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A two period pricing model for new fashion style launching strategy

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ABSTRACT

There is a trend in fashion product industry that firms launch new styles of their products more frequently. To investigate the optimal style launching strategy for a fashion firm, we propose a two-period pricing model for a fashion product firm. The firm sells a style of products in the first period as well as that he may utilize three different strategies in the second period, i.e., (i) the *N-Strategy*: the firm does not launch a new style; (ii) the *S-Strategy*: the firm launches a new style and stops selling the previous one immediately; and (iii) the *D-Strategy*: the firm sells the new and old style simultaneously in the second period. Different from previous literatures, we incorporate the satiation effect of consumers in our model and try to analyze its impacts on the fashion firm's new product launching strategy. Specifically, we assume that a consumer occurs a certain mental book value cost x if he/she has already purchased a previous style of the same brand.

Our main work is to illustrate in what condition and which one of the three strategies mentioned above is the firm's best choice, as well as the firm's best optimal retail prices over the two periods under them. Results show that a fashion firm's optimal launching strategy is mainly determined by the production cost and the consumer's mental book value. In detail, (i) when the consumer's mental book value and/or the production cost are relatively high, N-Strategy is the firm's optimal choice; (ii) when the consumer's mental book value is low and the production cost is high, S-Strategy is the best strategy; and (iii) when both the consumer's mental book value and the production cost are relatively low, the D-Strategy dominates the other two.

1. Introduction

As consumer needs are changing at a much more frequent pace and the women of today are revising their wardrobes more often, most fashion product firms are launching the new styles of their products more frequently than before (Mintel, 2003). Specifically, fast fashion brands such as Zara, H&M, Topshop and Mango have adopted a strategy of constantly renewing their product ranges with fashion-led styles. With such a strategy these firms produce about ten thousand new products a year and make the shelf life of a garment to fall from six months to a couple of weeks (Barnes and Lea-Greenwood, 2006).

Under such a background there is an usual phenomenon that a fashion product firm/brand launches several styles of their products for each season with various characteristics sequently. When a firm launches two preceding styles of similar products, we find some different launching strategies in practice. For instance, some fast fashion firms such as Zara and H&M will stop selling their previous styles almost at the same time when they are launching a new one, some luxury fashion brands such as LV and Coach will sell their obsolete styles in their factory outlets at discount prices, as well as some other brands will not launch new styles but just sell the same products at discount prices. Thus, some interesting research questions related to this issue include the following: (i) whether or under what condition should a firm launch a new style? (ii) when the firm launches the new style, whether should he stop selling the previous style immediately, or sell the previous one with a discount price? and (iii) for each strategy mentioned above, what are the firm's optimal pricing decisions?

To investigate the above questions, in this paper we consider a two-period pricing problem and introduce three launching strategies for fashion products, including the *N-Strategy*, the *S-Strategy* and the *D-Strategy*. In detail, as well as the firm launches a style of certain fashion products in the first period, he does not launch a new style but sells the previous one with a discounted price if he takes an N-Strategy. Under the S-Strategy, the firm stops selling the previous style immediately when he launches the new one in

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the second period. If the firm uses a D-Strategy, he will not only launch a new style in the second period, but also sell the previous one with a discount price simultaneously. With a two-period pricing model we derive out the fashion firm's optimal launching prices and discount rate under the above three launching strategies. Comparing the optimal profits among these three strategies, we obtained the conditions under which the firm should utilize each strategy.

Different from previous literatures, we incorporate the satiation effect of consumers in our model and try to analyze its impacts on the fashion firm's new product launching strategy. Specifically, our discussion of the launching strategies in this paper is based on the consumer's individual purchasing choice. We assume that all consumers are heterogeneous in their valuation v on a product as well as that whether a consumer buys a product or not depends on his/her surplus. The consumer's satiation effect is incorporated by assuming that a consumer occurs a certain mental book value cost x if he/she has already purchased a previous style of the same brand. In fact, the concept of mental book value was firstly introduced by Okada (2001), in which the author states that consumers have a mental book value for an owned good and it will result in psychological costs when they replace a functioning product.

Also, noting that the new launched style has negative impact on the sales of previous ones, we assume that the consumer's valuation on a previous style will reduce to θv $(0 \le \theta \le 1)$ when a new one launches. Myopic consumers will buy the product if and only if their surplus is non-negative. Followed with these assumptions, the market demand, as well as the firm's profit function under each strategy with given retail prices over the two periods is then derived out. Based on these profit functions, we derive out the firm's optimal decisions and then analyze the main factors those affect the firm's strategic choices.

Our results show that a fashion firm's optimal launching strategy is mainly determined by the production cost and the consumer's mental book value. In detail, (i) when the consumer's mental book value and/or the production cost are relatively high, N-Strategy is the firm's optimal choice; (ii) when the consumer's mental book value is low and the production cost is high, S-Strategy is the best strategy; and (iii) when both the consumer's mental book value and the production cost are relatively low, the D-Strategy dominates the other two.

The rest of our paper is arranged as follows. We briefly review the related literatures in Section 2. In Section 3, we formulate the consumer's purchase decision at an individual level. We derive the firm's optimal pricing decisions under the three different strategies in Sections 4, 5 and 6. In Section 7 we compare the optimal profits for the three different strategies to illustrate in which condition should the firm utilize them. Conclusions are in Section 8.

2. Literature review

Our paper is mainly related to three streams of literatures, i.e., (i) fashion industry, (ii) new product launching policy and (iii) two-period pricing models. In what follows, we will provide a brief review on them.

2.1. Research for fashion industry

Fashion industry is usually characterized by short product life cycles, volatile and unpredictable demand, tremendous product variety, long and inflexible supply processes and a complex supply chain (Choi, 2013; Wang et al., 2012). In such an environment, efficient supply chain management is important to the development of the industry and has received much attention from researchers. However, it is noteworthy that previous research on this topic mainly focuses on quick response (Bruce et al., 2004; Cachon and Swinney, 2011; Zhang et al., 2014) and fashion supply chain coordination (Castelli and Brun, 2010; Huang et al., 2011; Xiao and Jin, 2011; Shen et al., 2013; Wang et al., 2012; Li et al., 2014), as well as on sustainable issues (Choi and Chiu, 2012; Nagurney and Yu, 2012). Although how to price and order or produce new product is important to fashion firms, there is limited analytical research related except Ferguson and Koenigsberg (2007), Webster and Weng (2008) and Li et al. (2012). Ferguson and Koenigsberg (2007) present a two-period model to investigate the firm's production and pricing decisions. They examine the effect of competition between the new and old products on firm's decisions with considering that the old product provides lower valuations for the consumers. We differ from their work by incorporating the consumer's mental book value cost. Webster and Weng (2008) and Li et al. (2012) study optimal pricing and ordering policies in a fashion supply chain. Both of them study the problem in a single period setting while we investigate the problem in a two-period setting.

2.2. Research for new product launching policy

Product launch policy has drawn much attention from marketing and operation management research. Previous research has provided insights into issues such as the product introduction timing, pricing, quality and improvement decisions (Dhebar, 1994; Padmanabhan et al., 1997; Morgan et al., 2001; Kornish, 2001; Ofek and Sarvary, 2003; Lim and Tang, 2006). In our paper, we focus on the problems regarding product rollover strategies including whether or under which condition should a firm launch a new style, and whether should the firm stop selling the previous style immediately, or sell the previous one with a discount price when he launches the new style. The most relevant papers to ours are conducted by Levinthal and Purohit (1989), Lim and Tang (2006), Ferguson and Koenigsberg (2007), Arslan et al. (2009); Koca et al. (2010), and Liang et al. (2014). All of these six papers consider analytical comparisons of different product rollover strategies. Levinthal and Purohit (1989) consider both cannibalization and postponement effects with a deterministic demand. Lim and Tang (2006), Ferguson and Koenigsberg (2007), Arslan et al. (2009), and Koca et al. (2010) focus on the cannibalization effect and/or the product introduction and phase-out times. Liang et al. (2014) extend the above five papers by studying the interplay between strategic waiting behavior and different rollover strategies. Notice that most of the six papers mentioned above explore the product launch policy for durable product where updating or replacing the previous product policy could be utilized to encourage the consumer buy the new product, in this paper we specifically focus on fashion product where consumer could buy more than one product with various styles.

2.3. Research of two-period pricing model

Two-period pricing models are a kind of dynamic model which has been adopted by more and more researchers during the past decade (e.g., Fibich et al., 2003; Wang and Li, 2012; He et al., 2012; Zhang et al., 2014). Some authors used two-period models to capture the effects of demand disruptions on pricing decisions where the demand is unknown in the first-period and can be observed in the second period (e.g., Qi et al., 2004; Pan et al., 2009). Some other authors used two-period models to characterize some special effects dynamically. For instance, He et al. (2012) utilized a two-period pricing model with assumption that the cost of the second period is lower than that of the previous period to