

Pinduoduo's Pricing Strategy and Its Development Trend

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Abstract: With the vigorous development of Internet technology, the competition for e-commerce platforms has become more and more fierce, but Pinduoduo has successfully become a dark horse in the e-commerce platform with its unique e-commerce thinking, and quickly occupied a place in the e-commerce platform. Therefore, the reason why Pinduoduo stands out has also become a hot topic for scholars at home and abroad. This project takes Pinduoduo's pricing strategy and brand development trends as the research direction, and further researches and explores the difference between Pinduoduo group buying and traditional group buying. Starting from the Pinduoduo model, we will analyze the characteristics of the model and build a corresponding model. Based on game theory and optimization theory, we will further explore the algorithms and their influence under the Pinduoduo pricing strategy.

Keywords: Group Buying, Pricing Strategy, Game Theory, Brand Development.

1. Introduction

In recent years, China's e-commerce has developed rapidly and has played an important role in economic activities. It has not only created new consumer demand, triggered a new investment boom, opened up new channels for employment and income, and provided new space for mass entrepreneurship and innovation. Among them, Taobao T-mall and jingdong have gradually occupied the e-commerce market. However, Pinduoduo relied on low prices and social group buying forms to highlight the encirclement, break the three-legged dominance situation, and become the second largest e-commerce platform in the market. However, due to many factors such as the low cost of consumer transfer, the low cost of price search in e-commerce, and the competition for market share between market entrants and market entrants 0, consumers are more sensitive to price. Therefore, how merchants conduct scientific pricing has become the key for platforms and merchants to attract more customer orders. In addition, with the rise of live streaming with goods, The live broadcast industry ecosystem has gradually improved. The number of live broadcast e-commerce service companies and practitioners grow rapidly in 2020. As of the end of 2020, There are a total of 8,862 live broadcast e-commerce-related enterprises registered in China, an increase of 360.8% over 2019. The practice of live broadcast by e-commerce company owners. The number of people is also growing. By the end of 2020, the number of anchor practitioners in the industry has reached 1.234 million. The industry quickly moved from The transition from simple flow dividend mining to dividend mining of the entire ecosystem, especially through refined operations and supply chain penetration to achieve new increments. what measures should platforms and merchants take to actively respond to the current situation of live streaming diversion.

The significance of this project is mainly to uncover the mathematical algorithms under the pricing and marketing strategy of Pinduoduo as an emerging C2B e-commerce platform. Under the influence of Pinduoduo, the strategies of several other major e-commerce platforms and the analysis of Pinduoduo's pricing strategy on its brand development and

related suggestions for Pinduoduo's existing problems. Ordinary group purchase pricing strategies are studied by scholars at home and abroad. Among them, Kauffman[2] took the lead in studying the dynamic pricing of online group purchases and the behavior of new consumer participants, and found influencing factors such as the expected benefits of price reduction, the retention price effect, and the group purchase mentality; Zhang[3] et al. Studied the pricing and profit changes of retailers when consumers are positively and negatively affected by the Internet; Fan Lifan[4] et al. Under the static pricing mechanism, based on the Bertrand model, the optimal store prices and group purchase prices of duopoly merchants. From the perspective of consumers, Shiao and Luo [5]discussed the factors that affect consumers' willingness to continue to use online group buying, as well as the degree to which social exchange, trust, and the reciprocity and reputation of manufacturers' creativity affect consumer satisfaction and online group buying willingness. The results show that consumer satisfaction, trust and seller creativity jointly predict the intention of online group buying. Zhao Wenyan[6] et al. Established an optimization model and combined with game theory to obtain the optimal pricing of retailers and the optimal commission of the platform. The above scholars only analyzed from the perspective of ordinary online group buying, and did not analyze from the perspective of Pinduoduo social group buying. Therefore, this project will consider the influence of social factors, starting from the group-building model, analyze the characteristics of the model to build a corresponding model, and analyze how businesses should conduct scientific pricing based on game theory and related optimization theories to achieve the goal of maximizing the interests of the three parties or maximizing profits. In addition, Zhang Qianli [7] discussed the basic situation, marketing model and shortcomings of Pinduoduo, and strategic optimization measures. Yang Zhen [8] introduced the advantages and disadvantages of "virus" marketing on WeChat channels and the adaptability of different products in the magazine. Xiao Biyun [9]Research has found that with the improvement of the economic level, consumers have the possibility of upgrading or downgrading their consumption and Pinduoduo can develop in the direction

of new retail. At the same time, combining the actual situation and existing research results, make bold predictions about the future development trend of Pinduoduo.

2. Problem Description and Model Construction

2.1. Problem Description

In order to increase profits or expand market share, some merchants adopt the form of consolidation to expand their influence, thereby achieving the purpose of increasing profits or expanding market share. Pintuan and traditional purchase methods are similar in form, but their inner nature is very different. For consumers, Pintuan improves consumers' bargaining power and allows consumers to obtain goods at lower prices; for merchants, the low-price strategy can not only stimulate consumer consumption, increase sales, make small profits and quick turnover, but also achieve the purpose of occupying market share; for the platform, it can not only stimulate existing users to consume, but also attract more new users to register for consumption, thereby obtaining more commissions from merchants or using huge traffic to carry out other value-added services. Based on this, this article will start from the Pintuan model, in-depth analysis of the commodity pricing model under the Pintuan model, and analyze how to price scientifically in order to maximize the interests of consumers, merchants and the platform. Pintuan cooperates with the platform to use the platform's traffic to attract customers, increase sales, and obtain profits. The platform charges a certain commission. The platform will publish the price P of the group purchase goods, the group purchase size G , and the group purchase time period T . If consumers want to successfully purchase this product, they must reach the merchant's group purchase size through their own social relationships, such as WeChat, QQ or Weibo, within the specified time period T . Only when the merchant's group purchase size is reached, the merchant will arrange delivery.

2.2. Model Construction

Assuming that the market demand per unit time is $D=a-bp$, where a is the scale of potential demand in the market, which is not directly related to the price. It depends on factors such as the popularity of the goods and the quality of the goods sold in existing physical stores. a_1 is the scale of potential market demand in the group mode; b is the sensitivity coefficient of demand to price, demand will decrease as the price increases, b_1 is the sensitivity coefficient of demand to price in the group mode; p is the cost that consumers need to pay when purchasing the product, including commodity prices, time and energy costs.

In the group-fighting model, consumers are divided into initiators and followers, and initiators will generate communication costs when contacting followers. Assuming that the initiator's communication cost increases as the size of the group purchase increases, assuming that the communication cost coefficient is β , the total cost required by the initiator to purchase this product is $P+\beta(G-1)$. Not all initiators in the group can reach the group purchase size G , assuming that the success rate of the initiator is μ ($0<\mu<1$). The market demand of the initiator is:

$$d_1 = \mu \times ((a_1 - b_1(p + \beta(G-1))) \times T) \quad (1)$$

The market demand of followers is:

$$d_2 = (G-1) \times d_1 \quad (2)$$

The nominal demand of all consumers is:

$$D_1 = d_1 + d_2 = (\mu \times ((a_1 - b_1(p + \beta(G-1))) \times T)) \times G \quad (3)$$

Due to the quality of the goods and the personal reasons of the consumers, there will be repurchases or returns after the goods are sold. It is assumed that the probability of repurchases is λ ($0<\lambda<1$) and the probability of returns is θ ($0<\theta<1$).

The actual demand of the final consumer is:

$$D = D_1 + \lambda D_1 - \theta D_1 \quad (4)$$

The actual profit of the retailer is

$$W = D \times (p - c - c_e) = (1 + \lambda - \theta) D_1 \times (p - c - c_e) \quad (5)$$

Where c is the production cost of the commodity, and c_e is the commission of the e-commerce platform.

When the group buying platform operates the platform, it will generate operating and maintenance costs c_1 . The profit of the group buying platform is the commission received minus the operating and maintenance costs, that is $W_e = (c_e - c_1) \times D$.

In equation (5), the actual profit is biased by the price and the size of the group purchase, and the optimal price and the size of the group purchase are obtained, that is,

$$P^* = \frac{a_1 + b_1\beta + b_1c - b_1\beta G + b_1c_e}{2b_1} \quad (6)$$

$$G^* = \frac{a_1 - b_1p + b_1\beta}{2b_1\beta} \quad (7)$$

Bring P^* and G^* into formula (5) to get the maximum profit from the retailer's group purchase strategy:

$$W^* = \frac{a_1^2\mu - a_1^2 + a_1b_1p - 2a_1b_1\beta + b_1^2p\beta - b_1^2\beta - a_1b_1c + b_1^2cp - b_1^2\beta c + a_1b_1\beta G - b_1^2p\beta G + b_1^2\beta^2G - a_1b_1c_e + b_1^2pc_e - b_1^2\beta c_e - \mu^2b_1^2\beta^2 - \mu^2b_1^2p^2 + 2b_1^2\beta p\mu + 2\mu b_1\beta a_1 - 2\mu b_1\beta a_1 - 2\mu b_1^2\beta p + 2\mu b_1^2\beta^2}{4b_1\beta} \times T \quad (8)$$

3. Example Analysis

Combined with examples, analyze the impact of the initiator's communication cost β and group purchase size G on the optimal decision-making and profit of retailers and group purchase platforms in the group-buying model. Take the parameter values as: $a_1=200$, $b_1=1.2$, $c_1=8$, $c_e=5$, $T=24$.

3.1. The influence of communication cost β and group purchase size G on the optimal decision-making of retailers and platforms.

The initiator's communication cost coefficient is valued between $[0,1)$, and the group purchase size G is valued between $[2,11)$, which results in the profit trend of retailers and group purchase platforms.

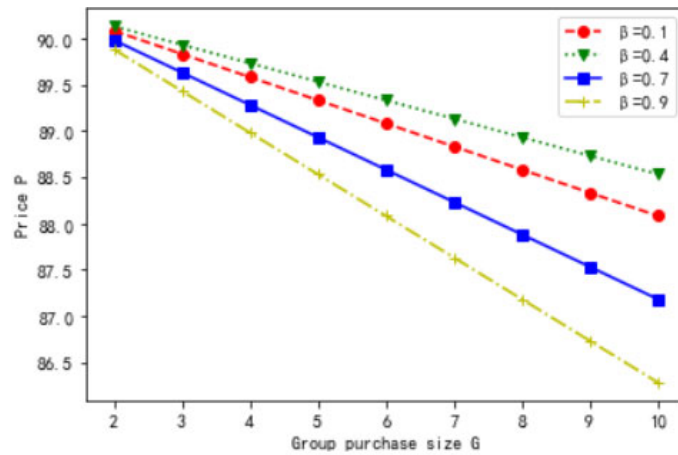


Figure 1. The influence of communication cost factor and group purchase size on the optimal decision-making of retailers

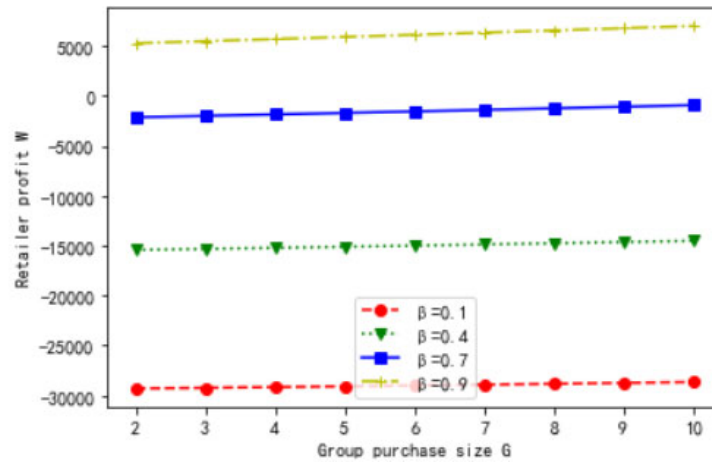


Figure 2. The impact of exchange cost factor and group purchase size on retailer profits

When the group purchase size is between [2,3], the initiator's communication cost has little impact on the commodity price. In addition, with the increase of the group purchase size, the commodity price increases sharply with the increase of the initiator's communication cost. The price difference increases sharply. Combined with Figure 2, when the group purchase size is the same, and the communication cost is 0.1, the retailer's profit always remains at a high level, and it shows a trend of gradually increasing profits as the group purchase size increases. Therefore, if retailers want to maintain high profits, they need to reduce the cost of

commodity exchange.

3.2. The impact of the success rate of group consolidation on the optimal decision-making and profits of retailers and platforms

The group purchase size G is 2, and the communication cost β is 0.5, which shows the profit trend of retailers and group purchase platforms.

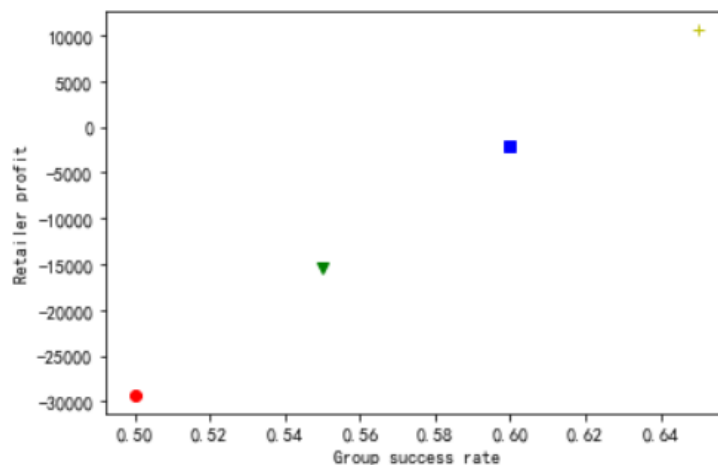


Figure 3. The impact of the success rate of the group on the profit of retailers

As can be seen from Figure3, when the consolidation rate is lower than 0.6, the merchant is in a state of loss. Therefore, if retailers want to increase their profits through group consolidation, they must ensure that the success rate of group consolidation of the goods sold remains at 0.6 and above.

4. Brand Development

4.1. There are distinct levels of commodities to help consumption classification

Judging from the distribution of Pinduoduo users, the proportion of users in third- and fourth-tier cities reached 65%, while users in first-tier cities accounted for only 8%. High-income people are the target group for consumption upgrading, and they are willing to pay to improve their quality of life. However, at present, Pinduoduo mainly sells low-cost goods, which cannot meet the high requirements of consumers in first- and second-tier cities, and the user base is difficult to maintain; for low-income people, compared with quality, the more important thing is price. They are often attracted by attractive products on the platform and spread them to the social circle. Therefore, Pinduoduo needs to have a deeper understanding and analysis of users during user operations, and accurately match user groups based on limited resources to obtain greater profits.

4.2. Pay attention to quality issues and improve user experience

In the past ten years, consumers have seen various marketing methods, which have led to a continuous increase in consumer prices. Nowadays, consumers are more rational when consuming, and attractive prices can no longer be the only standard for consumer consumption, but a higher price/performance ratio of goods, that is, when the price of goods is similar, consumers prefer better-quality goods. Therefore, Pinduoduo must strictly supervise platform sellers, improve platform access rules, conduct irregular quality sampling inspections of the goods sold by sellers, and control the quality of the goods from the source to improve the quality of the goods. In addition to strengthening the supervision of counterfeit and shoddy goods, Pinduoduo should also strengthen the supervision of seller behavior and formulate appropriate regulations and regulatory procedures.

4.3. Improve product attractiveness and optimize product portfolio structure

Everyone's needs are different. When consumers buy goods, they usually give up buying because they can't find the combination of goods they want. In order to achieve greater development, the platform should optimize its product structure, attract more consumers, expand communication channels, reach out to more consumers, enhance communication effectiveness, and allow more consumers to consume. With the development of the times, people's requirements for commodities no longer stay at the level of physiological needs, but pay more attention to psychological needs. The appearance quality of commodities directly affects the visual experience of consumers[10]. Therefore, the platform should vigorously encourage merchants to design product packaging independently, improve the appearance and aesthetics of products, and stimulate consumer

consumption.

4.4. Improve the after-sales service system and brand trustworthiness

In terms of after-sales service, it is necessary to improve the after-sales service rules and comprehensive after-sales service indicators of platform enterprises, actively carry out the training of enterprise customer service specialists, and improve the customer service rating system. Give consumers better after-sales service, narrow the distance with consumers, leave a good impression of the store, and promote consumers' re-consumption. At the same time, the platform should strengthen reputation publicity, reduce the platform's false propaganda about free goods, using the celebrity effect, hiring suitable people to endorse the brand, and designing various marketing topics to win the trust of consumers.

Acknowledgment

We thank the anonymous reviewers and editors for their very constructive comments. The work is supported by key teaching research project of graduate school of Anhui University of Finance and Economics, and Anhui University of Finance and Economics Undergraduate Scientific Research Innovation Fund Project under grant No. XSKY22155.

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