

## Editorial

# Mathematical Modeling Research in Fashion and Textiles Supply Chains and Operational Control Systems 2014

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After the success of the former special issue on *Mathematical Modeling Research in Fashion and Textiles Supply Chains and Operational Control Systems* in Mathematical Problems in Engineering, this second volume of the special issue has been compiled by the same editorial team. Similar to the first volume, we are very pleased to have attracted a lot of high quality submissions. Finally, this special issue selects and features some carefully reviewed interesting technical papers. They are introduced as follows.

In “*Optimal inventory policy under permissible payment delay in fashion supply chains*,” G. Li et al. study the fashion retailer’s optimal inventory cycle decision and the corresponding payment timing in a supply chain in which the supplier allows the payment delay. They examine the fashion retailer’s reaction decision and derive the optimal inventory policy for the fashion retailer with the goal of maximizing the total profit. They interestingly show that it is not necessarily optimal for the fashion retailer to select the discount way in inventory planning. They supplement their analytical analysis by numerical examples.

In “*The quota-based compensation plan in fashion retailing industry under asymmetric information*,” M. Yu et al. investigate the compensation plan problem in fashion retailing. They explicitly consider the situation when the supply chain includes a risk-neutral fashion retailer and a risk-neutral salesperson. They formulate the analysis as a two-stage game and they consider the scenario with asymmetric information. In their two-stage game, the fashion retailer provides a menu

of compensation plans to the salesperson in the first stage. The salesperson will then decide which plan to sign with respect to its own market knowledge. Under the asymmetric demand information setting, they consider the case when the fashion retailer is able to observe market information from the salesperson’s reactive decision to the offered compensation plan. In the second stage, they assume that the fashion retailer will make the optimal production plan and the salesperson will determine its own sales effort. Important issues such as adverse selection and moral hazard are considered. They counter-intuitively find that a higher quota level may hurt the fashion retailer but benefit the salespersons.

In “*Coordination of cooperative advertising in a two-period fashion and textiles supply chain*,” Y. He et al. analytically study the optimal cooperative advertising strategies in a fashion supply chain. They consider a supply chain which consists of a manufacturer and a fashion retailer. They explore the problem by developing a two-period cooperative advertising optimization model. They derive and compare the optimal cooperative strategies for the manufacturer and the fashion retailer under different cases. They finally develop a two-way subsidy contract which helps to achieve supply chain coordination.

In “*Dynamic pricing of fashion-like multiproducts with customers’ reference effect and limited memory*,” M. Liu et al. analytically study the dynamic pricing problem in fashion retailing. They consider the case in which consumers possess reference effect and memory window. They develop a new

reference price updating mechanism and derive the optimal dynamic pricing policy. They separate the analysis into different cases. In particular, for the two-product case, they reveal that the steady-state price of a core product will be lower than that of a noncore product under the optimal policy. They further estimate the fashion retailer's loss if he makes a mistake in the reference price effect assumption. They finally illustrate via numerical studies that their proposed model is versatile.

In *"Improving the performance of modular production in the apparel assembly: a mathematical programming approach,"* X. Wang et al. analytically explore the production problems in garment manufacturing. They build formal mathematical models to explore the optimal allocation of the production capacity to different assembly operations in a modular garment production system. They consider the optimization objectives to be the holding cost minimization (for the work in process inventories). They believe that the findings can be used as important references for garment manufacturers to better allocate their production resources in the commonly seen modular production system.

In *"Optimal financing order decisions of a supply chain under the retailer's delayed payment,"* H. Yang et al. investigate a supply chain with the capital-constrained fashion retailer. They consider the situation in which the fashion retailer has two payment choices, namely, the up-front payment (with a high discount price) and the delayed payment. They analytically explore the supply chain game and conduct equilibrium analysis. They find that, in the equilibrium, the delayed payment yields a bigger order quantity compared to the up-front payment scheme. This improves the whole supply chain's profit. They further support their analytical findings by numerical analysis.

In *"An optimization of (Q,r) inventory policy based on health care apparel products with compound Poisson demands,"* A. Pan et al. analytically model an optimal inventory policy for a healthcare apparel centre. They propose a single product continuous review inventory model and develop the optimal inventory policy with the objective of minimizing the expected average cost on an order cycle. They establish the mathematical model and study the structural properties of the problem. A comparison on costs between the optimal solution and the experience-based decision is conducted to illustrate the performance of the proposed optimal policy.

In *"A new business mode for FTs chain in an e-commerce environment,"* motivated by the fact that e-commerce is getting more and more popular in the fashion industry, X. Wang et al. explore an e-commerce mediated business model called "drop-shipping mode." They consider the situation in which both traditional and drop-shipping modes are present (they called it "mix mode"). By establishing a generalized model, they conduct their analytical study and reveal that the mix mode can effectively improve the overall supply chain profit. They also incorporate the fashion seasonality and the short product life into their analysis. They illustrate their findings via numerical examples and they conclude by saying that the mix mode business model is a sound and wise way

for the fashion companies to operate in the presence of e-commerce.

In *"Mechanism design of fashion virtual enterprise under monitoring strategy,"* M. Huang et al. explore the use of a revenue sharing contract to prevent moral hazard in fashion virtual enterprises (FVE). They observe that since the partners' levels of productive effort are not observable by the owner and other partners, serious moral hazard problem arises in FVE. Thus, they analytically study the problem by considering a risk-neutral owner and multiple risk-averse partners. They assume the risk-neutral owner's problem is on finding the optimal monitoring effort and incentive intensity and the risk-averse partners make decisions on their efforts. They develop a principal agent based model and find that implementing proper monitoring strategy can effectively reduce the moral hazard problem. The impacts brought by the partners' risk aversion level are also discussed.

In *"The impact of mobile TradeManager on fashion product sales: from usability perspective,"* Z. Liu et al. study the impacts of m-commerce for fashion companies. Based on an empirical survey with hundreds of MTM users, important factors such as subjective norm, perceived entertainment, system usability, and consumer self-efficacy are found to significantly affect individual's intention to adopt MTM. Further analysis shows an important insight that MTM usability is a joint function of various variables such as mobile device's system performance, the website's design, and the network characteristics.

In *"Supply chain contracts in fashion department stores: coordination and risk analysis,"* B. Shen et al. look into the operational control problems in fashion department stores. They observe that fashion department stores normally trade with their suppliers of national brands with the markdown supply contract whilst developing private labels with some designers under the profit sharing supply contract. Based on this observation, they build a formal analytical model and conduct analysis. They find that there exists a similar relative risk performance but a different absolute risk performance between the two different kinds of suppliers. They also reveal the impact brought by the optimal sales effort on the fashion supply chain. Finally, they show that the fashion supply chain can be coordinated by a sales effort cost sharing mechanism.

In *"Contracting fashion products supply chains when demand is dependent on price and sales effort,"* Y. Wei and L. Xiong study the optimal control in a two-echelon fashion supply chain with the revenue-sharing contract and the wholesale pricing contract. They consider the case when product demand depends on retail selling price and sales effort. They characterize the features of the optimal decisions and explore the corresponding profits. They interestingly find that if the fashion retailer determines the optimal effort investment level, it will be better off by adopting the wholesale price contract. However, if the manufacturer is the leader who determines the optimal effort level, it will prefer the revenue-sharing contract.

Finally, in *"Analysis of product complexity considering disruption cost in fast fashion supply chain,"* S. Sardar and Y. H. Lee explore the fast fashion supply chain management problem. They first argue that supply chain disruption would

happen in a fast fashion supply chain. Second, based on this argument, they develop an analytical model to help determine the supply chain disruption cost. They focus on the level of product complexity as a factor which affects the fast fashion supply chain disruption cost. Important insights and several strategies are proposed to better enhance fast fashion supply chain management with respect to the product complexity.

We believe that this second volume of the special issue follows the success of the first volume in presenting many interesting research studies related to the fashion and textile supply chain systems. The featured papers contribute to the literature with a lot of new insights and they help further advance the scientific supply chain management research for the fashion and textile industry.

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