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Research for pricing and selling strategies in channel management

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ABSTRACT

Pricing for products needs to consider comprehensively a variety of factors, including product costs, consumer preferences, and competitor reactions. In particular, based on the perspective of channel management, how to conduct a reasonable pricing in traditional enterprise—retailer sales channels directly relates to retails' marketing strategies and sales results. This paper attempts to build a pricing and sales strategy model from the perspective of channel management, of which the main body includes manufacturers, retailers and consumers. Based on Stackelberg's game model, this model adopts backtracking reasoning methods, investigating retailers' optimal behaviors and then using backward induction to find out manufacturers' optimal pricing model. The model focuses on the case of consumers' discrete preferences, and the market equilibrium analysis shows that it is practical for manufacturers and retailers to take bundling selling strategy at the same time under specific parameter values, and this bundling strategy is beneficial for the entire channel to get maximum profit. However, traditional sales channels possess characteristic of inefficiency, so it is unlikely for manufacturers and retailers to take bundling strategy simultaneously.

KEYWORDS

Channel management; Product pricing; Game theory; Bundling.

INTRODUCTION

The management process of enterprises covers varieties of levels including business strategic planning, business production management, business human resource management, business operation management, business financial management and business marketing management. A good run of all levels at the same time is the prerequisite for the enterprise to develop in a healthy way. However, the quality of business marketing management determines business survival; successful marketing will bring capital back to ensure the sustainable development of the capital chain loop and businesses[1]. Today, business marketing theory evolves continuously, from McKinsey 4P theory to 4C theory and there are also other marketing theories as well, but the essence of all the theories is to discuss how to successfully sell products in order to gain profits. Price in each marketing theory like 4P theory is very important. The company's pricing strategy is directly related to marketing results. Therefore, in marketing activities, pricing strategy is a key point. Each business need to price their products and services, and pricing strategy is one of the most important management decisions. Pricing will affect market demand and sales profits which can directly affect the business benefits; meanwhile, it can also affect the planning of other strategies[2-3].

Pricing strategy, in its essence, is closely connected with the market and is the process of scientific and reasonable pricing for a product or a service. During the pricing process, solely depending on sales or financial indicators is not enough; a variety of factors should be comprehensively considered, such as the business strategic planning, operational capability, product costs, consumer preferences, competitor reactions, etc[4]. In particular, based on the perspective of channel management, how to conduct a reasonable pricing in traditional enterprise—retailer sales channels directly relates to retails' marketing strategies and sales results.

RELATED WORK

Based on the perspective of the maximum manufacturers profits, Bikram et.al (2007) assumed the amount of returned merchandise as the random variable in direct selling mode, analyzed refund policies and pricing strategies for reverse logistics[5]. Based on a two-stage pricing methods, Eckalbar (2010) investigated the pricing issue under the circumstances of demand uncertainty. When the demand is uncertain, manufacturers make their own production plan and determine the quantity and price before the products go into the market; when the demand uncertainty has been solved gradually, the manufacturers need to change their pricing strategies correspondingly to pursue the maximum profits[6]. Hemant (2012) called the unresolved demand uncertainty phase as the first stage, and the phase after it as the second stage[7]. George et.al (2009) investigated the pricing scheme in the form of discount contract and analyzed the game model that the scheme built up. The results showed that a simple discount strategy can improve the sales revenue of manufacturers and distributors, and the best discounts response factor can be calculated with the help of the game model to set off the reference value to analyze consumer preferences in depth[8]. To sum up, there are many forms of pricing strategy in the channel supply chain, so making a pricing strategy needs comprehensive consideration of various practical factors, including survey of the channel structure, product cost, and consumer preferences.

THEORY MODEL

It assumes that the manufacturer produces both products X and Y which can be sold separately or be bundled for sale to the retailer. The manufacturer and the retailer in this model are like the leader and the follower in Stackelberg's model. The manufacturer prices X and Y based on their marginal costs plus, and the marginal cost for X and Y is $c_X \in [0,1]$ and $c_Y \in [0,1]$ respectively; and then the retailer again marks up the price based on the manufacturer's price to determine the final market price. When using symmetric costs, $c = c_X = c_Y$ establishes. This model will examine the structure of two channels: one is the vertically integrated structure, namely the integration of manufacturers and retailers and the other one is the discrete structures, which means manufacturers and retailers are independent. Channel structures and sales strategies will form an important impact on marketing results.

In the MD strategy, the manufacturer will introduce the two products to the market at the price of k_X and k_Y respectively while in the MI strategy, the manufacturer will implement bundling strategy, which is to sell the products at a bundled price of k_{XY} based on the total cost $c = c_X + c_Y$. The manufacturer also faces the problem whether to allow the retailer to sell its bundled product separately.

The retailer purchases products from the manufacturer and then sells them to consumers. If the manufacturer does not allow the retailer to break bundled products, the retailer can only implement bundling. In this case, the retailer will mark up the manufacturer's price k_{XY} to determine the market price p_{XY}.

Consumers' reservation price for the same product has heterogeneity which may result from their personality preferences, different consumption habits or purposes for buying one product. The purpose of consumers to purchase a product is utility maximization which determines the gap between the reservation price and the market price. One consumer has different needs towards two different products, so to add up, the market's demand for the two products is also inconsistent. In the model, the different demands of the two products are attributed to different market prices.

Model analysis focuses on the impact that the differences of the structure of distribution channel, the decision of channel members and the distribution of consumers have on the marketing results. For easier analysis, the bundling strategy is applied to two types of consumers: one with discrete preferences and the other one with continuous and uniform distribution of preferences, so this paper can analyze marketing difference of bundling between consumers with two types of willingness to pay.

(a) Consumer analysis

Assuming that the consumers consist of two parts, the proportion of one part of the consumers, who hold a higher reservation price R_H, is θ and the other part of consumers who holds a lower reservation price R_L takes up $1-\theta$. R_H and R_L ($R_H > R_L > 0$) represent two types of reservation price respectively, the parameter θ of different products is independent from each other.

Thus for the two products X and Y, the consumer can be divided into four types: $R_H R_H$、 $R_H R_L$ 、 $R_L R_H$ and $R_L R_L$. In this case, if taking bundling strategy to price the product at $R_H + R_L$, consumers $R_L R_L$ will be out while consumers $R_H R_H$ will get the utility $2R_H - (R_H + R_L)$. Bundling strategy will reduce product heterogeneity, making the demand curve flat. Whether to adopt bundling depends on tradeoff between the revenue of such bundling and the loss of losing consumers $R_L R_L$.

In order not to lose generality, assuming that the marginal cost of the two products is equal and below R_L and the manufacturer implement a consistent pricing to the two products, the analysis of the model can be based on the backward reasoning of Stackelberg's game theory. Under the given decision-making structure of the manufacturer, the retailer has to make the decision first, so it forms the retailer's optimal reaction set to the manufacturer's behaviors; then, the decision problem for the manufacturer lies in how to maximize its interests under the given optimal reaction set of the retailer.

(b) The retailer's reaction in separate channels

The retailer can determine the market price of the products; for instance, it can employ the price of $2R_H$、 $R_H + R_L$ or $2R_L$ in the bundling, or it can adopt price of R_H or R_L when selling the products separately. Under different marketing strategies and pricing, there are different revenues for the retailer.

In terms of the implementation of bundled sales price $2R_H$, the retailer will get a proportion of θ in both two types of consumers and its income will be $2(R_H - k)\theta^2$. The sales result will be the same when employing bundling at the price of $2R_L$ and selling the products separately at the price of R_L because the market price is at the lowest level of the reservation price, and the retailer's revenue will be $2(R_L - k)$. In similar way, the retailer will gain $2(\frac{R_H + R_L}{2} - k)\theta(2-\theta)$ with the implementation of bundling at the price of $R_H + R_L$; the income will be $2(R_H - k)\theta$ when the retailer sells the products

separately at the price of R_H; and if the retailer chooses not to sell, its revenue will be 0. Thus, the retailer's sales strategy and pricing largely depends on the manufacturer's pricing, k and the parameter of consumers' structure, θ.

Integrated channels can be regarded as a special case of separate channels, which means that a single member controls the pricing. In this case, the interests of the retailer and the manufacturer are consistent; the retailer's optimal reaction is the ultimate decision of the manufacturer. Therefore, the above analysis becomes the analysis of the manufacturer's decision process and its behavior depends on the marginal cost of the products and parameters of consumers' structure, θ.

Based on the above analysis, we can find that for the integrated marketing channels, bundling is not always the best choice. This finding is not consistent with the previous research's conclusion that bundling is the best strategy when consumers have continuous preferences and the marginal cost of the products is relatively low. The fundamental reason is that the distribution of the consumers' reservation price is discrete in this model and in this case, the feasibility of bundling strategy depends on the relative size of the two types of consumers and the gap between their reservation prices. Therefore, if the consumer group with high reservation price is larger or their reservation price is much higher than the other type of consumers, the price level should be set at $2R_H$ in order to gain income from consumers $R_H R_H$ and discarding consumers $R_L R_L$ are more favorable. Reversely, if the consumer group with low reservation price is in greater scale or their reservation price is not very different with the other type of consumers, the loss of discarding consumers $R_L R_L$ is too much, so selling the products separately at the price of R_L is the optimal choice.

(c) The manufacturer's decision in separate channels

In separate channels, the retail's reactions can be regarded as constraints for the manufacturer's decision making. Based on the reactions of the retailer, the manufacturer chooses appropriate price and sales strategy to maximize their own profits. In the model, the manufacturer establishes anticipation of the retailer's selling behaviors to seek the highest sales price in the channel.

For example, in order to induce the retailer to sell the two products separately at the price of R_H, the most profitable pricing is $k^* = 2\theta k$ for the manufacturer. Taking into account of the retailer's behavior, the optimal pricing for the manufacturer is $k^* = R_H$. Similarly, when the retailer takes bundling at the price of $R_H + R_L$, the optimal pricing for the manufacturer is $k^* = \frac{(R_H + R_L)(2-\theta) - 2R_H}{2(1-\theta)}$; when the retailer adopts bundling at the price of $2R_L$ or sells the products separately at the price of R_L, the optimal pricing for the manufacturer is $k^* = \frac{2R_L - (R_H + R_L)\theta(2-\theta)}{2(1-\theta)^2}$. Therefore, the manufacturer can compare the revenue with different pricing, and this comparison depends on the value of parameters R_H, R_L and θ.

(d) The equilibrium in separate channels

We can conclude the equilibrium in separate channels through the above analysis of behaviors of consumers, the retailer and the manufacturer. Since the model adopts the backtracking reasoning method and the behaviors depend on values of the parameters, the equilibrium possesses the following characteristics: when the value of (R_H, R_L, θ) is

$(R_L / R_H \le (\theta[(4-\theta)(1-\theta) + \theta^2]) / (1 + (1-\theta)^2)) \bigcap (R_L / R_H \le (2-\theta^2) / (2-\theta)^2)$, the optimal pricing for the manufacturer is R_H and the profit is $2R_H\theta$, the pricing for the retailer is R_H and the profit is 0, the market demands products at a proportion of θ.

In fact, for the retailer, the values condition of (R_H, R_L, θ) to price the bundling products at $R_H + R_L$ is very harsh unless θ is high or the ratio of R_L / R_H is large. The reason is that when R_L / R_H is large, pricing $R_H + R_L$ may attract part of consumers $R_H R_L$ and consumers $R_L R_H$ to offset the loss of

abandoning consumers $R_L R_L$ that bundling brings; and when θ is high, the proportion of consumers $R_L R_L$ is small, so the loss will not be large even if the retailer abandons them. Despite the harsh condition, the bundling is still important. When the value of (R_H, R_L, θ) meets the condition, bundling is still the best choice for the retailer.

To sum up, the market equilibrium has the following situations:

(1) If the reservation prices of the two types of consumers are relatively close and θ of consumers with high reservation price possesses a low proportion, the optimal pricing for the manufacturer is $k^* = \frac{2R_L - (R_H + R_L)\theta(2-\theta)}{2(1-\theta)^2}$. At the same time, the optimal strategy for the retailer is to sell the two products separately at the price of R_L or to adopt bundling at the price $2R_L$, and in this way, the retailer is able to target the entire market with a profit of $(\theta(2-\theta)(R_H - R_L)) / (1-\theta)^2$.

(2) If the gap between the reservation prices of the two types of consumers is relatively large and θ of consumers with high reservation price possesses a high proportion, the manufacturer is better to price the products at $k = R_H$. Then the retailer will choose to sell the products separately at the price of R_H to simply keep the consumers with high reservation price. The total market demand for the product is at a proportion of θ, and the retailer's profit is 0.

(3) If the reservation prices of the two types of consumers are close and θ of consumers with high reservation price possesses a high proportion, the manufacturer will price the products at $k = ((R_H + R_L)(2-\theta) - 2R_H) / 2(1-\theta)$, and the retailer will choose to implement bundling at the price of $R_H + R_L$, so part of consumers holding low reservation price for both products are excluded. The market demands combination products at a proportion of $\theta(2-\theta)$, and the profit for the retailer is $\theta(2-\theta)(R_H - R_L) / (1-\theta)$.

In situation (1), if the manufacturer attempts to take up the entire market, it has to sacrifice part of the profits to the retailer, so the retailer will set an appropriate market price which will not driven out part of consumers holding low reservation price. The reason for the manufacturer's unwillingness to exclude those consumers is that they take up a relatively large proportion. In situation (2), customers with low reservation price are no longer so important because their proportion is small, and thus the manufacturer only focuses on consumers with high reservation price. In situation (3), the reservation prices of the two types of consumers are relatively close, so the manufacturer prefers bundling, increases the bundling price and excludes some of the consumers with low reservation price.

(e) Analysis for pure bundling strategy

In the pure bundling strategy, the retailer are restricted to choose bundling to sell the two products, but the retailer can select a bundling price among $2R_H$、 $R_H + R_L$ and $2R_L$. Although the bundling strategy is guaranteed, but the price that the manufacturer offers to the retailer is limited; otherwise it will affect the market demand. It is worth noting that, for the integrated sales channels, pure bundling strategy will not have any impact because bundling is an internalized feature of the channel structure.

As mentioned earlier, the manufacturer will develop the most profitable strategy based on the retailer's optimal reactions; namely, given the retailer's specific reaction, the manufacturer will seek the highest price. Based on the comparison of profits under a variety of decisions, the manufacturer can choose the best strategy, and of course, this also depends on the different values of the parameters.

In the pure bundling strategy, there are two dimensions in investigation of profits: one is profits for the entire channel, and the other is the manufacturer's profit. The manufacturer expects the profits for the entire channel as high as possible, but of course, it must be based on the prerequisite that its own profits should be protected. When the entire channel implements bundling at the price of $R_H + R_L$, the results can be achieved through separate channels. So, the manufacturer's enforced pure bundling strategy can be realized, but the manufacturer must ensure that the market price will achieve the level of $R_H + R_L$ to gain the maximum profits. The most direct way for the manufacturer is to sell the products to

the retailer at the price of $R_H + R_L$, and then ask the retail to sell the products at the same price in the market just as the case of the integrated channel; however, it is impossible because the retailer will not choose like that. Although the retailer must implement bundling, it can choose a price between $2R_H$ and $R_H + R_L$ to make higher profits. When the manufacturer's pricing is higher than $R_H + R_L$, the retailer will choose a market price of $2R_H$ which is higher than the price corresponding with the maximum profits of the channel, and then the market demand will be less than the manufacturer's optimal level. To ensure that the retailer sells the products at the price of $R_H + R_L$, the manufacturer have to lower the pricing towards the retailer, but in this way, it is impossible for the manufacturer to obtain profits of the entire channel. Therefore, the optimal solution for the integrated channel cannot be achieved in the model, even though the retailer must implement bundling strategy.

In the pure bundling strategy, the market equilibrium can be described as follows:

(1) The situation is consistent with the previous analysis of separate selling. When the proportion of consumers with high reservation price is large or the gap between the reservation prices of the types of consumers is big, it is more beneficial for the retailer to sell the products separately. Reversely, if the proportion of consumers with high reservation price is small or the reservation prices of the types of consumers is close, the retailer tends to implement bundling and the manufacturer's pricing will induce the retailer to price the products at $2R_L$.

(2) It is possible for the manufacturer and the retailer to adopt bundling simultaneously. When given powers to limit the retailer's sales method, the manufacturer will tend to adopt bundling and to set a reasonable price in order to induce the retailer to implement bundling at a reasonable market price. Compared with the situation which allows the retailer to sell the products separately, it is more likely that bundling at the price of $R_H + R_L$ will become the optimal strategy, and the situation is consistent with that in the integrated channel.

CONCLUSION

By building the game model which includes manufacturers, retailers and consumers and combining market equilibrium analysis in case of different values of the parameters, the paper finds that the traditional manufacturer—retailer sales channels possess characteristics of inefficiency which is shown via the low possibility for manufacturers and retailers to take bundling simultaneously. The reason is that to some extent, retailers are unwilling to cooperate with manufacturers for the motive to maximize their own profits. For manufacturers, they have to surrender part of the profits to induce retailers to adopt bundling strategy.

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