Supply Chain Management and Information Technology-Review Based Study

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Introduction

This study describes the various reviews supporting supply chain management and Information technology. The main intension of this paper is to analyse how information technology is effectively utilized by supply chain management.

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.

Review of Literature

SCM is defined as the integration of key business processes from end user through original suppliers that provides products, services, and information and hence adds value for customers and other stakeholders (Lambert et al., 1998).

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.

There are numerous articles on the strategies, techniques and technologies for the design and development of SCM. Also, several literature survey papers which include taxonomy of SCM and modeling and analysis of SCM (e.g. Tan, 2001). However, there is a very few literature survey article that deals with IT in SCM. 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 review the literature on IT in SCM based on suitable criteria. The main objective here is to identify the major issues surrounding the application of IT in SCM, using suitable classification scheme and develop a framework for IT applications in SCM. Also, some future research directions are indicated for developing IT embedded SCM system.

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. The complexity of SCM has also forced companies to go for online communication systems. For example, the Internet increases the richness of communications through greater interactivity between the firm and the customer (Watson et al., 1998). 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) argue 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.

Supply chain management emphasizes the overall and long-term benefit of all parties on the chain through co-operation and information sharing. This signifies the importance of communication and the application of IT in SCM. 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.

For example, IT will facilitate quick partnership formation by making available the right information and hence developing a virtual enterprise. Organizational restructuring may be required if a company decides to go for an enterprise resource planning (ERP) systems such as SAP, Oracle, PeopleSoft, and BAAN with the objective establishing an effective supply chain. There are also other potential implications such as investment in IT and reengineering business process, market orientation, technology position and employee relations, and workforce characteristics. The issue of societal implications and knowledge management should be given due consideration in developing strategic planning for IT in SCM. However, it is essential to prioritize strategic dimensions that influence IT in SCM taking into account an individual organizational structure.

Fletcher and Wright (1996) report a study into the relationship between strategic use of information technology in financial service organizations and the strategic context within which such use is made. They found a good degree of integration of marketing and IT groupings with the strategic planning process, but document a high degree of strategic ambiguity and lack of strategic time frame for such investment decisions. The major reason for strategic ambiguity and time frame for investments in IT is the lack of understanding of the business processes and justification for a suitable IT system for SCM. Kardaras and Karakostas (1999) suggest the use of fuzzy cognitive maps as an alternative approach to existing strategic information systems planning models. This is a useful tool to facilitate creativity and synergy; to develop consensus and win commitment of those on whose actions the organization's future defends. However, such tools should be user friendly and have significant commitment from the management while implementing the recommendations made using the tools.

Manufacturing information system's strategic role includes minimizing manufacturing's negative potential, achieve parity with competitors, provide credible support to the business strategy and pursue a manufacturing-based competitive advantage.

Conclusion

For developing IT based SCM the problems based by the companies are, 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. Apart from that after implementing IT in SCM, the benefits are more for the companies to effectively achieve the objectives and maximize the profits of the organization.

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