Editorial   **Open Access**

Supply Chain Management in Textiles and Apparel

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Supply chain management (SCM) is a crucial part of modern textiles and apparel business [1]. In addition to the traditional concepts on improving the production efficiency, quality control, and product design, supply chain management focuses on enhancing the collaboration and cooperation among all companies in the supply chain with a goal of satisfying what market wants. With the advance of technologies, both in terms of computer-based information technology and materials-science related production technology, many timely research issues emerge in supply chain management of textiles and apparel. Based on a recently published edited research handbook on fashion supply chain management [1] and the recent development of the textiles and apparel industry, the following research issues are outlined and discussed.

Supply chain coordination is a core topic in fashion supply chain management. By coordination, it means the supply chain performance is maximized by the joint efforts of the supply chain members. One popular measure which can achieve coordination is vendor-managed inventory (VMI) in which the manufacturer and the retailer work as if they belong to a single unit and the manufacturer automatically helps the retailer replenish inventory with respect to the retailer's target inventory service level, sales performance, demand forecast, and inventory situation. A well-known successful case on VMI is between the manufacturer TAL and the retailer JC Penney. Despite being a well-proposed scheme, VMI is far from perfect and its implementation in practice in the textiles and apparel supply chain is still rather limited. For example, the issues on trust (e.g., will the retailer share fully real and accurate data? Will the manufacturer faithfully help the retailer in achieving the goals?) and responsibility share (e.g., who should be responsible for emergence order cost? Who would pay the inventory holding cost when the product is located in different places) are very important. In addition to VMI, the use of incentive alignment contracts is also significant. Popular forms of supply contracts such as quantity discount contract, minimum order quantity contract, markdown money sponsorship contract, rebates contract etc are all commonly implemented in practice [2,3]. However, how these contracts affect the performance of the fashion supply chain as well as its individual members is an open question which deserves further exploration.

The use of information systems is a necessary part of modern supply chain management in the textiles and apparel industry. It affects the operations as well as the implementation of important strategies such as VMI. Recently, among many topics related to the use of information systems, Radio frequency identification (RFID) technology is a hot topic. In fact, a lot of large scale fashion retailers, such as Marks and Spencer, are currently adopting RFID in their business. There are also many reported benefits and draw backs [4]. However, how much RFID actually brings in terms of monetary terms to these companies is a controversial issue. Moreover, whether RFID only fits the big companies and not the small ones is also arguable (see

[5] for more discussions). In addition to RFID, the use of business intelligence in the form of decision support systems is another industrial trend in textiles and apparel. Recent advances in this area include the multi-level e-multi-agent early warning mechanism for preventing loss of customers in fashion companies [6]. The proposed framework helps prevent loss of customers by improving connection and communication among supply chain members and enhancing information sharing. Another recently developed area is the intelligent fashion sales forecasting schemes. The use of machine intelligence such as artificial neural net-work (ANN) is reported to yield very positive results in fashion sales forecasting [7]. However, all these machine intelligence schemes are relatively time consuming to run and require sufficiency of data. New research questions hence arise on whether there are some intelligent methods which can produce timely forecast with high accuracy and relatively low demand on the amount of data and what kinds of technologies should be employed. Recent research results reported in [8,9] have started to address some of these important questions.

Risk management is now a top-agenda of almost every CEO in fashion companies. This issue is especially important because of the always changing market condition as driven by volatile market demand as well as the price of commodities like cotton being very unstable. As such, many traditionally explored topics in finance, such as mean-variance [10] portfolio management approach, and risk hedging, become pertinent issues. Recently, Chiu, Zheng and Choi [11] took a first step and applied the Value-at-Risk (VaR) approach in finance to explore the optimal pricing and inventory decision for fashion retailing. Future research can be conducted on, e.g., 1. exploring how one can make use of the stock market to offer investment hedging with respect to the purchase of materials (such as cotton) for textile companies, 2. examining how one can diversify risk by offering a larger variety of products in assortment planning for fashion retailers.

Sustainability and ethical supply chain management is a hot and timely issue all around the world. As an industry which is associated with pollutants (dyeing chemicals, CO_2 emission etc), the textiles and apparel industry is usually termed as an environmentally unfriendly industry. In recent years, governments of different countries have already taken important measures with a goal of addressing sustainability issues. For example, the Australian government is contemplating

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the imposition of carbon footprint tax on garment products, and the Chinese Mainland government has implemented strict rule to ensure business license will only be granted to those enterprises which follow and satisfy the respective sustainability rules and guidelines. However, the performance of these government measures is still unknown and yet to be realized. It hence opens new research issues and it will be interesting to examine the effectiveness of many of these measures. From the company perspective, the international standard such as ISO certification (ISO14000) also helps to certify the company's compliance of the environmental standards. It will hence be interesting to study: (1) how this kind of standard enhances the business performance of the company as well as the sustainability of the corresponding supply chain, and (2) whether early adopter or late adopter of these standards will perform better (e.g., see [12]). Another important related area is on corporate social responsibility (CSR). There is evidence supporting the claim that consumers for apparel products do care about CSR and they demand the corresponding fashion brand and manufacturing processes to be socially responsible. As a consequence, various research issues become important. For example, on consumer side, how consumers perceive CSR's value when they purchase the apparel product, how ethically framed retailing measures influences consumer behaviors towards fashion products etc; on production side, how CSR affects the efficiency and effectiveness of the production and distribution of garment and textiles products in the supply chain. Recent papers by Abraham [13], Barnes and Kozar [14], Stanforth and Hauck [15] and Gam [16] offer some exploratory findings related to some of these issues.

Undoubtedly, supply chain management is a very important part of the textiles and apparel industry. There are many new challenges which call for new solutions. As a result, this editorial paper discusses and proposes several critical research areas and questions for future investigation.

References

1. Choi TM (editor) (2011) Fashion supply chain management: Industry and Business Analysis. IGI Global.

2. Kurata H, Yue X, Layth CA (2011) Trade promotion model choice and information sharing in fashion retail supply chains. (Choi Edn) Fashion supply chain management.

3. Huang J, Leng M, Liang L (2011) Competition and coordination in a fashion supply chain with wholesale pricing schemes. (Choi Edn) Fashion supply chain management.

4. Azevedo SG, Carvalho H (2011) RFID technology in the fashion supply chain: An exploratory study. (Choi Edn) Fashion supply chain management.

5. Tajima M (2011) Small manufacturers vs. large retailers on RFID adoption in the apparel supply chain. (Choi Edn) Fashion supply chain management.

6. Lo WS, Hong TP (2011) A three-level multiple-agent early warning mechanism for preventing loss of customers in fashion supply chains. (Choi Edn) Fashion supply chain management.

7. Au KF, Choi TM, Yu Y (2008) Fashion retail forecasting by using evolutionary neural networks. Int J Produc Econ 114: 615-630.

8. Choi TM, Hui CL, Ng SFF, Yu Y (2012) Color trend forecasting of fashionable products with very few historical data. IEEE Transactions on Systems, Man, and Cybernetics - Part C, published online.

9. Yu Y, Choi TM, Hui CL (2011) An intelligent fast sales forecasting model for fashion products. Expert Syst Appl 38: 7373-7379.

10. Choi TM, Chow PS (2008) Mean-variance analysis of quick response programme. Int J Produc Econ 114: 456-475.

11. Chiu CH, Zheng J, Choi TM (2011) Optimal pricing and inventory decisions for fashion retailers under Value-at-Risk objective: Applications and review. (Choi Edn)Fashion supply chain management.

12. Lo CKY (2011) Quality and environmental management systems in the fashion supply chain. (Choi Edn) Fashion supply chain management.

13. Abraham N (2011) The apparel aftermarket in India – a case study focusing on reverse logistics. J Fashion Marke Manag 15: 211 – 227.

14. Barnes W D, Kozar JM (2008) The exploitation of pregnant workers in apparel production. J Fashion Marke Manag 12: 285-293.

15. Stanforth N, Hauck W (2010) The effects of ethical framing on consumer price perceptions. J Fashion Marke Manag 14: 615-623.

16. Gam HJ (2011) Are fashion-conscious consumers more likely to adopt eco-friendly clothing? J Fashion Marke Manag 15: 178–193.