Chapter 75

A Three-Level Multiple-Agent Early Warning Mechanism for Preventing Loss of Customers in Fashion Supply Chains

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ABSTRACT

The fashion industry is experiencing rapid changes in many areas, including the supply chain. Typical quick response (QR) systems have been broadly used in the fashion industry to enable agile supply chain management (SCM). However, the original functions of QR systems cannot completely address the challenge of issuing early warnings to prevent customer loss. This article merges the typical MIS system development procedure with that of an e-SCM multiple-agent decision support system to confront this problem. The system has three levels: data mining, ontology, and decision support. These levels are interlinked in handling different databases. Different agents execute different tasks at each level to achieve integration and communication in a supply chain with less human intervention. The proposed framework emphasizes transparent connections among businesses and assists in information sharing, thereby preventing customer loss.

INTRODUCTION

Customers continually patronize businesses that provide excellent products or services. Moreover, businesses should build an early warning mechanism to prevent customer loss. Hence,

setting up an early warning mechanism in supply chain management (SCM) is important to ensure that business-to-customer (B2C) relations run smoothly.

In the fashion industry, the key to business survival is satisfying customer orders, regardless of the state of the economic environment. A business usually plays multiple tasks in the supply chain,

including taking customer orders, processing these orders, and delivering the goods. In essence, the business collectively becomes a customer, retailer, wholesaler, distributor, manufacturer, and supplier.

One of the goals of SCM in the fashion industry is to manufacture products that adequately meet customer requirements, starting from the downstream supply chain (demand side) to the upstream supply chain (supply side). Another goal is to ensure that products can be efficiently produced and delivered from the upstream to the downstream. However, sometimes, an order has to move across different countries, creating an information gap between the demand and supply sides. This can have a negative impact on customers because they do not receive prior warning on the long-term distribution of the product they ordered.

The fashion industry features a very complex global supply chain (Lo, Hong, & Jeng, 2008). As such, SCM encounters some problems, particularly in information and logistics management.

Problems in Information Management

The supply chain of the fashion industry faces a six-phase information management problem. The six phases are as follows:

- **Collecting information:** A data collection mechanism or an information system should be used to collect daily transaction data.
- **Storing information:** A software or a database management system should be adopted to store transaction data.
- **Integrating information:** Different data should be integrated together from different databases.
- **Analyzing information:** Analytical software is used to analyze data sets.
- **Explaining information:** Analytical results are explained to aid in decision making.

- **Delivering information:** Shared information is delivered to business partners based on their requirements.

For large enterprises, building an information system is relatively easy. However, most companies in the supply chain of the fashion industry are small and medium enterprises (SMEs), making any large-scale information system difficult to establish. Thus, they rarely use advanced information systems, such as enterprise resource planning (ERP), in their basic MIS infrastructure (Lo, Hong, & Hsu, 2006).

Building a complete information system usually requires large investment in purchasing information equipment, including software and hardware. Despite the prohibitive cost, some SMEs choose to invest in information systems to gain a competitive advantage.

In the same vein, any industry should improve its capability in information delivery and validity, as well as in efficiently handling quick response (QR) requirements and customer complaints. This explains why more and more retailers in the fashion industry use point of sales (POS) systems to obtain information on customer transactions automatically. Hence, having a robust information system has become an indicator of success, whether the business operates solely or connects with others in the upstream and downstream of the industry.

Problems in Logistics Management

Logistics management also plays an important role in the supply chain of the fashion industry. It is divided into two categories based on the direction of objects: inbound logistics and outbound logistics. Inbound logistics represents the purchasing process of raw materials for a company. On the other hand, outbound logistics pertains to the distribution process of products from suppliers to customers. In a supply chain, such as an integrated pipeline (Copacino, 1997), the three main activities are supply, operation, and distribution.

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