultimate provision of product and service packages required by end customers (Harland, 1996). [1] Supply Chain Management spans all movement and storage of raw materials, work-in-process inventory, and finished goods from point of origin to point of consumption (supply chain).

Another definition is provided by the APICS Dictionary when it defines SCM as the "design, planning, execution, control, and monitoring of supply chain activities with the objective of creating net value, building a competitive infrastructure, leveraging worldwide logistics, synchronizing supply with demand, and measuring performance globally."

SCM is an increasingly applied operations paradigm for enhancing overall organizational competitiveness. A recent survey of more than 300 supply chain-related executives found that 92% of those surveyed were planning to implement one or more supply chain initiatives in 1999 (Bradley, 1999). SCM is based on the integration of all activities that add value to customers starting from product design to delivery. According to Simchi- Levi et al. (2000), SCM is a set of approaches utilized to effectively integrate suppliers, manufacturers, warehouses, and stores, so that merchandise is produced and distributed at the right quantities, to the right locations, and at the right time, in order to minimize system wide cost while satisfying service level requirements. However, it is impossible to achieve an effective supply chain without IT. Since suppliers are located all over the world, it is essential to integrate the activities both inside and outside of an organization. This requires an integrated information system (IS) for sharing information on various value-adding activities along the supply chain. IT is like a nerve system for SCM. There are many articles on IT in supply chain. Most of the literature discusses only the implications of one or two aspects of supply chain, for example, strategies, tools and techniques, but not in an entirety. However, a comprehensive survey of IT in SCM will be useful to identify the critical success factors of IT for an integrated supply chain. Unfortunately, design and implementation of IT system for an effective SCM have not received adequate attention from both researchers and practitioners, in particular, business to business (B2B) e-commerce (EC) and SCM. There are lots of debates around the applications of IT in SCM concerning business to business e-commerce model, matching to business model, etc. Considering the importance of IT in achieving effective SCM, an attempt has been made in this paper to identify the major issues surrounding the application of IT in SCM. Develop a framework for IT applications in SCM. Also, some future research

directions are indicated for developing IT embedded SCM system.

Information technology in supply chain management

Management Information Systems (MIS) is the term given to the discipline focused on the integration of computer systems with the aims and objectives on an organisation.

The development and management of information technology tools assists executives and the general workforce in performing any tasks related to the processing of information. MIS and business systems are especially useful in the collation of business data and the production of reports to be used as tools for decision making.

1.1 Benefits of MIS

The field of MIS can deliver a great many benefits to enterprises in every industry. Expert organisations such as the Institute of MIS along with peer reviewed journals such as MIS Quarterly continue to find and report new ways to use MIS to achieve business objectives.

1.2 Core Competencies

Every market leading enterprise will have at least one core competency – that is, a function they perform better than their competition. By building an exceptional management information system into the enterprise it is possible to push out ahead of the competition. MIS systems provide the tools necessary to gain a better understanding of the market as well as a better understanding of the enterprise itself.

1.3 Enhance Supply Chain Management

Improved reporting of business processes leads inevitably to a more streamlined production process. With better information on the production process comes the ability to improve the management of the supply chain, including everything from the sourcing of materials to the manufacturing and distribution of the finished product.

1.4 Quick Reflexes

As a corollary to improved supply chain management comes an improved ability to react to changes in the market. Better MIS systems enable an enterprise to react more quickly to their environment, enabling them to push out ahead of the competition and produce a better service and a larger piece of the pie.

Recently the concepts of supply chain design and management have become a popular operations paradigm. This has intensified with the development of information and communication technologies (ICT) that include electronic data interchange (EDI), the Internet and World Wide Web (WWW) to overcome the ever-increasing complexity of the systems driving buyer-supplier relationships.

2. REVIEW OF LITERATURE

The complexity of SCM has also forced companies to go for online communication systems. Various authors have given their views on the application of it in SCM.

Watson et al., 1998 has said that the Internet increases the richness of communications through greater interactivity between the firm and the customer. Graham and Hardaker (2000) highlight the role of the Internet in building commercially viable supply chains in order to meet the challenges of virtual enterprises. Philip and Pedersen (1997) attempt to study the ways in which the business community harnesses EDI with the help of a literature survey based on the application.

Armstrong and Hagel (1996) argued that there is beginning of an evolution in supply chain towards online business communities. For example, General Electric's trading process network is an online business community that allows the company to transact about \$1 billion dollar worth of business with their suppliers located all over the globe.

(Graham and Hardaker, 2000). Big three auto makers in the US are in the process of launching the automotive network exchange (ANX) to further understand the impending effects of electronic business communities. ANX will establish a standard method for parts suppliers to communicate with and obtain order information from the auto manufacturers.

3. THE IMPORTANCE OF COMMUNICATION AND APPLICATION OF IT IN SCM

Supply chain management emphasizes the overall and long-term benefit of all parties on the chain through co-operation and information sharing. This is largely caused by variability of ordering (Yu et al., 2001). Information sharing between members of a supply chain using EDI technology should be increased to reduce uncertainty and enhance shipment performance of suppliers and greatly improve the performance of the supply chain system (Srinivasan et al., 1994).

Companies need to invest large amount of money for redesigning internal organizational and technical processes, changing traditional and fundamental product distribution channels and customer service procedure and training staff to achieve IT-enabled supply chain (Motwani et al., 2000). The following are some of the problems often cited in the literature both by the researchers

and practitioners when developing an IT-integrated SCM: lack of integration between IT and business model, lack of proper strategic planning, poor IT infrastructure, insufficient application of IT in virtual enterprise, and inadequate implementation knowledge of IT in SCM. There is no comprehensive framework available on the application of IT for achieving an effective SCM.

4. ROLE OF MIS IN SCM

A management information system is critical to a supply chain management system. It automates simple and complex tasks and provides management with reports concerning logistical accounts services by an organization or supply chain process. Supply chain management practices are used in various logistical functions such as, transportation, distribution services, warehouse management (retail and wholesale) and industrial manufacturing

4.1 Materials and Information Flow Process

A management information system established for supply chain management analyzes the flow of materials or products through an automated accounting system based on logistics management. The system provides information and status on items relevant to cost accounting while determining profitability and the most effective way to manage inventory levels. Data from a logistical information system allows an organization to identify inventory levels, inventory turnover rates while identifying usable warehouse or distribution space.

4.2 Automation of Logistical Functions

Automation of the supply chain management process affects various components of a management system designed to optimize the logistical process. Areas such as, receiving, storage and distribution, delivery services and inventory management benefit from the integration of computer applications, database structures and records which reflect item processing which is connected to all of these departments or functions. When an item has a transaction on the system, one

or more of these functions are affected. Automation of the logistical function makes it easier to track products and determine product status.

4.3 Management Support System

The role of an information system is to collect raw data for transaction processing. Through specialized reporting and inquiries, the system produces management reports to assist management to make decisions which impact operations. When data is compiled in a supply chain system, it is used to determine strategies which impact inventory cost, distribution costs and product cycles. The management information system becomes a support system which uses transaction exception reports and feedback from other divisions in the organization to make sound decisions concerning all areas of the logistical function.

4.4 Creates Added-Value for Customers

The effect of an automated supply chain management system is two-fold. First, a supply chain management system provides customers with updated information on the status of an item or product cataloged within the system for sale, movement to a distribution point or flagged for a special reason (inventory procedure). The system provides instant status on an item. The second benefit is the ability to order an item from a manufacturer or depot and assign a "priority code" to the item for the customer. Most supply chain software designed for logistical functions automatically have this feature. If web-based databases are integrated into the supply chain automated system, the client can track the shipment of an item with a system assigned tracking number.

4.5 LIFO and FIFO Activities

A management information system in reference to the supply chain process must be able to distinguish the movement of items through inventory cycles. The movement of items affects cost accounting in the measure of profit and loss statements and inventory cost. When inventory is stagnant, it can cost organization money. Many organizations have incorporated LIFO and FIFO procedures to determine the cycling of inventory. LIFO (last in, first out) has a "no sell by" date whereas FIFO (first in, first out) is resigned for perishable goods with an expiration date. A supply chain system categorizes items according to this standard and

produces managerial reports with products or items classified under LIFO and FIFO designations.

5. REFERENCES

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