Essays on Retail Operations

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Abstract

The retail industry has transformed in the past few years, primarily due to the increasing preference for the online channel. This has led to (*i*) the emergence of online retail platforms, (*ii*) adoption of various omnichannel alternatives, and (*iii*) growth of technologies like the virtual mirror, virtual fitting room, and augmented reality that help consumers decipher the product attributes accurately. Consequently, the multichannel retailers have had to restructure their operational strategies, like channel choice for product sales in the presence of technologies like the virtual mirror, determination of the multichannel assortment, product pricing, and service level, and deciding whether to continue selling through or exit the online marketplace, to name a few. This dissertation examines these strategies in three essays.

The first essay studies the problem of channel choice for product sales and pricing policies of a multichannel retailer under competition from a pure online/e-retailer. Retailers that operate an online channel invest in technologies (called "fit-disclosing technologies") to reduce consumer apprehensions about the description and size of the product and enable the consumer to determine whether the product attributes match/fit their preferences. The effectiveness of these technologies depends on the retailer's investment in the same (either through in-house development or by acquiring from various firms). While pure online retailers have to invest in these technologies to improve accuracy and convey more product information to consumers, multichannel retailers can leverage their physical/brick-and-mortar (BM) stores to convey information if the technology is not very accurate. This results in a trade-off for the multichannel retailer – invest more in technology to improve its accuracy and coerce the consumers for online purchases or drive the product sales through the physical store. In this scenario, it is worthwhile studying (*i*) how the multichannel retailer can utilize the product pricing strategy to influence its channel choices while competing with the pure online retailer when both retailers make investments in fit-disclosing technology and (*ii*) how much should the multichannel retailer invest in fit-disclosing technology to convey product fit details to the consumers adequately. While the literature has studied the effectiveness of various technologies in conveying the product fit, this is the first study that analyzes their impact on the channel choice of the multichannel retailer and how the product pricing strategy influences the preceding choices. Findings suggest that the multichannel retailer may sell the product through any channel contingent on the importance of physically verifying a product. Interestingly, the multichannel retailer can sell the product even with a low investment if consumers are less likely to visit the physical stores for purchase. When the competing retailers endogenize the investment in fit-disclosing technology, the minimum technological investment required by the multichannel retailer to sell the product through the online channel may increase.

The second essay analyzes the product assortment, service level, and pricing decisions of the multichannel retailer when consumers make their purchase decisions contingent on the product matching their

expectations. For product categories that require physical verification of attributes like texture, bulkiness, and so on before making a purchase decision, consumers may prefer store visit, although it may lead to incurring the hassle of store visits. This makes the in-store assortment selection decision of the multichannel retailer more complex. Based on the online product information provided and the hassle experienced by consumers during the store visit, the retailer decides whether to offer those products in the store which are more likely to be sold or the ones which are not as preferred. An increase in sales of either type of product through the store requires keeping more products in the store, which increases the associated costs. In contrast, a small in-store assortment and/or service level may lead to a loss in revenue for the multichannel retailer due to consumers making a purchase decision without physical verification of the product. The loss may be higher if there exists a competing e-retailer in the market selling the same products as the multichannel retailer. The extant literature has studied assortment and service level decisions, assortment decisions under competition for the physical store, and omnichannel assortment. This is the first study to encompass the above three domains. In contrast to the literature, the results show that very popular products (that is, products preferred by most consumers) may not always be present in the store. Under competition from an e-retailer, contingent on the product information both retailers provide online, they may benefit from some products as both retailers may adopt the same pricing strategy under equilibrium. For other products, their strategies may be different, hurting the retailer that sets a high product price.

The third essay studies whether a manufacturer should continue to sell its authentic products on a marketplace platform apart from its own channel or exit the marketplace platform when similar products are being sold on the marketplace by third-party sellers who are unauthorized to sell the manufacturer's products. These third-party sellers are also called gray sellers. The products sold by a gray seller look similar to authentic products, except that their quality may be inferior to authentic products. While selling the product on the marketplace may help the manufacturer drive some consumers towards its own channel, competition with the gray seller may hurt its profits. To combat gray product sales, the manufacturer puts effort during a selling period, which reduces the gray product sales in the consequent period. While this may reduce the gray product sales, the manufacturer incurs costs for the combating effort. Unlike our study, past research on online retail marketplaces and gray sellers has not studied the impact of the gray sellers on the manufacturers' strategies to sell through the marketplaces. In line with intuition, the results show that the manufacturer will charge a lower price in its own channel than its product price in the marketplace. Furthermore, the manufacturer may not always charge a lower price in its own channel vis-à-vis the price of the gray product. It is optimal for the manufacturer to exit the marketplace if the marketplace is very popular among consumers because the consumers may not want to purchase products from another channel. Moreover, it is more beneficial for the manufacturer to combat gray product sales instead of coercing consumers to purchase from its own channel.