

Research on O2O Model Dynamic Pricing Strategy and Consumer Surplus Relationship Analysis and Promotion Strategy : Take Meituan as an Example

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Abstract. The O2O (Online To Offline) model has become a crucial component of modern commerce. In China, this model dominates key sectors, particularly in food delivery and fresh produce sales within supermarkets, serving as the primary operational approach. This paper takes a deep dive into the relationship between dynamic pricing strategies and consumer surplus within the O2O (Online/Offline) model, with Meituan serving as the primary case study. The O2O model plays a pivotal role in the digital economy, and understanding the interplay between pricing strategies and consumer surplus is essential for optimizing business performance in this sector. The paper offers a comprehensive analysis of O2O dynamic pricing strategies and the key factors that influence them. Furthermore, it identifies critical challenges such as data security, information security, and presents thoughtful recommendations for addressing these concerns. This research not only provides valuable insights for improving the operational efficiency of O2O platform enterprises but also enhances our understanding of how dynamic pricing impacts consumer welfare, making it a significant contribution to the study of digital business strategies.

1 Introduction

1.1 Research background

The O2O model, also known as Online To Offline, represents a business framework that integrates offline commercial opportunities with physical stores online platforms. In the current era of a thriving digital economy, the O2O model has emerged as a pivotal component within the realm of commerce. Within China, the O2O model is the predominant operational approach in sectors such as food delivery and fresh produce in supermarkets [1]. Over recent years, internet expansion has propelled advancements in the O2O business model. As per

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data released by Wang Jiayan in *FORWARD ECONOMIST*, between 2017 and 2021, user numbers within China's O2O industry have steadily risen, surpassing 700 million by December 2021. Projections indicate that by 2027, the market size for O2O will soar to nearly ¥7 trillion - an increase of approximately ¥3 trillion from 2022 [2]. The convenience facilitated by the O2O model has led consumers to opt for online purchases coupled with offline distribution increasingly. Platform-based entities like Meituan and Ele.me, along with companies employing O2O operating models such as Hema and JD.com, are highly favored among Chinese consumers [1].

1.2 Literature review

Feng, Ma & Tan analyzed the influence of WI and AI models, uncertainty on information sharing decisions, and WU and AU models on O2O models. First, when the information is not shared with the manufacturer, the merchant's choice of O2O mode depends on the commission rate. Second, in addition to the commission rate, it also depends on the uncertainty of demand. Thirdly, when manufacturers choose the O2O model, offline retail will also have a negative or positive impact, depending on whether the degree of substitution between online and offline channels can reach a certain level. However, they have not analyzed the influence of other factors, such as service and delivery time, on the choice of the O2O model with the continuous development and improvement of the O2O model and e-commerce platform [3]. Lei & Wu found some advantages, disadvantages, and opportunities of the current O2O model and put forward some optimization suggestions for specific examples based on the leading enterprises of the current O2O model. They used the SWOT method to analyze the advantages of O2O today. The advantages are rich information resources, novel functions, strong interactivity, and convenient and simple operation methods. Successfully let O2O model in the fast information era has achieved great success. Of course, the O2O model also has some disadvantages to the catering service platform, such as the uncontrollability of food delivery time, the disadvantage of ordering mode in advance, and the weak supervision of the restaurants. Although they gave suggestions on optimization measures such as technology, logistics, customer relationship, and marketing functions in the following, they still did not make a comparative analysis of O2O enterprises in other industries and did not actually solve problems such as customer information security [4]. Zhang proposed the supply chain of O2O mode with Meituan as an example, described the process of Meituan completing O2O, analyzed the current situation of O2O in the catering industry and existing problems, and put forward some suggestions. It mainly includes problems in the supply chain of Meituan Takeaway and Meituan group purchase service, such as the insufficient attraction of loyal customers of group purchase of low-price customers, Meituan takeaway account, long delivery time, and low quality of delivery. And put forward three logistics distribution management strategies, increasing the variety of merchants and implementing other improvement measures. However, only analyzed from the direction of the supply chain but did not analyze from the perspective of pricing strategy and consumers [5].

When studying the disadvantages of the application of the O2O model in platform enterprises and its improvement measures, most scholars only focus on the analysis of platform enterprises' hardware, such as logistics supply chain, food ordering mode, and activities to attract consumers, but lack the analysis of the relationship between the dynamic pricing of the platform and the merchants and the consumer surplus value. There is a lack of improvement and promotion of these two priorities in economics. Therefore, this paper will analyze the relationship between dynamic pricing strategy and consumer surplus and how to continuously improve and enhance the platform enterprises under the O2O model in the era of high number development.

1.3 Research framework

First of all, this paper takes Meituan, the largest O2O platform enterprise in China, as an example to analyze the dynamic pricing strategy of O2O platform enterprises and the consumer surplus theory to study the existing problems of the O2O model. Analyzing these problems summarizes the influencing factors of O2O dynamic pricing and the influencing factors of consumer surplus theory. Finally, the corresponding improvement measures and optimization strategies are proposed.

2 Case description

Meituan was founded in 2010. As of June 2022, among the O2O industry platform competition enterprises in China's community, Meituan ranked first, followed by 58.com, Ele. me and other platforms. Among them, Ele. me and other enterprises have formed a competitive pattern. The visibility and resources of these two large enterprises have opened a big gap with small and medium-sized enterprises [2]. Meituan, as one of the largest O2O platforms in China, has a development history and successful experience that provides rich case and data support for O2O model research. Through continuous innovation and business model optimization, Meituan has successfully guided online users to offline merchants and achieved a seamless connection between online and offline. Its dynamic pricing strategy not only improves corporate profits but also significantly affects consumer surplus. Therefore, taking Meituan as an example, it is of great theoretical and practical significance to explore the relationship between dynamic pricing strategy and consumer surplus in the O2O business model. In its 2023 financial report, Meituan pointed out that it had achieved steady growth in various business platforms, with an annual revenue of 276.7 billion yuan, up 26% year on year, and an operating profit of 13.4 billion yuan [6]. At the same time, Meituan increased its investment in research and development, with the annual R&D expenditure in the Chinese consumer market reaching 21.2 billion yuan. At the same time, Meituan keeps up with consumer trends, grasps holiday nodes, and fuels offline consumption. The "taste bud tour" of "moving because of eating and traveling for taste" has become a new trend of current tourism consumption. More and more niche areas have become tourism destinations because of special food, driving the overall growth of local life service consumption. Data from Meituan and Dianping show that during the National Day holiday in 2023, the number of dine-in orders contributed by consumers in other places in Shantou, Chaozhou, Taizhou, and Yangzhou increased by more than 500% compared with 2019, and the number of leisure orders in Shanwei, Chaozhou, Yanji, Liuzhou and Zibo increased by more than 600% [6]. All these are remarkable achievements of the O2O model made by Meituan as a leading enterprise.

Among them, Meituan takeout is regarded as the most important business of Meituan. In recent years, its turnover has been constantly increasing, accounting for more than half of the main business, as shown in Table 1 [7]:

Table 1. Operating revenue of various businesses in Meituan

| Revenue (billion yuan) | Year2018 | Year2019 | Year2020 |
|----------------------------|----------|----------|----------|
| Takeout | 38.1 | 54.8 | 66.2 |
| Travel to shops and hotels | 11.2 | 22.3 | 21.3 |
| Others | 15.8 | 20.4 | 27.3 |
| Total amount | 65.1 | 97.5 | 114.8 |

Through the analysis of some dynamic pricing strategies of Meituan, it can be seen that the role of Meituan in the O2O business model is not only reflected in its extensive

layout but also its accurate grasp of market demand and the application of dynamic pricing strategies. Through big data analysis and artificial intelligence technology, Meituan is able to monitor changes in market demand in real time and flexibly adjust its pricing strategy based on different market environments and user behaviors. This dynamic pricing mechanism not only improves the profits of firms but also affects consumer surplus to a certain extent. Meituan's dynamic pricing strategy is mainly implemented in the following ways: first, it is a time-based pricing strategy, such as adopting different prices during peak and off-peak periods to balance supply and demand; The second is personalized pricing based on user behavior, which provides differentiated prices by analyzing users' consumption habits and ability to pay; The third is the pricing strategy based on market competition. By monitoring the price changes of competitors, it adjusts its pricing strategy in time to maintain market competitiveness. Among them, as an O2O platform enterprise, the most prominent Meituan Takeaway and Meituan Preferred are typical commission platforms. To this end, Meituan also launched a series of sales promotion vouchers in 2023 to promote consumption during the holidays after the pandemic. In 2023, Meituan Flash Sales efficiently connected millions of local retailers and brands with hundreds of millions of consumers, with order volume increasing by more than 40% year on year. Instant retail presents a new trend for the whole category, the whole region, and the whole scene [6]. On the day of "November 11", the number of commodities participating in the activity increased by 123% year on year, covering digital home appliances, beauty care, pet food, department stores and clothing, maternal and child toys, and other core categories, with sales hitting a record high [6]. In terms of instore hotel and travel business, in 2023, offline consumer demand rebounded significantly, Meituan holiday bookings hit a record high and achieved a year-year growth of more than 100% in the annual GTV. Annual transaction users increased by more than 30% and annual active merchants increased by more than 60%, both hitting record highs [6].

3 Analysis on the problem

3.1 Impact factor identified of dynamic pricing strategy and consumer surplus value of O2O enterprises

3.1.1 Factors influencing dynamic pricing and consumer surplus: service efficiency

When studying platform-based O2O enterprises, Ma & Song et al. pointed out that relative service efficiency and contract mode interact with each other to affect the profits of commission platforms and their partners [8]. That is, when the commission platform with differentiated services adopts BBP, its service efficiency is positively correlated with its market share so that the long-term cooperation between the platform and its partners can be achieved more easily. By signing long-term contracts, more customer information can be accurately obtained, and the purpose of accurate advertising can be achieved so as to improve the penetration of customers. At the same time, it also increases the market share, but at the same time, it may lead to a decrease in profits [8]. At the same time, in the survey "Meituan Preferred", satisfaction with fresh delivery after the delivery home is greatly related to the fresh characteristics related to service efficiency, food types, and so on [9]. Meituan can improve service efficiency by increasing delivery speed and improving food types so as to improve the opportunity and advantage of dynamic pricing strategy [8].

3.1.2 Factors affecting dynamic pricing and consumer surplus: the input proportion structure of each factor

The input proportion structure of each factor becomes the key factor affecting pricing. Among them, in the theoretical basis of pricing in the catering industry, consumer surplus refers to the difference between the amount of money consumers are willing to pay and the amount of money they actually pay, that is, the psychological benefits consumers obtain through consumption. Cognitive value pricing refers to the method in which a firm determines the price according to the buyer's cognitive value of the product [10]. Therefore, Meituan, as a platform enterprise in the catering industry with Meitakeout as its main business, needs to increase its market share by increasing the investment ratio of R&D, manufacturing, logistics, brand influence, service content, and so on, so as to make consumers feel more profitable. Through this series of great efforts, the consumer surplus is increased, the psychological benefits of consumers are also improved, and the consumption behavior of consumers is promoted.

3.1.3 The effect of dynamic pricing on consumer surplus

Dynamic pricing strategies within the O2O model, exemplified by Meituan, play a critical role in influencing consumer surplus. Meituan's pricing decisions directly affect the value that consumers derive from its services. Through dynamic price adjustments, Meituan can affect behavior and purchasing decisions. A significant consequence of Meituan's dynamic strategy is its capacity to stimulate demand by offering discounts or adjusting prices based on various factors, including time of day, supply and demand dynamics, and user preferences. This targeted pricing approach can attract additional customers and enhance overall sales volume. However, although dynamic pricing can enhance Meituan's revenue and market share, it may also result in a decrease in surplus [8]. Frequent price increases may lead consumers to perceive a decline in the value they receive, thereby affecting their satisfaction and loyalty to the platform. To mitigate the potential negative effects on consumer surplus, Meituan might consider implementing strategies that enhance the overall consumer experience, such as personalized recommendations, loyalty programs, and improved service quality. Balancing dynamic pricing with initiatives that provide additional value for consumers can help sustain or even enhance consumer surplus in the long term.

3.2 Problem identified analysis

3.2.1 The loopholes and disadvantages of Meituan's profit model

From Pan's research, the main profits of Meituan are as follows, as shown in Figure 1 [11].

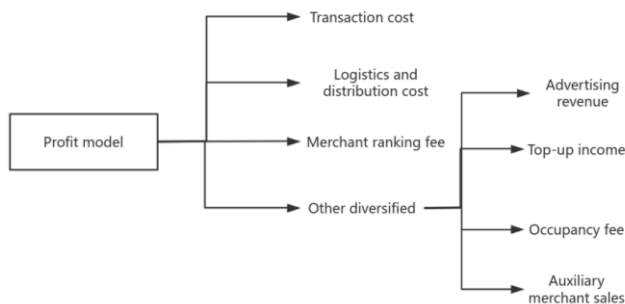


Figure 1. Existing profit models of food delivery platforms [11]

Although Meituan is a leader among O2O platform enterprises, Meituan's single profit model, weak profit point ability, lack of targeted profit objects, lack of innovative profit leverage, and lack of payment system will make Meituan takeaway lose a large part of its competitiveness in today's highly competitive industry environment where all food and beverage brands are developing their own O2O brands. Moreover, Meituan's simple profit model is easy to copy and imitate, just like Ele. me and other platform enterprises competing for the market of Meituan, which has reduced its market share [12].

3.2.2 Integrity problems and information security problems in the O2O mode of Meituan

Meituan uses the O2O model to obtain a large amount of data for analysis, precise advertisement delivery, and preferential push. However, in this process, many serious problems, such as information security and integrity, have also arisen. The O2O business model has great difficulty in ensuring integrity in the field of online transactions. A real survey results show that the commodity information and prices displayed by some merchants on their online platforms are significantly different from the actual situation offline. The difficulty of the O2O network platform and regulatory authorities verifying all the information published by merchants one by one leads to the easy occurrence of false information on the network platform, thereby triggering consumers' questioning of the O2O model [13]. In today's Internet era, information security has become one of the key issues that need to be urgently addressed. The O2O model is highly dependent on the mobile Internet and also inevitably faces the risk of information leakage. Among them, the security of users' personal information and transaction funds is particularly prominent. The O2O network platform is not only likely to be attacked by network hackers but also may face the illegal operations of service providers due to the temptation of huge capital flows.

3.2.3 Barriers to entry are low and the right regulations are lacking

At present, Meituan has a significant problem in that it lacks a set of unified standards for accurate evaluation of merchants' actual operating conditions at a comprehensive level and has not yet established a professional evaluation system. This defect has greatly lowered the threshold for merchants to enter Meituan, thus making it difficult for the overall level of products and services provided by online grouping merchants of Meituan to reach a high level. From the perspective of economics, the main operation strategy of Meituan online group buying is to provide convenient services for consumers while trying to obtain the most favorable price so that consumers can enjoy the largest discount rate. However, this strategy has squeezed the profit space of merchants to a certain extent. According to the theory of marginal cost and marginal revenue, when the operating profit of merchants is constantly decreasing, or even close to or lower than their marginal cost, the enthusiasm of merchants to participate in activities will inevitably be severely hit [14]. In the long run, merchants may reduce costs in order to maintain profits, which directly affects the quality of products and services they provide. For example, low-quality raw materials may be adopted, human input in the service link may be reduced, or the standard and efficiency of the service may be reduced. This situation will not only harm the interests of consumers but also adversely affect the reputation and long-term development of Meituan's platform. Once consumers lose trust in the products and services on the platform, Meituan may face severe challenges, such as user loss and market share decline, which will affect its overall economic benefits and market competitiveness.

4 Suggestions

4.1 Form a new profit model of diversified takeout platforms

The specific implementation form is as follows in Figure 2:

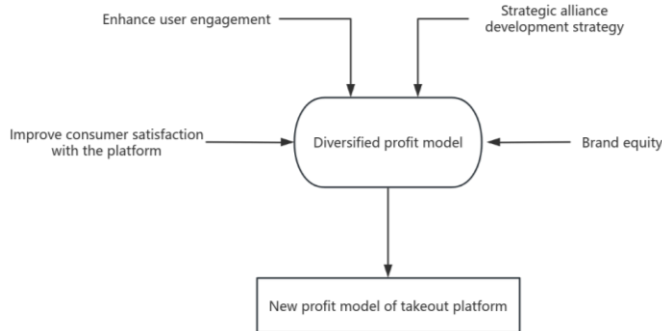


Figure 2. New profit model of food delivery platform [11]

The development of Internet food delivery platforms covers a number of key strategies:

4.1.1 In terms of profit model

Diversified profit model: diversified profit methods are used to not only charge platform service fees but also add ranking fees, merchant advertising fees, consumer recharge fees, and fees for assisting merchants in sales. The platform service fee shall be charged a certain percentage according to regulations. The ranking fee is determined according to the product quality and consumer rating ranking of merchants. The top ones are recommended, while the bottom ones are difficult to get attention, and the ranking changes with the consumer rating. Merchants pay advertising fees to obtain platform promotion to improve their ranking and promote consumers to recharge for investment and operation through preferential treatment. The platform holds events to help merchants sell products and earn sales commissions.

Logistics and distribution + diversified business model: This model obtains profits through diversified operation and logistics distribution. In addition to the above diversified operation, it makes use of the advantages of logistics distribution to serve consumers on the premise of ensuring product quality and developing flash delivery, cross-city transportation, and other services. For example, cross-city transportation can enable food materials from different provinces to reach consumers quickly, and the improved model opens up more profit channels. Logistics and distribution should be regarded as a means of profit to increase income. For example, Home Food Club has set up its own takeout transportation service to provide fresh food materials and convenient services for high-end business people.

4.1.2 In brand building

Platform brand is an important asset, representing image and possibilities. However, price competition has advantages and disadvantages, and brand equity is a better competitive advantage, which can highlight brand value and differentiated services and attract merchants to settle in. Its path includes strengthening reputation management and forming brand reputation, such as training delivery riders and catching competitors' mistakes, strengthening reputation among riders, providing protection, and avoiding excessive supervision. At the

same time, when building a brand, we should pay attention to market positioning and adopt a differentiated brand development strategy.

4.1.3 In terms of enhancing user engagement

First of all, Meituan needs to improve service quality: the company implements a differentiated operation strategy, and the delivery platform service is bilateral, so it needs to strengthen the relationship with merchants and service to consumers, effectively access the order management system when customers place orders, supervise merchants, deal with problems in time and provide compensation. Secondly, the informatization construction of the platform should be strengthened, and the efficiency of receiving orders through the management of docking order rate, order, and customer registration should be improved. Merchants can use the order-receiving machine and request the platform for maintenance and teaching. Third, increase the traffic of takeout platforms: cooperate with Alibaba, Tencent, and other enterprises, allow transactions through WeChat and Alipay, strengthen the promotion and marketing depth, advertise on mobile games or film and television platforms, and pay attention to the differentiated marketing strategy between old customers and new customers. Fourth, to meet consumers' personalized service needs, the business scope of the platform should be expanded to provide diversified product categories and personalized services, such as daily necessities purchases and chef home service. Finally, realize the rapid feedback mechanism of customer complaints: establish the online feedback mechanism, improve the efficiency and speed of customer service to deal with problems, train employees, analyze the causes, and solve the platform operation problems.

4.1.4 In terms of development strategy

In the establishment of a strategic alliance development strategy, modern enterprises pay attention to aggregation and cooperative development, as well as platform competition not only in itself. Among them, the forms of strategic alliance include:

Cooperation with communication software: Software vendors should be promoted to promote the delivery platform to bring traffic, such as the cooperation between Meituan and Tencent, which has been greatly promoted.

Cooperation with third-party logistics companies: to make up for the lack of logistics speed, such as Haidilao and Ele.me cooperation to use hummingbird distribution.

Cooperation with third-party payment systems: it is convenient for users to pay. For example, Ele. me cooperates with Alipay, and Meituan cooperates with WeChat to support multiple payment methods and facilitate delivery tracking.

4.2 Strengthen the construction and control of relevant laws

The occurrence of consumer hijacking by takeout delivery personnel is rooted in the fact that the entry threshold of employees is too low, all kinds of people can enter the business so that willing violators can take advantage of it. Therefore, it is extremely necessary to screen employees in terms of educational background and other aspects. In addition, setting a reasonable threshold for entry supplemented by guidance and education, can more effectively prevent such incidents. At the same time, it provides opportunities for people with bad backgrounds to turn over a new life. Therefore, the establishment of special training institutions to train food delivery personnel should become one of the future development directions of the takeaway O2O industry [15].

4.3 Strengthen the examination of cooperative merchants and tighten access standards

4.3.1 *Strict merchant access mechanism*

The platform should establish a set of comprehensive and rigorous merchant entry audit standards. Businesses are required to provide detailed true, and valid business licenses, health licenses, health certificates of employees, and other relevant documents. At the same time, professional personnel are arranged to conduct field visits to evaluate whether the business premises, equipment, facilities, sanitary conditions, etc., meet relevant standards. In addition, the past business records and credit status of merchants should be examined to ensure that merchants have legal and compliant business conditions and a good health environment, as well as to control the quality of merchants from the source [11].

4.3.2 *Strengthen daily supervision*

Through the combination of big data technology and manual spot checks, an all-round and multi-level regular monitoring system will be built. Big data is used to analyze merchants' sales data, user evaluation, and other information and select merchants that may have problems with focus. At the same time, professional supervision personnel are regularly organized to conduct spot checks on the ground, and strict inspections are carried out on the food production process, raw material procurement channels, storage conditions, and other merchant links. For the illegal merchants found, strict punishment measures will be taken according to the degree of violation, such as suspending business for rectification, imposing corresponding fines, and even giving permanent offline punishment to the merchants who have serious circumstances and do not change repeatedly, so as to play a warning role.

4.3.3 *Join consumer supervision*

Adding consumer supervision is one of the better ways to enhance consumers' trust in the platform because product quality problems will affect the platform image and consumers' consumption intention. First of all, Meituan can conduct regular or irregular surveys on customer satisfaction and give warnings to merchants with dissatisfied customers to encourage them to achieve customer satisfaction. Secondly, it can also produce some public results such as rankings and lists through the integration of a large amount of data according to customers' evaluations, which can also solve customers' concerns and tangled problems.

5 Conclusion

5.1 Key findings

Meituan's dynamic pricing strategy is influenced by factors such as service efficiency and the input proportion structure of each factor. The identified problems include a single profit model, integrity and information security issues, low entry barriers, and lack of regulation. To address these issues, suggestions include forming a new profit model, strengthening legal construction, and tightening merchant access standards.

5.2 Research significance

This study contributes to the development of the O2O industry and improvement of Meituan's competitiveness. Addressing the issues related to consumer surplus and information security it can lead to better consumer experiences and more efficient market operations. It also provides insights for other platform enterprises to optimize their strategies and enhance their performance.

5.3 Limitations

First of all, the research mainly takes Meituan as an example, which may not fully represent the situation of the entire O2O industry and the universality of the research results may be limited. Secondly, this paper mainly uses secondary data, which lacks primary data, which may lead to the lack of depth and accurate research results. Finally, the research direction of this paper is single. Although some suggestions have been put forward for Meituan's existing problems, such as profit model loopholes, integrity and information security issues, low entry threshold, and lack of supervision, the specific implementation effect and feasibility of these suggestions may need to be further explored. In this paper, the analysis of the relationship between dynamic pricing strategy and consumer surplus in the O2O business model can be further studied from more perspectives, such as the impact of consumer psychology, market competition, and other factors on this relationship.

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