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Dynamic Pricing in B2C Based on Online Product Reviews

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Abstract

To study how e-tailors should fix the price to influence word-of-mouth to maximize profits, this paper comes up with a dynamic pricing model based on online product reviews. Customers base consumption decisions on the principle of utility maximization. A lower price can lead to more positive reviews and improve the utility, but it may reduce the profit. The model gives the optimal pricing strategy for the e-tailor in a duopoly market competing with an offline retailor. The analytical results show with the increase of online reviews, the optimal pricing of the e-tailor increases and the growth rate declines.

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Keywords: dynamic pricing;online product review;B2C;game theory

1 Introductions

As the business model of information society, electronic business has influenced human life greatly and is challenging traditional management theory. B2C is quite different from the physical retailing store in shopping model. The differences between B2C and the physical retailing store in product presence, consumer group and service time lead to the distinction in pricing strategy.

Dynamic pricing is the dynamic adjustment of prices to consumers depending upon the value these customers attribute to a product or service[1]. The advent of electronic business reduces trade cost of dynamic pricing. Market uncertainty and fierce competition also motive e-tailors to adopt dynamic pricing to maximize profits.

B2C websites allow consumers to comment on the products they have bought. The Online product review is one of major components of IWOM, and it has significant impact on consumption decision of online shopping[2-3]. The pricing of B2C directly affect perceived utility and comments made after

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purchase, thus determining the sales volume and profit of products. Therefore, considering the impact of online product reviews on pricing is of great importance for e-tailors to reasonably fix its price and increase profits.

2 Literature reviews

Pricing models in posted price mechanisms mainly divide into 3 categories: models based on inventory, models based on customer information and models based on market competition. Among dynamic pricing researches based on inventory, Federgruen and Heching[4] studied optimal pricing and inventory strategies when facing an uncertain demand. They also discussed the quantity rule between the optimal strategy and corresponding profits. Elmaghraby and Keskinocak[5] summarized the literature and practices in dynamic pricing. Among dynamic pricing researches based on customer information, Rusmevichientong [6] depended on customer preference data from Auto Choice Advisor website to fix prices for GE motors based on non-parameter method, and they compared their method with other methods and data resources. Morris [7] studied how to apply customer preference data to airline business, and proposed reserve pricing strategy and seat releasing strategy. Among dynamic pricing researches based on market competition, Bernstein and Federgruen[8] investigated the equilibrium behavior of decentralized supply chains when retailers face demands of which the distribution depends on its own price as well as those of competing retailers. Cao [9] examined the use of leader-follower games, cooperative games, and two person nonzero sum games in internet pricing.

There are only few researches that consider the effect of IWOM on pricing. Xiaoming Yan and Ke Liu[10] studied the optimal production and sales polices for a new product during the lifetime of the product under the influence of word-of-mouth to maximize profits. Xinxin Li and Lorin M Hitt[11] established a model to analyze the impact of online product reviews on the optimal price and consumer welfare, and they used the data collected from digital camera market to verify its theoretical result empirically. Yipeng Liu et al[12] developed an analytical model with software diffusion to examine the optimal pricing strategy for a spreadsheet software product under the effects of both piracy and word-of-mouth through its life cycle.

This paper studies how to take advantage of online product reviews to fix the price reasonably in duopoly market to maximize profits from the perspective of e-retailors.

3 Analytical model

H1: There are only two retailers selling the same product in the market- a pure e-tailor and an offline retailer. The two retailors do not cooperate to fix the price. Both of them can collect all the information they need in pricing and adjust their price quickly. Because of the uncertainty of market, both sides aim at maximizing profits of the present stage.

H2: Customers who scan the website of e-tailor and have the willingness to buy the product believe online product reviews are reliable. They also trust expert comments and product introduction.

H3: The quantity of information customers need when making a consumption decision follows even distribution [0,1]. We assume that the quantity of information that a customer master when collecting information from both online channel and offline channel is 1. The quantity of information refers to the percentage the product information a customer master occupies in all the information a customer can get about the product.

H4: Customers base their decisions whether to buy the product or not on the principle of utility maximization. If customers choose to buy a product from only one channel, they will not buy it if the utility is less than zero and buy it if the utility is equal or greater than zero.

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