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ABSTRACT

A supply chain is a network of suppliers, factories, warehouses, distribution centers, and retailers, through which raw materials are received, transformed, produced and delivered to the customer. An effective and efficient way of handling this network is called a Supply Chain Management System (SCMS). The purpose of this study is to design an electronic supply chain system to be capable in an electronic market. Here, the authors consider a supply chain composed of supplier, plant, and customer. The aim is to optimize a real time web-based order-delivery system in which customer satisfaction is noted. As such, a comprehensive web-based order-delivery system in an electronic market is proposed and optimized applying mathematical programming.

Keywords: Customer Satisfaction, Electronic Market, Electronic Supply Chain, Logistic, Mathematical Model

1. INTRODUCTION

Being a complex network of suppliers, factories, warehouses, distribution centers and retailers, the success of any SCMS depends on how well these system components are handled and integrated (Zhao et al., 2008). Recently, information has become a significant item in determining the productivity of a complex enterprise. The enterprise’s ability to process information and make rapid but accurate decisions lead to growth (Halldorsson et al., 2003). In such a scenario it is necessary to forecast and estimate the demand, supply raw materials to the point of sale locations and reorganize the business structure if necessary (Simchi-Levi et al., 2007). To realize these goals a system must seamlessly integrate both information...
and material flow. Such a system can provide access to information, aid decision-making and execution (Halldorsson et al., 2007).

1.1. Supply Chain Management

Supply chain management (SCM) is an integration of materials, information, and finances in a link among supplier, manufacturer, wholesaler, retailer and consumer (Cooper et al., 1997). Supply chain management consists of coordinating and integrating these flows both within and among companies. It is considered that the final goal of any effective supply chain management system is to reduce inventory (with the assumption that products are available when needed). As a solution for successful supply chain management, complicated software systems with Web interfaces are competing with Web-based application service providers (ASP) who facilitate to provide part or all of the SCM service for companies who rent their service (Ketchen & Hult, 2006).

Supply chain management flows can be divided into three main flows:

- The product flow;
- The information flow;
- The finances flow.

The product flow includes the movement of goods from a supplier to a customer, at the same time, any customer returns or service requirements. The information flow consists of transmitting orders and updating the status of delivery. The financial flow involves credit terms, payment schedules, and consignment and title ownership arrangements. There are two main types of SCM software: planning applications and execution applications. Planning applications use advanced algorithms to identify the best way to fill an order. Execution applications track the physical status of goods, the handling of materials, and financial information involving all parties. Some SCM applications are based on open data models that support the sharing of data both inside and outside the enterprise (this is called the extended enterprise, and includes key suppliers, manufacturers, and end customers of a specific firm. This shared data may reside in diverse database systems, or data warehouses, at the web sites of the enterprises. By sharing this data “upstream” (with a company’s suppliers) and “downstream” (with a company’s customer), SCM applications have the potential to improve the time-to-market of products, reduce costs, and allow all parties in the supply chain to better manage current resources and plan for future needs (Larson & Halldorsson, 2004).

Increasing numbers of companies are turning to Web sites and Web-based applications as part of the SCM solution. A number of major Web sites offer e-procurement marketplaces where manufacturers can trade and even make auction bids with suppliers (Haag et al., 2006).

1.2. Electronic Supply Chain Management

E-Supply Chain Management (e-SCM) refers to the flow of physical goods and associated information from the source to the consumer (Tanriverdi, 2006). Key e-Supply chain activities include purchasing, materials management, distribution, customer service, and inventory forecasting. Effectively managing these processes is critical to the success of any online operation (Chen et al., 2007).

1.3. Organization of SCM

In commerce, a retailer buys goods or products in large quantities from manufacturers or importers, either directly or through a wholesaler, and then sells individual items or small quantities to the general public or end user customers, usually in a shop, also called store. Retailers are at the end of the supply chain (Lavassani et al., 2008b).

Many shops are part of a chain: a number of similar shops with the same name selling the same products in different locations. The shops may be owned by one company, or there may be a franchising company that has franchising agreements with the shop owners (see also restaurant chain).
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