

The research of the impact on consumer perceived value of postponement strategy —— Based on multiple linear regression analysis

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Abstract. With the continuous development of e-commerce, how to improve consumer stickiness has become the focus of e-commerce platforms. Increasing consumer satisfaction is one of the important ways to increase consumer stickiness. In recent years, with the development of the logistics industry, postponement has gradually become a hot spot for scholars. By using the postponement strategy that can solve the "Bullwhip effect" effectively, further consumer perception could be improved. However, some scholars believe that the postponement strategy improves consumer perception as well as reduces consumer satisfaction. Therefore, this paper uses questionnaire survey to collect data, and multiple regression models are used to analyze the causal relationship between delay strategy, like logistics delay strategy, design delay strategy, payment delay strategy, and consumer perception. According to the results of multiple regression analysis, it is found that different delay strategies have different impacts on consumers' perception, and the rational use of delay strategies can help increase consumers' perceived benefits and reduce consumers' perceived losses, which results in improving consumers' satisfaction.

Keywords: postponement strategy; CODP; customer satisfaction; customer perception; e-commerce

1. Introduction

Postponement/delay strategy plays an important role in the e-commerce industry. Postponement refers to delaying some activities in the value chain until the uncertainty of customer demand is reduced to a certain level. Friedman[1]described "postponement" as suppliers and manufacturers can transfer risks to buyers and postpone value-added investments or services in products until they receive consumer orders. Postponement enables firms to maximize possible benefits, reduce the cost of the marketing system and possible risks. The strategy is suitable for short life cycle products with rapid depreciation and great demand uncertainty. According to the position of client order separation point (CODP) in the value chain, postponement can be divided into product design postponement, procurement postponement, production postponement, logistics postponement, form postponement strategy, etc. The deep cooperation between Dell and its suppliers is an example of procurement postponement. Dell, as a manufacturer, due to the rapid replacement of computers, is required to reduce the inventory level of products and spare parts as much as possible, to reduce the depreciation risk of obsolete inventory. Dell's parts are stored in the Supplier Logistics Centre (SLC). SLC is a buffer for the supply of Dell parts, which is usually located near Dell's factory, and the parts are replenished by the supplier. After receiving

the online order, the factory immediately carries on the assembly production according to the customer's request. At the same time, Dell shares demand information with suppliers, and suppliers will supply SLC with spare parts in time. The application of purchase postponement strategy enables Dell to reduce the inventory cost of parts. Another example is that Amazon applies "virtual inventory" to implement postponement strategy. Namely, Amazon doesn't own the physical inventory and only shows the information of products to end-customers, while the physical inventory is controlled by the supplier. After receiving the order, it will be shipped directly from the supplier to end-customers. Amazon could reap great benefits and mitigate inventory risks via adopting "virtual inventory", to meet the challenges caused by products with rapid depreciation and strong fluctuations in demand.

Previous studies have claimed that postponement strategy may have a positive impact on consumer satisfaction for e-commerce firms. It lies in the fact that postponement enables retailers to meet the customized and diversified needs of the individual consumer as well as improve consumer service level. For example, most e-commerce companies in China, similarly Jindong, Taobao adopt the postponement strategy for delivery. After receiving client orders, they assemble and transport standard components as required, which saves operating costs while increasing product sales. However, the possible negative impact of applying the postponement strategy on customer satisfaction in e-commerce retailing remains to be explored. First, when implementing postponement strategy, manufacturing and production activities need to be moved after the order is received. During the period between placing an order and receiving the product, consumers need to pay great waiting costs, especially for time-sensitive customers, who may cause a decrease in satisfaction. Second, the postponement strategy may increase the purchasing risk for consumers. Since it is not "what you see is what you get", the quality of the products received by customers may not meet expectations. Therefore, exploring the relationship between postponement strategy on customer satisfaction in e-commerce retailing is essential and interesting.

The objective of the study is to determine whether the postponement strategy can improve consumer satisfaction in e-commerce retailing. On the one hand, the findings are expected to provide reference value for e-commerce firms from the consumer's point of view for the future development and marketing of innovative products and functional products. On the other hand, it could provide new sights and suggestions for the development of postponement strategy in the field of e-commerce.

The rest of the study is organized as follows. The second part respectively introduces the literature review of postponement strategy and consumer perception. The third part introduces the hypothesis and the basic situation of the questionnaire survey, and the fourth part analyses the results of the empirical analysis. Finally, the main findings and development suggestions are discussed.

2. Literature review

2.1 Literature Review of postponement strategy

In 1950, Alderson[2] first introduced the concept of postponement in his literature. Anderson divided it into three ways: form, identity, and location. He described postponement as an

analytical tool which is the most effective way to determine the delivery of products to the end consumer. Postponement arranges the production sequence in the most effective order, and each step was postponed to the latest feasible point in the sequence. The efficiency of the marketing system can be improved by postponement the differentiation of products. For example, postponement moves the product differentiation closer to the clear demand signal, saving the cost input related to uncertainty and the actual moving cost of goods. Later scholars extended the concept of postponement. Zinn & Bowersox[3] divides postponement into five types: labeling, packaging, assembly, manufacturing, and time. Many scholars emphasize the location of postponed activities in the supply chain, and then add the concept of location postponement. Postponement is initially applied to distribution channels, that is, the forward movement postponement of inventory. Later scholars expanded the concept of postponement. Bucklin not only proposed that postponement is the supplier transferring the risk to the buyer, but also extended the concept of postponement to the postponement-speculation principle. With the development of e-commerce, many scholars have begun to pay attention to the postponement strategy of the e-commerce industry. In the face of the changes of customers' demand for availability and variety in the e-commerce industry, the demand for "adapting to different consumer needs" is increasing. At the same time, intense market competition leads to the increase of market volatility and liquidity. In such a market environment, retailers have more tendency to use postponement strategies. The research of Hamid(2015) provides an insight into postponement, and he believed that the application of postponement should not be limited to the point of purchase. The supply chain of sales services, software and upgrade services can all extend the implementation postponement. Su and Chuang [4] argued that postponement is a natural choice for companies to make profits. They believed that postponement was a positive help to the supply chain. Because postponement makes the product generic until the demand is realized, postponement is also an aid in marketing, manufacturing, and logistics. Finally, when postponement is combined with mass customization may reduce the inventory risk of forecasting demand, improve the availability of products, and shorten the waiting time.

At present, most of the research on postponement oriented to enterprises, aiming at improving the marketing efficiency and profitability of enterprises, and evaluating the links and locations where postponement may occur, have not discussed whether postponement has an impact on consumer satisfaction from the perspective of consumers. In an ideal situation, enterprises need to receive the demand signal before they can trigger the cycle of design manufacturing transportation. However, when part of the production and manufacturing process is postponed receiving the demand signal, the implementation of postponement must bear certain risks. After receiving the demand signal, there will be a game between customers and retailers. Enterprises must bear the risk of uncertain demand. Meanwhile, customers can't guarantee that the products they receive are the same as the exhibits. It is necessary to explore whether the postponement strategy has an impact on customer satisfaction.

2.2 Customers perceived value in the e-commerce industry

Since 2010, the development of e-commerce model has gradually become an essential marketing platform for enterprises to enhance their competitiveness with the continuous improvement of science and technology. In the context of increasingly fierce market competition, Customer Perceived Value (CPV) is highly concerned by academics and e-commerce. Creating and providing good perceived value for customers has become a meaningful indicator for enterprises

to gain competitive advantage. Zeithaml[5] proposed that customer perceived value is lower price payment and more profit acquisition, emphasizing the trade-off between the price paid and the benefits received. This "comparison of perceived benefits and perceived given" view is the universally accepted conceptual basis for customer perceived value. Monroe[6] defined CPV as the ratio between perceived gains and perceived losses. The customer's perceived value comes from the customer's subjective judgment and is affected by the situation and preferences. The product or service provider cannot decide and control it. In the process of value evaluation, customers mainly weigh the perceived gains just as quality, benefit, and utility, of which the product or service itself and the perceived gains and losses similarly total cost, including monetary and non-monetary expenditures. This is the core of customer perceived value.

The constituent dimensions of customer perceived value have not formed a unified standard in academic, and could be roughly divided into three categories, "the theory of perceived benefits and sacrifices", "the theory of multiple elements" and the "theory of comprehensive evaluation". The "benefits and sacrifices Theory" believed that customer perceived value is the overall evaluation of product utility based on the perception of benefits and losses[5] Here, perceived gains refer to the physical attributes, service attributes, and available technical support of the product in the purchase and use of the product; perceived losses include all costs faced by the purchaser during purchase, such as purchase price and acquisition cost, transportation, installation, ordering, maintenance, and repair, as well as the energy and time spent in maintaining the relationship with the supplier, etc.[2]. The "multi-factor theory" proposes that it is too simplistic to consider customer perceived value as a trade-off between quality and price[7]. In fact, the value provided by any product or service includes functional value and social value. Value, emotional value, cognitive value, and situational value[7]. The "comprehensive evaluation theory" believes that perceived value is the customer's perceived preference and evaluation of certain attributes, attribute performance, and product use results that help the achievement of their goals and intentions in specific situations[8].

Existing research has not expanded the scenarios of consumer perception value in the e-commerce industry. This article studies the impact of e-commerce's postponement strategies on consumer perception of value, expands the application scenarios of consumer satisfaction research, and provides scholars and entrepreneurs new perspectives and insights.

The most accepted classification of postponement strategies is divided into time postponement, location postponement and forming postponement and postponement strategy are a combination of these three types of postponement.

3. Methodology

3.1 Hypothesis proposed

Postponement strategy can not only improve consumer perception, to explain more clearly, it will generate consumer perception benefits; Except that, it may also reduce consumer perception, in another word, produce consumer perception sacrifices. Therefore, this study analyses whether the use of postponement strategies can improve consumer satisfaction.

Classified according to the position of the delayed activities in the value chain, delays can be divided into product development delays, procurement delays, production delays, and logistics

delays. Therefore, the postponement strategy can bring consumer perceived benefits in product production, design, logistics, packaging, payment, etc., and then affect consumer satisfaction. For example, using a postponement strategy in design to allow customers to participate in product design can closely meet customer needs and create customized products; adding customized elements when placing orders can increase customer participation and improve customer satisfaction; In terms of logistics, use logistics delays to set up strategic reserve warehouses across the country to shorten the transportation distance between products and customers, reduce logistics and transportation time, so that customers can receive products more quickly, thereby improving consumer satisfaction. Using the postponement strategy in the above aspects can make consumers feel the perceived benefits, so it can improve consumer satisfaction. Benefits should be analyzed around the measurement indicators proposed next.

Based on the above discussion, hypothesis H1 is proposed:

H1: the consumer's perceived benefit generated using postponement strategy can improve consumer satisfaction

Although the use of a postponement strategy can improve consumer satisfaction to a certain extent, there are also some shortcomings in the postponement strategy, which makes it possible to increase consumer satisfaction while also causing consumer perception losses, thereby reducing consumer satisfaction. For example, in terms of design, using a postponement strategy to allow customers to participate in product design, and adding DIY design when placing an order, although it can increase the customer's sense of participation, it will also reduce the merchant's delivery speed, thereby increasing consumers' waiting time, which brings about loss of consumer perception, which in turn will reduce consumer satisfaction. Similarly, in terms of logistics, using logistics delays and setting up warehouses across the country can reduce logistics and transportation time, so that customers can receive products more quickly, but at the same time, it also increases consumers' impulsive consumption and brings consumption. Consumers perceive loss, which in turn will reduce consumer satisfaction.

Based on the above discussion, hypothesis H2 is proposed:

H2: the consumer's perceived loss caused by the use of postponement strategy will reduce consumer satisfaction

Through this research, the consumer satisfaction measurement index system is constructed at different stages of the supply chain through postponement strategy. On the one hand, the measurement index is used to measure the consumer's perceived benefit and the other is used to measure the consumer's perceived loss. Collect consumer data through questionnaire surveys. This questionnaire sets the number of respondents as 500 and collects the basic information of the respondents before starting the specific questions. This information includes the interviewee's gender, age, monthly income, and occupation. The questions are mainly divided into two types of items: perceived benefit and perceived sacrifice. All questions are answered on a five-point scale; the specific information of the questionnaire is as follows.

3.2 Basic situation of the questionnaire

Based on previous studies on consumer perception and postponement strategies, combined with the specific research content and research context of this research, the following questionnaire was designed. The questionnaire is divided into 3 parts. The first part is the basic information of

the interviewee, and the second part is the positive question items for measuring consumer satisfaction, a total of 7 items. The third part is the negative items for measuring consumer satisfaction, a total of 8 items. This research will use the "Questionnaire Star" for questionnaire distribution. The effective sample size and item items must reach a ratio of at least 5:1. In this study, a total of 300 questionnaires were issued and 153 questionnaires were returned. The recovery rate was 51%, which exceeded the minimum number required for the sample.

It can be seen from the results of the questionnaire that almost half of the interviewees are the people with the most aged 26-30 years old, indicating that the younger generation in this age group are more accustomed to online shopping than offline shopping. Secondly, the questionnaire also shows that people with an income level of 5,000-8,000 yuan are more inclined to shop online, accounting for 26.14% of the total number of respondents. People with lower incomes may have just solved the problem of food and clothing and don't have too much money for non-essential goods. Consumers with higher incomes may prefer offline shopping. Finally, the industry of the people who accepted the questionnaire survey involves various fields. Among them, school students and R&D personnel accounted for the largest proportion, accounting for 13.07% and 12.42% of the total number respectively. Overall, these results indicate that the collected samples are highly random and meet the scientific requirements of the questionnaire survey.

4. Analysis

4.1 Descriptive statistics

As can be seen from the questionnaire in appendix, the overall satisfaction with online shopping of respondents is averaged at 2.88, indicating that, the respondents are relatively satisfied with the services of e-commerce; the items in the second part are averaged at 3.9, which shows that the deferred strategy can indeed improve consumer satisfaction; the items in the third part are divided into 2.14, indicating that the implementation of the deferred strategy may also lead to the possibility of reducing consumer satisfaction.

4.2 Principal Component Analysis

As show in table 1 to 3.

Table 1. KMO and Bartlett's Test

KMO Sampling Appropriateness Quantity		0.961
Bartlett Sphericity Test	Approximate chi-square	1864.322
	Degree of freedom	105
	Significance	0.000

Table 2. Summary of the model

R	R ²	R ² (Adjusted)	Standard Estimate Error	Durbin-Watson
0.5	0.28	0.197	0.654	1.639

Table 3. Total variance explained

	Total	Percentage of variance %	Accumulation %	Initial Common Factor Variance		Total	Percentage of variance %	Accumulation %	Initial Common Factor Variance
1	9.728	64.854	64.854	1.323	9	0.32	2.119	90.535	1.269
2	0.863	5.751	70.605	1.3	10	0.31	2.035	92.569	1.281
3	0.6	4.001	74.606	1.199	11	0.27	1.797	94.367	1.563
4	0.517	3.446	78.053	1.242	12	0.26	1.73	96.097	1.292
5	0.45	2.998	81.051	1.217	13	0.22	1.431	97.529	1.336
6	0.397	2.646	83.697	1.361	14	0.2	1.343	98.871	1.423
7	0.369	2.458	86.154	1.184	15	0.17	1.129	100	1.405
8	0.339	2.261	88.415	1.359					
Accumulation 64.85%									

Before performing factor analysis, first determine whether the research sample is suitable for factor analysis, that is, perform KMO (Kaiser-Meyer-Olkin Measure of Sampling Adequacy) analysis and Bartlett's sphere test on the research sample. The closer the KMO value is to 1, the more suitable the variable is for factor analysis. When the KMO value is less than 0.5, the variable is not suitable for factor analysis. Bartlett's sphere test must be significant at the 0.000 level, that is, reject the null hypothesis. The appropriate test results of factor analysis with SPSS 19.0 software are shown in table2. It can be seen from table2 that the KMO value is 0.961, and the result of Bartlett's sphere test is $P=0.000 < 0.05$, indicating that at the level of $\alpha=0.05$, the correlation matrix of the selected measurement index is not the unit matrix. That is, the selected measurement index is between. There is a problem of excessive correlation, which is suitable for factor analysis.

Under normal circumstances, for the results of principal component analysis, first, the characteristic value of each factor must be greater than critical value 1. Second, the cumulative explanatory variation of the selected factor must be greater than 60%; in addition, the factor load of each measurement index needs to be greater than or equal to 0.4. The results of the principal component analysis are shown in table3. The characteristic value of each factor is greater than 1, and the cumulative explanatory variation of the 15 factors is 64.85%, which is greater than the critical value of 60%. It shows that the items designed in this article have structural validity.

4.3 Multiple regression analysis

As show in table 4.

Table 4. ANOVA & VIF of Each Item

Model 1	Sum of Square	Degree of Freedom	Mean Square	F	Sig.
Regression	22.431	15	1.495	3.489	.000
Residual	58.718	137	.429		
Total	81.150	152			
Item No.	7	8	9	10	11
VIF	2.724	3.119	2.582	2.843	2.222
Item No.	12	13	14	15	16
VIF	3.044	3.508	3.286	2.830	3.221
Item No.	17	18	19	20	21
VIF	2.978	3.309	3.385	2.968	2.760

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5. Conclusion

Through the methodology and analysis of the results, the following conclusions and recommendations can be drawn. First, the consumer's perceived benefit generated by the postponement strategy can improve consumer satisfaction; at the same time, the consumer's perceived loss caused by the postponement strategy will also reduce consumer satisfaction.

Secondly, the following problems can be seen from the empirical analysis results. The data analysis of item 15 shows that consumers value whether the actual object matches the description. In order to improve consumer satisfaction with the product, merchants should focus on improving product quality and lowering the cost of raw materials; or increasing the heterogeneity of products to enhance product competitiveness.

Not only that, the data analysis results of item 14 also show that too long receiving time will greatly reduce consumer satisfaction. Therefore, businesses must increase the speed of response because the speed of manufacturing in China reduces the patience of consumers to wait, and longer production time will lose customers. How consumers respond quickly after completing their needs, such as modular production, gives consumers freedom and restrictions, and only needs to select modules for combination, thereby improving the response speed of the supply chain.

However, the data analysis results of item 20 show that the stimulating consumer behaviour of merchants does not improve satisfaction, such as large-scale festival promotions and instalment interest-free preferential policies. Although consumers spend more money, they reduce satisfaction. As far as payment methods are concerned, if merchants consider consumers, they should raise their corporate social responsibility awareness and display some rational

consumption slogans on the merchandise display interface instead of unrestrainedly promoting consumer behavior.

Finally, item 13 reflects that online payment is an important factor in improving consumer satisfaction. Online payment is also a necessary condition for the development of online shopping. Merchants should continue to maintain or continue to open the boundaries of payment software, and e-commerce platforms should also be improved. The stability and success rate of payment methods.

Appendix

Part 1. Users Basic Information Statistics

1. Your gender: [single-choice question]

Male/Female

2. Your age group: [single-choice question]

Under 18/18~25/26~30/31~40/41~50/51~60/ Over 60

3. Your monthly income level [single-choice question]

Less than 3000 RMB/3000 RMB-5000 RMB/5000-8000 RMB

8000-10000 RMB/More than 10000 RMB

4. Your current occupation [single-choice question]

Full-time Student /Production Staff/Salesperson/Marketing/Public Relations Staff/Customer service/Logistics staff/Human Resource/ Finance/ Civilian/ R&D personnel/ Manager/ Teacher

Consultant/ Professionals (such as accountants, lawyers, architects, medical staff, journalists, etc.)/ Other occupations

5. Frequency of your online shopping (the number of online shopping transactions, one order is considered as one transaction) [single choice]

5-7 times a week/1-2 times a week/1-3 times a month/1-3 times a month/1-3 times a month

1-3 times a month/1-3 times during half a year and above/ Once a year

6. Online shopping apps or websites you often use (choose up to 5 items) [Multiple Choice Questions]

Taobao.com/ JD.com/ Vipshop.com/ Pinduoduo.com/dewu.com (POIZON)/xiaohongshu.com

Tik Tok/ KUAISHOU/ Dangdang.com/ Farfetch.cn/ Kaola.com/ Foreign shopping site

Part 2. Improve customer satisfaction

Instructions: The following items are used to measure whether the postponement strategy has an impact on the improvement of online shopping consumer satisfaction. The options use a five-point scale, divided into five levels, from strongly disagree to strongly agree. The highest improvement is 5 points, and the lowest is 1 point.

7.If you can customize the design of product colors, components, patterns, etc. when placing an order, your satisfaction with the product will be improved. [Scale question]

Average score for this question: 3.89

8. If you can choose the packaging of the product when you place an order, such as choosing a packaging style and adding a gift card, your satisfaction with the product will increase. [Scale question] Average score for this question: 3.9

9. If you choose a pre-sale product when you place an order, and you can buy the desired product when you can't get the spot, your satisfaction with the product will increase. [Scale question] Average score for this question: 3.93

10. If you choose a pre-sale product when you place an order, you can choose to return or exchange the product at any time during the waiting period. There is sufficient time to consider whether you need this product and reduce impulse consumption. Then your satisfaction with the product will increase. [Scale question]

Average score for this question: 4.03

11. If the product you place an order is set up in storage warehouses all over the country, and the receiving time is shortened to 1-2 days, your satisfaction with the product will be improved. [Scale question]

Average score for this question: 4.02

12. If you can use installation, consumer loans and other leveraged consumption when paying for shopping, you can immediately satisfy your consumer desires, thereby dispersing the current economic pressure. Then your satisfaction with the product will increase. [Scale question]

Average score for this question: 3.84

13. If you can use convenient and fast online payment when shopping and paying, your satisfaction with the product will be improved. [Scale question]

Average score for this question: 4

Part 3. Decrease in customer satisfaction

Instructions: The following items are used to measure whether the postponement strategy has an impact on the reduction of online shopping customer satisfaction. The options use a five-point scale, divided into five levels, from strongly disagree to strongly agree. The maximum reduction is 1 point, and the minimum is 5 points.

14. If you can customize the design of the product's colour, components, patterns, but this process takes a long time to wait for the delivery, your satisfaction with the product will be reduced. [Scale question]

Average score for this question: 2.25

15. If you can customize the design of the product's color, components, patterns, etc., but the actual product received does not completely match the description of the webpage, your satisfaction with the product will be reduced. [Scale question]

Average score for this question: 1.97

16. If you can customize the design of the product's color, components, patterns, etc., resulting in the inability to return the product except for quality problems, your satisfaction with the product will be reduced. [Scale question]

Average score for this question: 2.09

17. If you can choose the packaging of the product when you place an order, such as different packaging styles, writing greeting cards, etc., which invisibly increases environmental protection pressure, your satisfaction with the product will decrease. [Scale question]

Average score for this question: 2.19

18. If you choose to buy pre-sold seasonal products when you place an order, it may be out of season when you receive the product, and your satisfaction with the product will decrease. [Scale question]

Average score for this question: 2.1

19. If the product you buy has a strong supply chain responsiveness, it can be shipped immediately after payment, and there is almost no time to regret, thereby reducing the probability of customers canceling orders and increasing impulsive consumption. Then your satisfaction with the product will decrease. [Scale question]

Average score for this question: 2.25

20. If you can use advanced consumption methods such as installment and consumer loans to pay for shopping, it creates an economic burden and develops bad consumption habits. Then your satisfaction with the product will decrease. [Scale question]

Average score for this question: 2.16

21. If you use online payment instead of physical currency to pay for shopping, and you have no sense of digital currency, resulting in uncontrolled consumption, your satisfaction with the product will decrease. [Scale question]

Average score for this question: 2.15

Part 4. Overall Satisfaction Survey

Instructions: The following items are used to measure the overall satisfaction of online shopping. The options use a five-point scale, divided into five levels, ranging from very dissatisfied to very satisfied. The maximum reduction is 1 point, and the minimum is 5 points.

22. What is your attitude towards the overall satisfaction of online shopping? [Scale question]

Average score for this question: 2.88

Thank you for participating in the survey!

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