

Impact of Customer Loyalty Program and Logistic Time on Different Types of E-Commerce Customers

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Abstract: This paper mainly makes research of the impact of customer loyalty programs and logistic time on different types of e-commerce customers. This paper intends to demonstrate the efficiency of JD.COM customer loyalty program and a potential method for different users, such as a wholesaler or a lower retailer to improve the logistic service quality they acquired. This paper adapts data analysis, such as hypothesis testing and regression. For different user levels, the efficiency of the customer loyalty program is varied. The membership will improve the loyalty explicitly for certain user types but the others show little sensitiveness to the priority logistic service. Customers of different user levels appear different sensitiveness to the delivery time. Most users exhibit that their customer loyalty is always affected by the delivery time of logistic service. As an exception, it can prove that lower retailers and wholesalers attach little interest to the difference between commitment order time and actual logistics time. The customer who is very sensitive to the delivery time could establish a new ID to acquire the preference service and priority of delivery arrangements. From the platform's side, the JD platform could mitigate the logistics difference between user levels to develop customer loyalty.

1. Introduction

To provide core customers with a better shopping experience, JD.com has specially launched JD.com plus members. The rights and interests of plus include shopping feedback, self-operated freight-free, worry-free return and exchange, exclusive customer service, and exclusive goods, to comprehensively improve and enrich customers' online shopping privileges. The delivery time of the freight coupon shall be subject to the date on which the user purchases the full member of plus. The freight coupon shall be valid within 30 days from the date of issuance, and then the freight coupon shall be issued on the user's purchase date every month. The freight coupon can only be used to offset the freight of JD self-operated commodity orders.

For each repeat customer, the corresponding user is classified according to his or her past purchases so that the customer's user-level takes on a value of 0, 1, 2, 3, or 4, where a higher user_level is associated with a higher total purchase value in the past. For users who are enterprise users (e.g., small shops in rural areas or small businesses), the corresponding user_level takes on a value of 10.

Word-of-mouth (WOM) is related to customer acquisition, return on quality, and customer satisfaction, which means WOM contributes to customer lifetime value (CLV). Its results help identify customers who exhibit typically promising targets for marketing action indicating their WOM is highly elastic. The paper concludes how companies can make use of both the satisfaction of WOM and when it comes to new customers acquisition, more efficient methods for reallocating their market resources are essential [1]. Service quality is important for customizing habitual travelers and for attracting new users. Meanwhile, transit agency must measure their performance. Regarding CSI (customer satisfaction index), it emerges that the attributes giving the highest contribution to overall satisfaction are relieving purchasing the tickets, security against crimes on a bus, reliability of runs that come on schedule, and personnel appearance. HCSI in the paper can be considered a useful tool for measuring transit service quality to monitor transit agency performances and fulfill customer requirements [2].

The paper argued eight factors (the 8Cs-customization, contact interactivity, care, community, convenience, cultivation, choice, and character) that potentially impact e-loyalty and develop scales to measure these factors. In a word, the 8Cs considered, were found to significantly impact e-loyalty. To compete fruitfully, e-retailers will need to develop and maintain customer loyalty [3].

Customer loyalty and trust are the key factors for long-term profitability and growth for organizations. The findings suggested that website user interface quality, information quality, awareness of e-commerce, and perceived privacy are significant predictors of e-customer Trust (ECT) and in turn, e-loyalty, referred to as security risk was found to have an insignificant impact on ECT. The findings of the study are beneficial for the e-commerce industry in enhancing ECT and e-loyalty, meanwhile, help them in improving their online business [4]. The study aims to examine the relationship between customer satisfaction and loyalty through the introduction of commitment, trust, involvement, and perceived value as mediators in the e-service context. Commitment, trust, and involvement are each illustrated to be partly mediators between satisfaction and loyalty, while perceived value is sure to be an integrated mediator. The results have implications for the maintenance of customers' loyalty in an interactive e-service setting [5]. The paper analyzes the existing distribution modes adopted by China's e-commerce enterprises. Based on the empirical analysis of the electronic market at JD.com, this paper compares and investigates the different logistics distribution modes faced by e-commerce enterprises. The research analysis and results bear strong managerial insights for e-commerce logistics distribution practitioners. Logistics has become an important indicator of an e-commerce enterprise's market-acquisition ability [6].

The Five Dimensions of Service Quality Measured by the SERVQUAL Instrument. The SERVQUAL instrument measures the five dimensions of Service Quality. These five dimensions are tangibility, reliability, responsiveness, assurance, and empathy. Customer expectations embrace several elements, including desired service, adequate service, predicted service, and a zone of tolerance that falls between the desired and adequate service levels [7]. The loyalty programs probably trigger the customers' antipathy. The problem appears that supermarket chain loyalty programs are not successfully creating loyalty. These loyalty mechanisms are not creating ultimate loyalty to one supermarket because customers belong to more than one supermarket loyalty program to get special prices and promotions. Thus, this study is intended to investigate the relationships among loyalty programs, customer satisfaction, and customer loyalty in the retail industry [8].

Loyalty programs are one of the most popular marketing strategies. The paper argues that loyalty programs could be classified into two types: monetary-based rewards and special treatment-based rewards. The research also models consumer switching using the Markov Chain and reveals that higher program facility perception is associated with higher attitudinal loyalty, concurrently increasing customer equity. Firms are encouraged to integrate effective elements into their loyalty programs, in addition to monetary elements [9]. The industry 4.0 era has incurred a shift in consumers' purchasing behaviors from traditional retailing to online and/or e-commerce. Smart digital installation and advanced technologies have enabled online service, encouraging customers encounters without face-to-face contact with employees. The paper demonstrates that online services are becoming widespread in multiple areas of daily life. This study elaborates implications of e-commerce service in terms of reborn opportunities and as a new customer service strategy incurred, the competition intensified [10].

This paper mainly makes research of JD logistic delivery arrangement and its customers' reaction. Take repurchases amount as an index to measure customer loyalty. The difference between commitment order time and actual logistics time is used to qualify the platform logistic arrangement and judge the priority logistic service of a user who is equipped with membership. After considering customers of different users' levels and customers' JD membership, this paper intends to demonstrate the efficiency of the JD customer loyalty program and a potential method for different users, such as a wholesaler or a lower retailer to improve logistic service quality they're acquired.

2. Theory

2.1. Characteristics for retailing E-commerce and Additions to the Customer Loyalty Programs

E-commerce, as the dominant business model around us, demonstrates explicit efficiency and variety during its development. Every part of traditional commerce is taking e-commerce more seriously, then new patterns and theories are revealed. Under e-commerce, equipped with websites and apps, the responses from customers are rapid, have various perspectives, easy to measure and analyze. On the other hand, more information carried back from customers enhances the requirement of allocating and distinguishing ability. Retail in industry changes all the time. These platforms are required to adjust their service orientation or even their discount level. Retailing has tremendous transaction quantity and a high rate of recurrence.

To draw customer loyalty, a series of benefits for customers will be integrated as customer loyalty programs. These loyalty programs can be divided into two types: paid or free, but the purpose is the same. How to decide on a competitive loyalty program and which type of programs influence the customer most efficiency, better logistic service, or the more aggressive discount? The platform should elaborate their programs after analyzing their customer's characteristics. The different retailing platform gathers different customers.

2.2. A Greater Importance Attached to the Customer Loyalty for retailing E-commerce

A great measurement scale for e-commerce is customer loyalty. E-commerce's characteristic, the adequate information about the customer, makes it possible to assess the different sale patterns. Through the searching history, click times, visitor volume of the different category products, the big data system will emerge customer's preference. Meanwhile, we can quantify the effects of customer loyalty, the frequency of these customer purchases, and the trend of his consumption. This information would inflect the efficiency of customer loyalty programs, for instance, JD PLUS membership.

2.3. Measure the Customer Loyalty quality with Four Dimensions

Four dimensions of customer loyalty quality. These four dimensions are tangibility, authenticity, accuracy, and empathy. Equipped with four dimensions of customer loyalty quality, the platform could assess their loyalty programs more reasonably and more accurately. It is available for them to determine: strengthening the level of loyalty programs for market acquisition, or cutting down the program's fee to reduce the cost.

(1) Tangibility

Since customer loyalty is tangible, customers acquire their perception of service quality by comparing. For instance, the Plus membership would like to be informed of their bonus discount compared to the ordinary customers. It is the appearance of the website expressions, the package ornament, or even the rapid response in requirement of staff service. Customers may focus on the discount they received, but other details will also weigh.

(2) Authentic

Loyalty doesn't merely mean that we shorten intervals between the customer's two recent purchases. Authentic indicates that for a certain time quantum, the total amount of a customer's consumption is increasing. Under the premise, more frequent consumption means better customer loyalty.

(3) Authentic

It means customer loyalty is specific to certain platforms. This dimension is likely to enlarge the brand effect. For instance, while choosing this certain platform, the customer shows more willingness to stand a higher price for better service or lower risk. Trust and confidence may be embodied in this platform or the customer loyalty that links the customer to this platform. Thus, accuracy ensures that customer loyalty is associated with this platform rather than the sale pattern, which could be easily copied.

(4) Empathy

It means providing caring individualized attention, including memorizing the customer shopping habits. For example, memorize the former orders' characteristics like the proportion of different sizes, or the preference of logistic method and the deadline. It is essential to provide individual attention to show to the customer that the company does best to satisfy his needs. Empathy is an additional plus that the trust and confidence of the customers and at the same time increase the loyalty. Nowadays, the cost for a customer to change the corporation platform is quite low. In that case, the loyalty fades rapidly.

3. Research Hypotheses

This paper studies the impact of the difference between commitment order time and actual logistics time on customer loyalty, how the impact change when customers are from the different user level, and how the impact change when customers are PLUS membership. Different city level means different objective conditions and different customer characteristics, which will influence the impact of the difference between commitment order time and actual logistics time on re-consumption. Here are some hypotheses.

3.1. Different city levels

The city level in JD data is categorized into five-level. Level 1 means municipality directly under the Central Government. Level 2 means provincial capital. Level 3 means other tier1 and tier 2 cities. Level 4 means other tiers 3 and tier 4 cities. The remaining city is level 5. The regional economical difference in China is significant. The highway mileage and the road network destiny are based on the economic strength of cities. It is reasonable to assume that the logistical infrastructure is serious differentiation.

The deliver time algorithm is more accurate equipped with more statistics. The statistics, orders quantity, are perhaps related to the city level. Some city is equipped with a relatively higher order amount. According to these, the deliver time algorithm in such cities will be more accurate, for which the city level may cause the diversity in re-consumption willing.

At some city level, some more junior wholesalers who are sensitive to the accuracy of the logistical estimation will show more willingness to re-consumption. Because wholesalers' customers may attach great importance to the delivery time. In a word, there is a demand for more accurate delivery time estimation. The city level with a larger order amount perhaps owns a better delivery time algorithm.

Hypothesis 1: different city level means different logistical infrastructure, different delivery time algorithm accuracy

Hypotheses 2: the impact of the difference between commitment order time and actual logistics time will be different for different logistical infrastructures, different delivery time algorithm accuracy.

3.2. Different User level

Firstly, joining PLUS membership to a certain degree means this customer will increase the priority of the JD platform while choosing a platform. In respect of the sunk cost, the membership fee, after a customer join PLUS membership, he or she may pay more attention to the JD platform to utilize membership. Secondly, it seems that "membership increases customer loyalty" is true. However, some objective factors should be taken into consideration. it is still needed to ensure that the platform system will increase a customer's user level due to a customer's membership. The increase of this customer's user level is caused by the customer's enlarging purchase amount. For instance, the wholesalers' and junior retailers' invoices always have a huger order amount than the common e-commerce customer. In JD data they are classified as level 10, and over 90% of them are members of PLUS. A high user level is based on confidence established by long purchasing history in this specific platform.

Hypothesis 3 Higher user level will show more customer loyalty. The impact of the difference between commitment order time and actual logistics time will be weaker for higher user-level customers.

3.3. PLUS, Membership or not

In respect of the sunk cost, the membership fee, after a customer join PLUS membership, he or she may pay more attention to the JD platform to utilize membership. Some customers pay for PLUS membership because of their historical purchasing experience in which they develop confidence with the platform.

Hypothesis 4 PLUS membership will significantly amplify customer loyalty. The impact of the difference between commitment order time and actual logistics time will be weaker for customers with PLUS membership.

4. Research context and identification strategy

4.1. About Hypothesis

This paper censuses the highway mileage and network density of each city level. To avoid the impact of extreme statics, Tibet's relevant data was not taken into consideration. As Table 1 demonstrated, it is found that little difference exists between city level, except for city level 3's network density. Under the circumstance of the grown logistic service industry, the source of goods supply in China appears distribution concentration and the transportation is mainly between province. The difference between the provinces or city level is not a proper method to measure logistical conditions. In addition, after the long period of development of the algorithm and the accumulation of logistical data, the number of errors is mitigated. For city level 3's explanation, city level 3 represents most of tier 1 and tier 2 cities which are mainly located on the east coast equipped with network density.

Table 1. Different city-level

Item	Highway mileage	Network density (kilometer per square kilometer)
City level	Average	Average
1	13976.7	0.94
2	16762	1.08
3	15479.2	3.07
4	13059.5	1.06
5	17650	1.71

4.2. Study design and procedure

The difference between commitment order time and actual logistics time on re-consumption qualified as an index of customer loyalty. A positive number means earlier than expected, a negative number means later than expected. About repurchases identification, the transactions that occurred within 15 days are taken into account. Different user levels are equipped with different characteristics. User-level 10's repurchase amounts are 18.57 times in 15-day period. User-level 10 means they are lower retailers or wholesalers. The total amount of user-level 0's data is only 8. Take no consideration of user levels 0 and -1, higher user levels are equipped with lower advanced quality. A positive number means earlier than expected, and a negative number means later than expected minutes.

Table 2. Different user-level

User-level	Average repurchase amount	Average difference	Total amount
-1	1.04	311	551
0	1	418	8
1	1.05	564	18634
2	1.08	496	26300
3	1.13	453	21634
4	1.39	470	22639
10	18.57	406	937

4.3. Estimate Results

We formally test the impact of user-level on customer repurchase amount and the difference between commitment order time and actual logistics time. Difference= $f(\alpha+\beta$ treatment i-PLUS membership+user level i+error) Repurchase amount= $f(\alpha+\beta$ treatment i-PLUS membership+user level i+error)

After regression analysis of the data (Table 3), the data analysis results are shown below (Table 4). For user-level -1, the membership enhanced the customer loyalty but the platform won't be awarded the plus member in the aspect of logistic speed. For user-level 1, PLUS membership shows the most significant impact. The membership enhanced the customer loyalty but the platform will award the plus member in the aspect of logistic speed. For user-level 2, the membership won't enhance customer loyalty and the platform won't be awarded the plus member in the aspect of logistic speed. In contrast, in user-level 3, the membership enhances customer loyalty but the platform won't be awarded the plus member in the aspect of logistic speed. As for user-level 4, the membership won't enhance customer loyalty but the platform will award the plus members in the aspect of logistic speed. However, in user-level 10's case, the membership won't enhance customer loyalty and the platform won't award the plus members in the aspect of logistic speed. It may be caused because level 10 is composed of lower-level retailers or wholesalers. They may attach great importance to the benefits of price., which confirms hypothesis 3. Because of the lack of user-level 0's data, the statics is not applied.

Table 3. User-level details and PLUS membership information

User-level	Average difference	Total amount	PLUS, amount	Percentage
-1	311	551	111	21.70%
0	418	8	0	0%
1	564	18634	5946	31.91%
2	496	26300	5715	21.74%
3	453	21634	6005	27.76%
4	370	22639	5768	25.48%
10	406	937	181	19.32%
		Total amount	23723	
		Average (all)	26.15%	

Table 4. Regression results

95% p-value	Level -1	Level 1	Level 2	Level 3	Level 4	Level 10
Difference	0.87268	5.3186×10^{-16}	0.075797	0.13386	6.1749×10^{-8}	0.79948
Repurchase	0.0089439	9.9996×10^{-14}	0.56292	0.017958	0.12990	0.61381

5. Conclusion

This paper mainly makes research of JD logistic strategy and its customer reaction. After combining the delivery time and customer repurchase frequency, this paper demonstrates the efficiency of the JD customer loyalty program and a potential method for a wholesaler or a lower retailer to improve their logistic service quality. Customers of different user levels appear different sensitiveness to the delivery time. Most users exhibit that their customer loyalty is always affected by the delivery time of logistic service. As an exception, it can prove that lower retailers and wholesalers attach little interest to the difference between commitment order time and actual logistics time. The customer who is very sensitive to the delivery time could establish a new ID to acquire the preference service and priority of delivery arrangements. From the platform's side, the JD platform could mitigate the logistics difference between user levels to develop customer loyalty. JD platform should take level 10 users as a specification. For their PLUS membership or other customer loyalty program, the scope of discount

will dominate their decisions. JD could also improve the category of users for a precise measurement of their program and logistic service assessment.

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