Chapter 38
Integrating Green ICT in a Supply Chain Management System

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ABSTRACT

Green Integrated Supply Chain Management (GISCM) brings together various stakeholders in the supply chain within and outside the organization to help the organization improve its environmental credentials. To benefit both the business and the environmental bottom line, the supply chain management of an organization needs to be analyzed, planned and optimized for sourcing and deliveries and in an environmentally-conscious manner. Such analysis includes suppliers, customers, regulatory authorities and employees at all levels on an organization. Undoubtedly, electronic (Internet-based) systems deliver enterprises with a competitive advantage by opening up opportunities to streamline processes, reduce costs, increase customer patronage and enable straight thorough processing capabilities. These same characteristics of good SCM can be converted to handle environmental issues related to supply chain operation and processing. This chapter proposes a fundamental framework for creating and analyzing GISCM solutions.

INTRODUCTION

This is the age of communication based around the Internet technologies. As a result, enterprises are able to conduct both inter-organizational and intra-organizational activities efficiently and effectively. This efficiency of communication has percolated in to many arenas of organizational activity including customer relationships, resource planning, supply chains and, in the context of this discussion, green supply chains. Given the cost of logistics and its importance in order fulfillment processing, organizations may want to capitalize on the opportunity to communicate and to reengineer their supply chain operations that would sustain them in the globally competitive and challenging world of e-business. As discussed by Unhelkar and Dickens (2008), organizations also

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look for green advantages in their supply chains such as legal compliance and market positioning. Internet-based supply chain systems promise the capability to respond in real-time in changing product demand and supply, and offer easy integration functionality with backend information systems (PeopleSoft, 2002; Turner, 1993).

Although a number of Internet-based supply chain systems (or integrated supply chain management systems – ISCM systems) are available for adoption, enterprises do not guarantee to implement the systems in conjunction with their existing information systems. Furthermore, the ISCM systems may not fulfill the connection and implementation requirements between participants in the supply chain.

After the initial e-commerce hype had dissipated, surveys undertaken in 2001 tended to paint a different picture as to the success of these implementations. Smith (2002) concludes that at least 15% of supply chain system implementations during 2001 and 2002 were abandoned in the US alone. Although several reasons can be identified as the cause of implementation failure, the main problem rests with the fundamental analysis of ISCM operations and requirements.

The purpose of this chapter is to provide considerations for the implementation of Integrated Supply Chain Environments (ISCE) that provide business efficiency and better environmental outcomes. This chapter will initially examine some of the available literature regarding ISCE. The fundamentals of ISCE – technologies and processes - are investigated[1]. These issues are discussed further and an analysis methodology is proposed to address some of the issues identified previously. This forms the basis of a construct for a theoretical model for enterprises to adopt in the analysis phase of developing Green ISCM (GISCM) systems. This chapter concludes with a future research direction in investigating technological issues of GISCM systems operation.

GREEN INTEGRATED SUPPLY CHAIN MANAGEMENT OVERVIEW

GISCM involves the linking of Suppliers and Customers with the internal supply processes of an organization from an environmental perspective. Internal processes include both vertically integrated functional areas such as materials, sales and marketing, manufacturing, inventory and warehousing, distribution or perhaps, other independent companies, which involved in the supply chain (i.e. channel integration). Customers at one end of the process can potentially be a supplier downstream in the next process, ultimately supplying to the end user (Turner, 1993; Handfield et.al, 1999).

GISCM SOLUTIONS

Whilst large-scale GISCM systems are yet to happen in some organizations, the concept of establishing information flows between points in the supply chain has been around since the 1980's. Through Electronic Data Interchange (EDI), customers and suppliers have communicated supply data through direct dial-up interfaces and other mediums (Zieger, 2001). However, the ability for the Internet to create a common communication infrastructure has made integration much more cost-effective. GISCM has promised to "deliver the right product to the right place at the right time and at the right price" (Comptroller, 2002).

From the basic supply chain software development perspective, four vendors are well known: namely Oracle, SAP, PeopleSoft and Ariba. There are also a multitude of medium-sized vendors in the ISCM solution space (Armstrong, 2002) that need to be considered from a green perspective. All vendors claim that ISCM will enable the enterprise to respond, in real time, to changes in demand and supply.

For instance, current ISCM solutions allow organizations to automate workflows concerning