

Chapter 9

The Impacts of Transshipment on Dual-Channel Coordination: A Fashion Company Case Study in China



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1 Introduction

Fashion market is competitive with a number of various brands and retailers. In the new era of Internet, fashion retailing is not only in the physical stores, but also online channel. This is particularly true in China. According to statistics in 2016, China's online retail sales is 5.16 trillion Yuan (about 0.7 trillion USD) with an increase of 26.2% compared with 2015, and particularly, fashion retail sales online reach to 1.44 trillion Yuan (about 0.2 trillion USD) (National Bureau of Statistics of the People's Republic of China 2017). This data implies that fashion and apparel is one of the important sectors in online retailing with approximately 30% of total online retail sales. In China, the well-known online retailing platforms include Taobao.com, Tmall.com, and jd.com. These platforms help fashion brands to sell in-season and out-of-season products, which seriously affect volume and value of sales offline retailing. Online retailing is challenging due to the low-price strategy and intensive competition, many fashion retailers face difficulties in inventory management between dual-channel coordination so that the profit margins are squeezed. To better balance online and offline channels, both the manufacturer and the retailer should collaborate on inventory distribution and transshipment (Wang 2013). Therefore, transshipment contract is widely adopted by fashion supply chain members to solve channel problems, such as shortages, inventory, and uneven distribution of interests between direct marketing channels (e.g., direct sale store offline and self-support store online) and franchisees.

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© Springer Nature Singapore Pte Ltd. 2019
B. Shen et al. (eds.), *Fashion Supply Chain Management in Asia: Concepts, Models, and Cases*, Springer Series in Fashion Business,
https://doi.org/10.1007/978-981-13-2294-5_9

In the transshipment contract, one particular retailer can transfer his excessive products to other retailers who are in stock shortage at a certain price (Dong and Rudi 2004). Transshipment contract has been widely examined in the extant literature in supply chain management. The transshipment is implemented in traditional retail channel can reduce cost of the whole system and improve service level through risk pooling (Tagaras 1989). It always benefits the O2O supply chain and offers many managerial insights by studying fashion products in market demand (Zhao et al. 2016).

In this paper, in order to further highlight the validity of transshipment contract, we explore the method of dual-channel interest coordination in fashion retail management. This paper is organized as follows. Section 2 reviews the relevant literature on the transshipment strategy in a dual channel. After it, in Sect. 3, we conduct a case study based on the model and analyze the impact of the transshipment contract on order, inventory, shortage, transport capacity, and profit. Finally, the paper concludes the managerial insights for fashion channel members.

2 Literature Review

This paper firstly reviews the application of wholesale price contract which is one of the most common strategies in apparel industry, and then we review the extant literature on the transshipment contract.

The wholesale price contract mainly refers to the price determined by wholesale order quantity that buyers paid for. The research on the wholesale price contract can be traced back to Spengler (1950), and the author finds that the wholesale price contract cannot coordinate supply chain and is difficult to solve the actual benefits distribution between channels. This result has been proved in recent studies (e.g., Qu et al. 2012; Lan and Ji 2016). From retailers' perspective, Qu et al. (2012) conduct the numerical simulation analysis and examine the value of wholesale price contract. Lan and Ji (2016) analyze whether inequity aversion (self-interest is higher or lower than others' interests) makes loss of benefit. They find that the wholesale price contract cannot coordinate the retailer management. In fact, the wholesale price contract is able to achieve coordination under certain conditions (Wang et al., 2015). By setting up the incentive model, the wholesale price contract coordinates supply chain only with certain demand distribution (Yu and Liu 2010).

In order to promote the development of enterprises better and faster, the transshipment strategy has been examined by scholars and adopted in the real business world. Comparing the transshipment strategy with non-transshipment strategy between competitive firms in a dual-channel supply chain, Zhu and Zhao (2011) conclude that transshipment operations are beneficial to the firms' performance. Using a soft drink supply chain as an example, Dong et al. (2012) find that transshipment can better match supply and demand. In order to deal with matching problem, Li and Xu (2010) examine that the supply chain inventory collaboration of short life-cycle products under dual-channel structure. This result is consistent with Zhang (2005),

which compares the adjusted demand with the original demand and proves that transshipment strategy fortifies supply–demand match, especially in the circumstance of the increasing demand uncertainty. With the adoption of vendor managed inventory (VMI) strategy, Chen et al. (2012) demonstrate that transshipment can reduce the mismatch between demand and supply, which is an effective strategy to resist of supply risk and improve whole supply chain profit (Hezarkhani and Kubiak 2010; Zhang 2014).

Transshipment strategy may benefit or hurt the firms' performance (Shao et al. 2010). The demand and capacity variability have a significant effect on the magnitude of coordinating transshipment prices which exists for only a narrow range of problem parameters (Hu et al. 2007). No matter how the transshipment price changes, Zhao and Atkins (2009) further explain that transshipment will not lead to a lower retail price, a higher safety stock and a situation that benefit consumers, only definitely benefit retailers, suppliers, or the entire supply chain.

Therefore, this paper highlights transshipment contract which can alleviate the imbalance of supply and demand without considering the influence of transfer price, through taking fashion brand J as an example of dual-channel operation mode. This study aims to provide inspiration for the enterprise operation management by a comparative analysis, which is different from previous research methods.

3 Case Study: A Chinese Apparel Company Comparative Analysis

3.1 The Background of Company J

J fashion brand was founded in 1994, and its headquarters locates in Hangzhou, China. The brand strives to become the best design platform in China based on the core value concept of “better design, better life.” At present, J brand with a number of sub-brands continues to expand its market coverage and gradually form a good brand image with clear and precise brand positioning, highly recognizable design, and professional fashion collocation.

As of June 30, 2016, there are about 1316 retail stores in China and 12 other countries or regions, consisting of about 432 self-owned stores, about 855 franchise stores and 29 overseas stores; in addition, J brand also extends to its business to online platforms such as Tmall.com, jd.com, Vip.com, WeChat.com. In October 18, 2016, a total of 966 million Hong Kong dollars (about 100 million USD) were raised in Hong Kong IPO prospectus, and 28% of which will be used for the construction and improvement of dual-channel interactive platform. Obviously, it shows that J brand attaches importance to the dual-channel retailing mode.

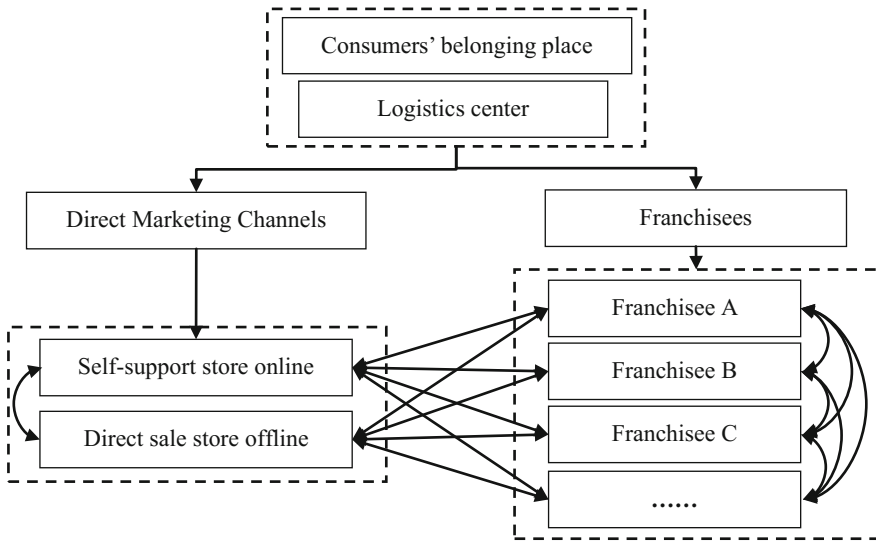


Fig. 1 Implementation process of brand J

3.2 Transshipment Contract Implementation in Company J

J fashion brand formally launched dual-channel project in March 2014 through unified order platform management, intelligent logistics delivery system, and reasonable benefits distribution, to achieve products integration of online and offline channel. The results reveal that dual-channel operation situation of J fashion brand is greatly improved by enterprise investigation. For instance, there are about 200 stores offline involved in supplying for online stores in period of November 11, 2016 and Fig. 1 shows the implementation process of brand J. Turnover of goods is increased by 7%, and volume of sales is raised by 19.7% through information visualization and transparency. Moreover, inventory sharing and transfer products can reduce the occurrence of shortage and inventory backlog, thereby improving overall retailing profit.

3.3 Implementation Evaluation

Understanding the background of company and the reasonable use of transshipment contract in J brand, this section will further highlight the advantages of the transshipment contract based on the implementation conditions of the transshipment contract.

Table 1 Order quantity changes in dual-channel under different contract conditions

| | σ | Wholesale price Contract | | Transshipment contract | |
|---------------------------|----------|--------------------------|-----------------|------------------------|-----------------|
| | | Order quantity | Order increment | Order quantity | Order increment |
| Franchisees | 10 | 2506 | – | 2505 | – |
| | 50 | 2658 | 6.1 | 2627 | 4.9 |
| | 100 | 3132 | 25.0 | 3006 | 20.0 |
| Direct marketing channels | 10 | 5505 | – | 5502 | – |
| | 50 | 5634 | 2.3 | 5558 | 1.0 |
| | 100 | 6037 | 9.7 | 5730 | 4.1 |

3.3.1 Implementation Conditions

The imbalance between supply and demand includes the uncertainty of market demand and the low sharing degree of inventory information between direct marketing channels and franchisees result in imbalance of apparel dual-channel retailing.

Each product sells at the same retail prices within online and offline channels. This is beneficial to maintain good brand image and implement transshipment strategy effectively.

Demand follows uniform distribution. Apparels are short life-cycle products with absolute competitiveness in market, and the demand obeys uniform distribution (Sigma is the standard deviation of demand, and it is limited to 10–100 in this paper).

3.3.2 Contrastive Analysis and Results

Provided that a certain type of J brand’s product has been sold 2500 pieces in Franchise stores and 5500 pieces in direct marketing channel, this study carries out data simulation of order quantity, inventory quantity, shortage quantity, transshipment quantity, and expected profit in a dual channel by using MATLAB software according to the standard deviation of demand changes from 10 to 100. The analysis between the wholesale price contract and transshipment contract is as follows:

Order quantity

When the standard deviation of demand changes from 10 to 100, the order increment of franchisees respectively reaches to about 25 and 20% on the basis of wholesale price contract and transshipment contract, and the direct marketing channel is about 9.7 and 4.1% separately (Table 1). Though the rising degree of franchisees is larger than that of direct marketing channel with the increase of market demand, transshipment contract can effectively reduce the order quantity of direct marketing channel and franchisees, and the reduction rate is about 5%.

Table 2 Inventory and shortage changes in dual-channel under different contract conditions

| | σ | Wholesale price contract | | Transshipment contract | | |
|---------------------------|----------|--------------------------|----------|------------------------|----------|--------------------|
| | | Inventory | Shortage | Inventory | Shortage | Transport capacity |
| Franchisees | 10 | 6 | 1 | 5 | 0 | 0 |
| | 50 | 158 | 17 | 132 | 9 | 3 |
| | 100 | 632 | 67 | 525 | 35 | 13 |
| Direct marketing channels | 10 | 5 | 3 | 2 | 0 | 0 |
| | 50 | 134 | 18 | 53 | 3 | 9 |
| | 100 | 537 | 37 | 211 | 13 | 35 |

Inventory and shortage

Under the condition of wholesale price contract, when the standard deviation of demand is 100, the inventory and shortage quantity of direct marketing channel and franchisees increase correspondingly. Meanwhile, the direct marketing channels' inventory quantity is 537 and the shortage quantity is 37, which is on the low side relative to the franchisees' stock 632 and shortage 67 (Table 2). The inventory and shortage degree of direct marketing channel are lower, as direct sale stores offline and self-support stores online belong to the brand enterprises, who can realize internal sharing and transportation.

Direct marketing channel's and franchisees' inventory and shortage decrease under the transshipment contract. Then, the decrement of direct marketing channel is more significant compared to franchisees' 525 and 35, whose inventory and shortage is respectively 211 and 13. Hence, the implementation of transshipment contract can deal with the overstock and shortage problem effectively.

Transport capacity

The application of transshipment strategy improves the frequency of goods transferred and promotes cooperation in a dual supply chain. When the standard deviation of demand reaches to 100, the number of products can be transferred from direct marketing channel to franchisees about three times more than that franchisees transfer, after both channels completing self-adjustment task (Table 2). It is obvious that the franchisees need more transported capacity to solve the profit loss because of shortage.

Profit

When the standard deviation of demand reaches to 100, the impact on profitability in a dual supply chain is intensified with the market demand enlarging, and the order quantity increasing (Table 3).

There is still a big gap in the profit increment among franchisees (-15.5%) compared to direct marketing channel (2.8%) according to transshipment contract.

Table 3 Profit changes in dual channel under different contract conditions

| | σ | Wholesale price contract | | Transshipment contract | |
|---------------------------|----------|--------------------------|-----------------------|------------------------|-----------------------|
| | | Profit | Profit rate increment | Profit | Profit rate increment |
| Franchisees | 10 | 498,864 | – | 499,217 | – |
| | 50 | 471,603 | –5.5 | 480,416 | –3.8 |
| | 100 | 386,412 | –22.5 | 421,664 | –15.5 |
| Direct marketing channels | 10 | 1,758,527 | – | 2,060,585 | – |
| | 50 | 1,750,151 | –0.5 | 2,074,623 | 0.7 |
| | 100 | 1,738,583 | –1.1 | 2,118,491 | 2.8 |

However, it has been obviously improved compared with the wholesale price contract. Therefore, transshipment contract is feasible to implement, and it can achieve positive promotion and raises the profit margins by 4–7% (Table 3).

3.3.3 Overall Performance Analysis

This subsection is still using MATLAB software to simulate sales data by comparing both of contracts, analyzing order quantity, inventory quantity, shortage quantity, and profit of J brand dual-channel retailing system (Fig. 2). This study finds that transshipment strategy is an important value-added tool for apparel supply chain management, making the overall orders decreased about 5%, amount of inventory, and shortage reduced about 35–45% and 50–85%, respectively, and the overall profit rate increased by nearly 20%. Therefore, transshipment contract is more conducive to achieve optimal allocation of resources and the maximization goal of profit in the dual-channel supply chain than the wholesale price contract which cannot carry out cooperation and coordination.

4 Conclusion, Insights, and Future Research Opportunities

4.1 Conclusion

This paper mainly explores how the transshipment contract affects order quantity, inventory, shortage, and profit based on the dual-channel mode and takes J brand as a case study to evaluate different market demand. The real data was adopted for simulation. The results show that whether direct marketing channel or franchisees can significantly overcome the uncertainty of market demand by means of products transferred. Moreover, the transshipment strategy can reduce order quantity, resist of inventory risk and opportunity loss due to shortage, and improve firms’ profits finally.

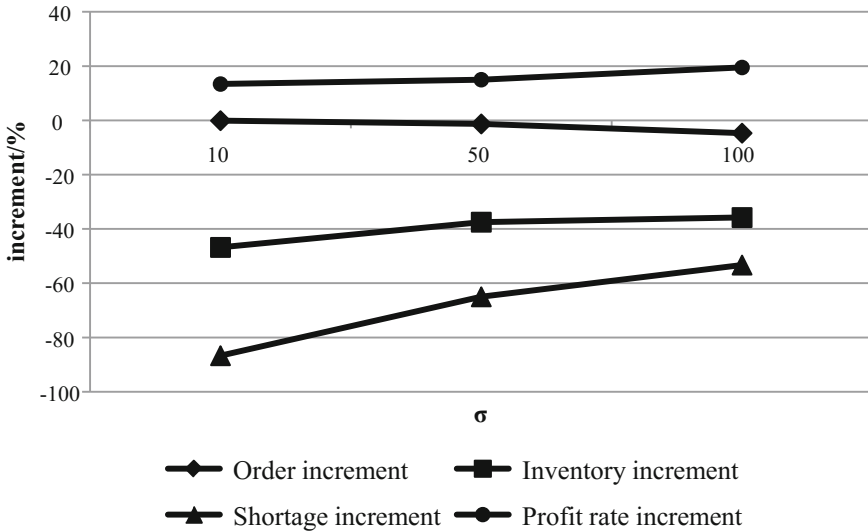


Fig. 2 Overall retail changes compared to the wholesale price contract

4.2 Managerial Insights

In light of current situation of business case and future development direction in the fashion industry, forecasting sales demand timely and reacting to order quickly can significantly affect firms' profit. Coordination and cooperation sharing of information are the key to develop the dual-channel mode. Thus, information construction, mining sales data deeply, and close collaboration are greatly helpful to optimize order and promote mutually beneficial cooperation between the channels. If we can adopt this strategy appropriately, it cannot only strengthen stable development of enterprises, but also achieve the maximum profit of the whole supply chain.

4.3 Future Research Opportunities

The effective transshipment rules between direct marketing channel and franchisees are not formulated in this paper, which just analyzes advantages of transshipment contract comparing with the wholesale price contract. For the future research, it is interesting to investigate how to select appropriate franchisees fairly for direct marketing channel according to types of products, inventory, delivery address, how to make a reasonable transfer price to further balance benefit distribution in dual channel, and how to share inventory information and then reduce the rate of customer loss.

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