Kuninori SUZUKI

Bunka Fashion Graduate University, JAPAN

Possibilities for a "SaaS"-Based Warehouse Management System in the Fashion and Apparel Industry

1. Introduction

It has become increasingly important to have both visible and accurate real-time inventory management tools available when managing merchandising and logistics in the apparel industry. In order to meet the requirements for controlling and managing inventory, the industry has traditionally introduced expensive and heavily featured logistics-related software. However, an increasingly sophisticated clothing market, combined with a shortened fashion cycle and diversified trends and tastes, has increased the demand for more advanced and inexpensive IT-driven logistics services. The development of such logistical requirements in the clothing industry has focused attention on SaaS (Software as a Service)-based WMSs (Warehouse Management Systems). SaaS users do not purchase or own the software; rather, they employ its functions via the Internet. Having to purchase state-of-the-art software in order to manage products and logistics would cost a considerable amount of money.

A SaaS-based WMS, however, means that a sophisticated system can be introduced relatively inexpensively given that only monthly fees are payable. Moreover, a

SaaS-based WMS is easy to adopt and easy to access without additional maintenance and services. In addition, workers in the warehouses or logistics centers can operate the complicated, heavy tasks in healthy conditions without suffering mental or physical stress, which means their sense of well-being is increased and they are more satisfied workers. It is important to have a human-friendly logistics system in place (Frazelle, 2002, 343-6).

This paper proceeds as follows. In Section 2 there is a description of the research focus of this paper. In Section 3, the previous studies around fashion logistics are presented. Section 4 shows the effects of using a SaaS-based WMS. In Section 5, case studies in the fashion industry are examined. Section 6 presents the conclusion.

2. <u>Research Focus: Improvement of Logistics and Inventory Management in the Fashion Industry</u>

In this paper, we will discuss how logistics and inventory management can be improved by introducing a SaaS-based WMS in the fashion industry. Fashion markets have been defined as exhibiting typically the following characteristics (Christopher *et al,* 1998, 82-3): short lifecycle, high volatility, low predictability, and high impulse purchase. The combined effect of these pressures clearly provides a challenge to logistics management (Christopher *et al,* 1998), and the increased attention placed on warehouse and fulfillment operation in the last few years has produced a harvest of improvement in technology and functionality in warehouse management systems (Frazelle, 2002, 270).

Apparel products tend to be delivered in the beginning of each season. The inventory needed for replenishment in the warehouse is required to be on hand. It is sometimes

difficult to procure special textiles or furs, and therefore additional orders cannot be done. Some products cannot be ordered the same way basic items are, by using logical inventory strategies and statistics. If many products are not sold even after price markdowns have been taken, the inventory will be transferred to the next year. When there is no profit, the inventory rests; on the other hand, when profit can be found, the inventory is appreciated. Under these circumstances, it is necessary to be aware of the exact number of items that can be sold within any given season. This is the total number of real inventory items plus incoming inventory items subtracted by the number of items scheduled to be shipped. These numbers need to be visualized in real time through actual inventory management operations in order to have the minimum levels of required inventory items available at any particular point in time (Suzuki, 2007, 52-3).

In the apparel industry, the visualization of inventory in real time and accurate inventory management are both becoming increasingly important. A comprehensive, sophisticated, and company-wide inventory management system that can integrate incoming inventory, logistics center inventory, store inventory, and returned goods inventory is required. The capability to manage and analyze massive amounts of sales data by unit control (e.g. color and size) and to be able to do so for thousands of stores in a short period of time, is an important requirement. In addition, the fashion retailing industry has a variety of venues for selling the merchandise, such as on-line shops, department stores, and outlets, so their order information and treatment information will vary. Even the same products have different shipping styles when sold by different venues.

In order to meet these requirements to control and manage inventory, an expensive

and heavily featured warehouse management system is being conventionally used today. However, an increasingly sophisticated clothing market, combined with a shortened fashion cycle and diversified trends and tastes, has increased the demand for more advanced and inexpensive IT-driven logistics services.

As for the well-being of employees in the fashion industry, there have been few systematic studies assessing Human Resource Management and Employee Satisfaction in logistics (Geringer *et al*, 2002, 5-30). However, the solutions that have been presented so far tend to focus on the designing of better systems and operational processes (Berglund, 1999, 59-70). The logistics arm of the industry still has to rely on human resources to a great extent in order to achieve better collaboration in supply chains and smooth operations in warehouses. Managers in logistics centers may be looking only at their own job territories, while floor workers may be unaware that the accumulation of mistakes and damages they make every day is causing enormous logistical inefficiency and dissatisfaction of employees in the supply chain (Shinohara, 2006, 3). Christopher (1992) also sees that the major reason for supply chain inefficiency is the lack of coordination and linkage between various parties in the chain.

However, such problems can be solved by introducing a SaaS-based WMS, as it allows operational progress information in warehouses or logistics centers can be known in real time. In addition, the progress of each worker can be analyzed by processing data. The labor management function that evaluates each worker's efficiency can be included. If a particular section within the operation makes rapid progress, the workers can be transferred to another section where the work is falling behind schedule, and their distribution can be corrected by remote control using a

WMS system. The concrete number of completed operations, such as picking, checking, etc., can be shown in the warehousing site; such real-time data can help to bring out the workers' highest sense of motivation and to enhance their well-being by providing them a sense of fulfillment concerning their work in logistics centers.

This paper tries to clarify the view of the logistical effectiveness of the SaaS-based WMS, particularly as it pertains to the well-being of the employees in the fashion industry. In the following section, the effects of using a SaaS-based WMS will be introduced and examined. On the basis of this foundation, the case studies are presented in Section 4.

3. Previous Studies around Fashion Logistics

Logistics studies have gathered the interest of many scholars and experts, and numerous theories have been developed (Shinohara, 2006, 15).

Christopher defines logistics as a planning orientation and framework that seeks to create a single plan for the flow of products and information through a business, and supply chain management builds upon this framework to achieve linkage and coordination between the processes of other entities in the pipeline, i.e. suppliers and customers, and the organization itself (Christopher, 2005, 4). On this basis, one goal of supply chain management might be to reduce or eliminate the buffers of inventory between organizations in a chain through the sharing of information on demand and current stock levels (Christopher, 2005, 4). Christopher points out that "fashion retailing, and the manufacturing sector that supports it, are clearly highly dependent on an agile logistics capability" (Christopher, *et al*, 1998, 99). Successful companies in the fashion industry are not only able to capture the imagination of the customer

with their products, but they are often characterized by their market agility as well. They are finding that it is possible to make significant improvements by reducing the logistics lead-time and capturing information sooner on actual customer demand (Christopher, *et al*, 1998, 97). This can be related with the concept of WMS that will be discussed in greater detail later in this paper. An SaaS-based WMS is a system that can fulfill the process from receiving to shipping in the logistics center while minimizing inventory level via the Internet in order to compete successfully in short lifecycles and volatile markets and to bring the products to market within the shortest possible timeframe.

There have been many reports and studies on "sweatshops." Sweated labor began emerging in the apparel production industry in many countries of the developing world, and was even reemerging in some advanced countries (Rosen, 2002, x). The well-being of employees in the factories has been seriously considered, particularly in the case of sweatshops. However, it is not only factory work that needs to be improved, but also logistics work in the warehousing environment as well, as this is some of the most dangerous work in the industry and offers a low quality of working life in many organizations (Frazelle, 2002, 343). In most warehouses today, it is difficult to keep someone on-post for more than three months (Frazelle, 2002, 344). However, by introducing a SaaS-based WMS and thus promoting a more human-friendly warehousing environment, the well-being of the employees in the logistics center can be achieved. New technology can greatly increase worker productivity in logistics, too.

By examining the previous studies pertaining to fashion logistics, there is no doubt that a SaaS-based WMS can be useful in successfully managing the logistics pipeline,

while at the same time keeping employees satisfied by using this information system. On the basis of previous studies done, and by using the following case studies, we will discuss the possibilities for a SaaS-based WMS and services in the fashion and apparel industry and business.

4. The Effects of Using a Warehouse Management System

True breakthroughs in logistics performance are achieved when new ways are identified to substitute information for inventory and work content (Frazelle, 2002, 276). It is undeniable that great improvements in logistics productivity were achieved when personal computers were mainstreamed, thus enabling logisticians to have real-time and broad access to demand, supply, inventory, and shipping information (Frazelle, 2002, 276).

The WMSs are powerful optimization tools in warehouse operations, logistical information sharing, and inventory management. The main effects of using a SaaS-based WMS are as follows:

(1) Careful information management in warehouses

By the installation of bar code systems, wireless LAN systems, or automatic identification systems, warehousing and shipping checks and storage location management can be introduced easily and seamlessly. Goods and information can be managed as a whole (Suzuki, 2004, 102-10).

(2) Supply-chain-wide and company-wide information sharing

For example, receiving and shipping information, and inventory information in a logistics department can be shared with different departments in the same company,

such as the sales department. Also, this information and data can be shared outside the company by accessing the Internet link to the warehousing software (Suzuki, 2004, 58-61).

(3) Standardization and regularization for the warehouse operation

The functions for supporting the warehouse operation can help improve working efficiency and accuracy. The material flow in the warehouses will be smoother as task instructions are made based on the information found on the orders. Also, because each item can be systematically located, even for someone other than a person in charge of replenishment, it is easier to confirm inventory and replenish items. Making warehouse operations more efficient also greatly contributes to enhancing the working surroundings, which shows consideration on the part of management for the workers' health (Suzuki, 2004, 102-108).

(4) Control of operational progress information

Operational progress information in warehouses or logistics centers can be known in real time. In addition, the progress of each worker can be analyzed by processing data. The labor management function that evaluates each worker's efficiency can be included. Workers whose section operation makes rapid progress can be transferred to the section falling behind in the schedule, and their distribution can be corrected by remote control using a WMS system. The concrete number of completed operations, such as picking and checking, can be shown in the warehousing site, which will help to increase the workers' motivation to its highest level and will enhance their well-being by providing them a sense of fulfillment concerning their work in the logistics centers (Frazelle, 2002, 270-1).

(5) Enforcement of inventory management

By controlling and managing real-time inventory in logistics centers, surplus and safety inventories can be minimized. By avoiding stock-out items, the rate of goods delivery can be improved. Automatic orders can be created using the data regarding changes in inventory that are typical and expected (Frazelle, 2002, 91-144).

(6) Reducing operational costs

Thanks to correct stock information, the costs and time involved in inventory or stocktaking can be reduced. Checking inventory by human hands, which is time-consuming, can be replaced by software that does this more quickly and accurately, thus reducing costs.

Purchasing state-of-the-art software for merchandising and logistics management has often required substantial initial investment and costs. A SaaS-based WMS, however, means that a sophisticated system can be introduced relatively inexpensively given that only monthly fees are payable. Moreover, the introduction of such a system can be easy to adopt and easy to access without additional maintenance and services (Suzuki *et al*, 2008, 98-9). In situations where the contract must be canceled due to changes in user companies' management policies, cancellation procedures will go smoothly with almost no substantial additional costs.

(7) Improvement of customer service

Achieving a reduction in lead-time, improving delivery rates, and offering value-added services such as distribution processing will eminently improve customer service levels. The profit margin for each order will also be increased. All of these will enhance customers' satisfaction and sense of well-being (Frazelle, 2002, 70-90).

5. **Case Study: Introduction of a SaaS-based WMS**

The *Logizard-Plus* SaaS-based WMS software, which has a good reputation for its application to Japanese apparel and fashion goods, is sometimes upgraded. However, its users do not have to take any responsibility or bear any expense for those upgrades. Highly advanced merchandising and logistics management systems can be introduced and installed quickly and inexpensively. Server maintenance in the SaaS-based WMS environment is easy. Each company is not required to own its own server; instead, only the company that offers the service owns and maintains the server and controls and manages the earthquake-resistance system, the power supply, and security for the in- and out-flow of information at the Internet data center. It is not easy for individual companies to install their own servers; thus, the sophisticated and reliable backup and Internet security system of the SaaS provides value (Suzuki *et al,* 2008, 100-1).

The basic task process of a SaaS-based WMS such as *Logizard-Plus* (an application for apparel and fashion goods) is described below (Suzuki *et al*, 2008, 122-3). After thoroughly sharing company-wide information among all the sections and grasping the inventory information of the logistics center in real time, a quick response system from the customers' references is built. Orders come in via fax, email, and telephone, and after their confirmations by *Logizard-Plus*, the appointed date of delivery and shipment requests can be done. Inputting an ID and a password accesses the *Logizard-Plus* Web site. After confirming the real inventory situation, orders and delivery directions are input, which will then be sent to the logistics centers. According to specific customer requests and delivery directions, task processes are made for each customer; shipping direction lists of each item are created; and invoices can be

printed and published. In the logistics center, the picking operation can be made according to this process. Effectively, smoothly, and reasonably, products are withdrawn systematically at each location. After picking the ordered items, distribution processing such as price tagging based on list indication information can be done, and after enveloping an invoice, the items are packed. At the same time, the label of the customer invoice is also published. After affixing the label, the items to be delivered are conveyed to the truck yard. The shipping companies receive their customer lists on floppy disks or other computer memory tools. Without the introduction of *Logizard-Plus*, many annoying tasks had to be done by hand such as shipment requests, invoice creation, and so on. This increased the risks of miswriting and omitting invoices, which then caused shipping errors.

Indeed, many issues of logistics management cannot be solved quickly and efficiently when warehousing by hand. There is a limit to what can be done when using that method. The strenuous and repetitive work required of employees in actual warehouses may cause them to have mental or physical disorders as a result. Without using software for logistics management and inventory, workers can feel heightened mental or physical stress, and thus feel as though they are being forced to work in unhealthy conditions, even if they can complete their tasks and fulfill their job responsibilities.

Therefore, the installation of a SaaS-based WMS is a great improvement over the working conditions that are usually found in an actual warehouse, and this improvement is achieved by using information technology. Using *Logizard-Plus*, standardization and regularization for the warehouse operation can be achieved. The employees in the logistics centers of the fashion companies can be satisfied with the evaluation of the effectiveness of their work after introducing the SaaS-based WMS

(Hisahiro Tatsujo, Frontier Domain Corporation, 2006, 94-5).

Magaseek, a listed company on the *Mothers*, which is part of the Tokyo Stock Market, operates one of the biggest fashion Web sites in Japan. They collaborate with popular female magazines to entice Web users to purchase their goods. *Magaseek* grew rapidly, and the arrangement of its logistics system could not keep up with its growing orders. The company tried to deal with this problem in a conventional way, but it was also worried that IT-based logistics system development with a traditional WMS software company would take more time than *Magaseek* was willing to sacrifice for such a transition. Then *Magaseek* decided to utilize *Logizard-Plus*, a SaaS-based WMS that had a good reputation in the apparel industry in Japan. With the introduction of *Logizard-Plus*, *Magaseek* quickly achieved its timely and visible logistics system in real-time, and all logistical information and data could then be shared outside the company by accessing the Internet link to the *Logizard-Plus*. Supply-chain-wide and company-wide information sharing could also be achieved (Suzuki *et al*, 2008, 124-5).
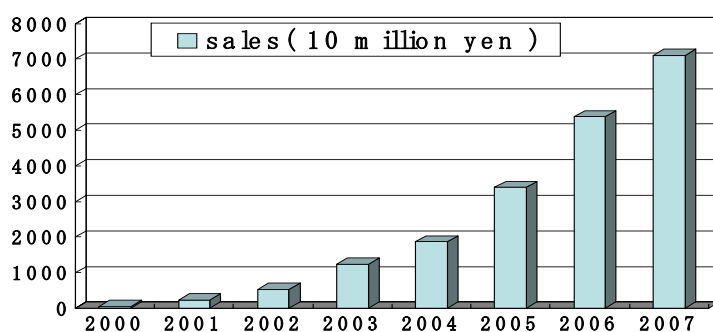

Figure 1: Sales of *Magaseek*

Source: From http://www.magaseek.com

Figure 2: Members of *Magaseek*

On the *Magaseek* Web site, a variety of merchandise items advertised in magazines is procured, and after the merchandise arrives in its warehouses, photos are quickly taken and the items are listed for sale on the site. It is necessary for the site to provide information that matches young people's sense of fashion. With the introduction of *Logizard-Plus*, the additional customization that *Magaseek* sought, such as the Photo Management System, was obtained. Also, *Magaseek'*s bar codes can be affixed to the price tags that the apparel companies have already attached to the merchandise. Thus *Magaseek* has achieved the effective customization of the basic scheme of *Logizard-Plus*, and operational progress information in warehouses or logistics centers can be known in real time.

Major apparel companies in Japan develop many brands, some of which have sales in the range of 5,000 million to 10,000 million yen or more. Logistics centers are operated in many cases on a single-brand basis as well as on a company-wide basis (Suzuki *et al,* 2008, 126). However, until recently, it was not easy to operate on time with an IT system.

To solve this problem, even the major Japanese companies began to introduce and install a SaaS-based WMS. By watching the trends of the fashion scene, which change quickly and suddenly, the companies can introduce a highly advanced

merchandising and logistics system. The companies should build a highly advanced IT system that shows accurate alerts, and that is practical for checking the merchandising trends for each store and each product on a daily basis. The SaaS-based WMS is useful for achieving this purpose, because it can be easily introduced or eliminated with few initial investment costs. Also, by achieving a reduction in lead-time, improving delivery rates, and offering value-added services such as distribution processing, the level of customer service be eminently improved (Suzuki *et al*, 2008, 126-32).

With a WMS, radio handy terminal systems can be useful for quick checking tasks. (Frazelle, 2002, 299-304) However, it is also possible to use mobile phones (Suzuki *et al*, 2008, 140-1). The use of synthesized voice is increasingly popular in warehouse operations (Frazelle, 2002, 305), which may be connected with mobile phone systems in the future.

6. Conclusion

In examining the possibilities for the application and use of a SaaS-based WMS, it can be concluded that this software is well-suited to the unique characteristics of the fashion industry such as short lifecycles, high volatility, low predictability, and high impulse purchase (Christopher, 1998, 82). As the case studies are examined, the SaaS-based WMS such as *Logizard-Plus* is suitable to current paradigms of logistics management in fashion markets, and is also effective in warehouse operations and inventory management.

In addition, SaaS-based WMS software is useful in reducing workers' mental and physical stress in the logistics management and warehouse environments in the

fashion industry and employees' health satisfaction with a sense of well-being can be realized and accomplished. This is true not only for venture companies but also for major companies in the apparel and fashion industry, which are starting to use it on an increasing basis.

The process of logistics management in the fashion industry can be enhanced by using a SaaS-based WMS. Therefore, the easy introduction and installation of this system can help apparel companies develop better and more efficient logistics strategies.

Reference:

Berglund, M. et al (1999), "Third-party logistics: Is there a future?," *The international journal of logistics management,* Vol.10

Christopher, M (1992), *Logistics and Supply Chain Management*, Second Edition, (London, Pitman Publishing)

Christopher, M (2005), *Logistics and Supply Chain Management*, Third Edition, (London, Prentice Hall)

Christopher, M, Lowson B, and Peck, H (1998), "Fashion logistics and quick response," *Logistics and Retail Management* (London, Kogan Page)

Frazelle, E.H., (2002), *Supply Chain Strategy* (New York, McGraw-Hill)

Geringer, J.M. *et al* (2002) "In search of 'best practices' in international human resource management: Research design and methodology," *Human resource management*, Vol.41

Hisahiro Tatsujo, Frontier Domain Corporation (2006), "Web-gata-WMS-de-on-line-hanbai-muke-3PL-genba-kouritsuka-wo-5bai-up," *WMS & TMS* (Tokyo, Ryutsu-kenkyu-sha)

Rosen, E.I (2002), *Making Sweatshops* (California, December)

Shinohara, M (2006), *European and Japanese Logistics Paradigms* (Tokyo, Maruzen Planet)

Suzuki, K (2004), *Senryaku-warehouse-no-keyword* (Tokyo: Faraokikaku)

Suzuki, K. (2007), *Ryutsuzaiko-no-kanrisakugen* (Tokyo: Nikkan-kogyo-shimbumsha)

Suzuki, K. & Endo, H. (2008), *Shohinkanri-buturyukanri* (Tokyo: Nikkan-kogyo-shimbumsha)