Study on Customer Loyalty of Cross-border Import E-commerce Platform Based on Human-Computer Interactive User Experience

Yajing Zhang *

Shandong Management University, Jinan , China

* Corresponding Author Email: 3116851297@qq.com

Abstract. Under the environment of economic development and consumption upgrade, cross-border import e-commerce is developing faster and faster. With the reduction of product differentiation between platforms and the gradual saturation of business model dividends, maintaining customer loyalty has become the key to improve the competitiveness of platforms. This article mainly from the perspective of customer experience, explores the main aspects of experience that affect customer loyalty, and then finds the direction for improvement and puts forward corresponding suggestions for improvement. This paper takes customer experience as independent variable and customer loyalty as dependent variable, establishes models and hypotheses, collects data by designing a questionnaire, uses SPSS 22.0 to do correlation regression analysis on the collected data, validates hypotheses and models, and finally concludes that customer experience directly affects customer loyalty. The most significant positive impact on customer loyalty is service experience, website, product, Logistics and payment experience. It also puts forward suggestions to enhance customer loyalty, such as strengthening customer relationship management.

Keywords: Cross-border e-commerce for imports; Customer experience; Customer loyalty; Multivariate regression analysis.

1. Introduction

With the increasing demand for overseas commodities, the personal purchase agency model has been unable to meet the domestic demand, so a variety of cross-border e-commerce platforms for imports came into being. On the other hand, the cross-border e-commerce for imports has been growing rapidly due to the strong support of national policies, the standardization of import tax policies and the reduction of tariffs on some imported goods in 2015, and the introduction of The Belt and Road Initiative in 2013. In addition, in international trade, export trade in China occupies a large proportion, but in recent years, because of the economic downturn in Europe, Japan and other major exporting countries, the proportion of China's exports have been reduced, followed by an increasing proportion of imports. And in China's economic structure, consumption accounted for only 35-40%, and compared to the proportion of 50% in other countries, there is still a lot of room for China's consumer market to rise. While the cross-border e-commerce of imports is developing with great momentum, various factors that restrict the development of the platforms are ubiquitous. According to the data of the report, the number of complaints received on the e-commerce consumer dispute platform in 2018 increased by 38.36% year-on-year, compared with 48.02% in the previous year, and the proportion of complaints from users of cross-border e-commerce platforms reached 14.05%.

2. Theoretical foundation

2.1. Definition of customer experience

Different scholars have different understandings according to the contents and perspectives of the research. Through the review of literature, the representative concepts of customer experience at home and abroad are summarized in Table 1.

Table 1. Definitions of customer experience by scholars at home and abroad

Scholars	
Lasalle,D.&Britton,Terry A (2003)	They point out that in the process of contact between customers and enterprises, customers will evaluate products and services as a reference for their next purchase, which is the result of interaction between enterprises and customers.
Wen Tao (2007)	Customer experience is customers' emotional reaction to the merchant's products, personnel and services in their interaction with the merchant under the marketing environment set by the merchant.

Based on the summary of the definitions of customer experience, this paper believes that customer experience is a special perception that arises in the process of interaction between customers and enterprises, under the influence of customers' internal activities and external influences.

2.2. Customer loyalty

2.2.1 Definition of customer loyalty

Behavioral perspective: Han Jinglun and Wei Fuxiang (2001) argue that customer loyalty is the behavior of consumers who repeatedly buy the products of a brand over a long period of time due to the influence of price, product, and service related factors. The depth of customer behavioral loyalty depends mainly on the number of repeated purchases and the rejection of other product brands in the same category.

Attitudinal perspective: Gremler and Brown (1999) define customer loyalty as a customer's willingness to make active, repeated, and continuous purchases of a product, and it is expressed in the form of active promotion, word-of-mouth referrals, and positive purchase intentions. And customer attitudinal loyalty can be reflected in the customer's willingness to repeat purchases, the tendency to recommend the product to others, and the tolerance of price.

Comprehensive perspective: Li Dingan and Yuan Yazhong (2007) define customer loyalty as combining customers' inner fervor and repetitive buying behavior, which includes not only inner emotional changes but also external buying behavior.

2.2.2 Classification of customer loyalty

The dimensions of customer loyalty as classified by major scholars are shown in Table 2.

Table 2. Dimensional division of customer loyalty

Scholars	Dimensional division
Dick&Basu (1994)	Customers' intention to repeat purchase, intention to actively recommend the brand, price tolerance and intention to purchase other products of the brand
Wang Yuexing and Feng Shaojin (2002)	Customers' intention to make repeated purchases, preference and tolerance for products or services

In summary, most scholars have studied customer loyalty from a comprehensive perspective, mainly dividing customer loyalty from two aspects: behavioral loyalty and attitudinal loyalty. Therefore, this study also divides customer loyalty into behavioral loyalty and attitudinal loyalty according to the problems of cross-border e-commerce platforms for imports.

3. Empirical process of empirical research on customer loyalty of cross-border e-commerce platforms for imports

3.1. Research hypotheses and variable measurements

3.1.1 Research model

Based on the study of Yang Bo (2018) who summarized the factors affecting customer loyalty distributed at the customer level, platform level and logistics level, the customer experience in this paper is divided into website experience, product experience, logistics experience, payment experience and service experience. In terms of measuring customer loyalty, the dimensions mainly include attitudinal loyalty and behavioral loyalty, which are mainly measured in terms of price tolerance, intention to repeat purchase and recommendation to others.

3.1.2 Research hypotheses

Among the five dimensions divided in this paper, the measurement of each dimension is shown below.

The website experience is divided into two aspects, one is the intuitive and simple interface design. The other is the perfection and convenience of website functions, which mainly includes smooth shopping process and convenient product search and consultation function.

Product experience is mainly about three areas: product quality, product price and product information. Product quality refers to whether the quality of products purchased by customers on the platform is consistent with the description of the platform and what customers expect; product price refers to whether the price of products displayed on the platform is within a reasonable range and within the tolerance of customers; product information refers to whether the information of products displayed on the platform is perfect and accurate.

Logistics experience is mainly reflected in two aspects: real-time logistics information and logistics transportation timeliness. Real-time logistics information means that the platform can always provide customers with real-time and accurate logistics information during the process from placing orders to obtaining goods, while the timeliness of logistics transportation means that the transportation of goods can be consistent with customers' expectations and the time promised by the platform and the integrity of the package during transportation.

The payment experience is mainly reflected in two aspects, the convenience and security of payment. The convenience of payment means that the common payment tools used by the platform are commonly used by most people and the platform provides a variety of payment methods and instruments, while security means that the payment process is protected by a high level of defensive mechanisms to prevent Trojan horse infringement and phishing links.

Service experience is divided into three main aspects. First, it is the timeliness of the response, which mainly means that the problems of customer consultation and feedback can be solved quickly and effectively; second, it is the convenience of the return and exchange service, which can give a quick solution and complete the return and exchange process in response to the customer's return request; and third, it is the uniqueness of the personalized service, which can recommend the right products in time in response to the customer's request. Based on the above findings, the following hypotheses are proposed in this paper.

Table 3. The hypothesis code and hypothesis description

Hypothesis code	Hypothesis description
H1	Customer experience positively influences the customer loyalty of cross-border e-commerce platforms for import.
H1a	Customer website experience positively influences the customer behavioral loyalty of cross-border e-commerce platforms for import.

H1b	Customer product experience positively influences the customer behavioral loyalty of cross-border e-commerce platforms for import.
H1c	Customer logistics experience positively affects customer behavioral loyalty of cross-border e-commerce platforms for imports
H1d	Customer payment experience positively influences customer behavior loyalty of cross-border e-commerce platforms for imports
H1e	Customer service experience positively influences customer behavior loyalty of cross-border e-commerce platforms for imports
H1f	Customer website experience positively affects customer attitudinal loyalty of cross-border e-commerce platforms for imports
H1g	Customer product experience positively influences customer attitudinal loyalty of cross-border e-commerce platforms for imports
H1h	Customer logistics experience positively influences customer attitudinal loyalty of cross-border e-commerce platforms for imports
H1i	Customer payment experience positively affects customer attitudinal loyalty of cross-border e-commerce platforms for imports
H1j	Customer service experience positively influences customer attitudinal loyalty of cross-border e-commerce platforms for imports

The scale was designed by comprehensively referring to the scales of related literature and the existing development of cross-border e-commerce platforms for exports to ensure that the designed questions meet the research criteria.

(1) Measurement of customer experience variables: This paper combines Yang Bo's factors influencing customer loyalty and Luo Gusong and Guo Junhui's dimensional division to divide the customer experience variables in this paper into the following five dimensions: website experience, product experience, payment experience, logistics experience and service experience, and the scale design of customer experience variables is shown in Table 4.

Table 4. Measurement scale of customer experience variables

Item	Dimension
The platform's website interface design is overall attractive, the content layout is reasonable and user-friendly, and the overall style fits the theme of the website.	Website experience
The overall style of the platform's website is attractive to you and can make you feel happy.	
The platform's website provides a full range of convenient functions (i.e. the website features a product search function, online review function and online consultation function, etc. and the use of the website is fast and smooth)	
The quality of the products purchased on the platform is consistent with or even better than what you expect	Product experience
The product information provided on the platform's website allows you to learn more about the product and the product information is not too different from the actual product.	
The price of the products offered on the platform is within or even below the range you expect	
The platform is always able to provide real-time updates on logistics information.	Logistics experience
The delivery time of the product is the same or shorter than what you expect or what the platform promises	
The package is shipped without much damage	
The platform offers a wide range of convenient payment methods	Payment experience
The platform can provide a secure payment protection mechanism to ensure that payment information and customer information are not leaked.	

You can get fast and effective reply and solution for your inquiry and feedback The platform has fast and convenient return and exchange services The platform provides personalized services to your satisfaction (mainly including recommending the right products for you and meeting your other special requirements for goods or services)	Service experience

(2) Measurement of customer loyalty variables: In this paper, customer loyalty is divided into attitudinal loyalty and behavioral loyalty. In terms of attitudinal loyalty, this paper measures it in terms of customers preferring the platform, and in terms of behavioral loyalty, this paper measures it in terms of platform recognition and recommended purchases.

Table 5. Measurement scale of customer loyalty variables

Measuring item	Measured variable
When you need to buy products across the border, you will choose this website first You think this platform is better than other cross-border e-commerce platforms for imports You will recommend this cross-border e-commerce platform for imports to others	Customer loyalty

3.2. Empirical results

With the previous preparation as the foundation, the data collected from the questionnaires were organized and analyzed to verify the model and the validity of the hypotheses. Therefore, this section focuses on descriptive analysis, reliability and validity analysis, correlation analysis and regression analysis of the data.

3.2.1 Descriptive statistical analysis

The descriptive statistical analysis is to statistically describe the relevant data of the variables concerned, including frequency statistics, discrete and concentrated trend analysis, etc. In this paper, the descriptive statistical analysis was mainly conducted on the basic information of the survey respondents in terms of frequency and percentage,

From the above table, we can see that the data collected in this paper are mainly from female full-time students and female enterprise employees with bachelor's degree and more stable income, which is because females with higher education and more stable income have a greater demand for high-quality overseas products.

3.2.2 Reliability and validity analysis

(1) Reliability is the term used to measure the reliability of data. Reliability is directly related to whether the data are still the same or close when the same survey is repeated several times for the respondents. The most commonly used method to test the reliability of a survey is the Cronbach alpha coefficient analysis. A Cronbach alpha coefficient greater than 0.7 indicates that the reliability of the questionnaire meets the criteria for survey research. In this paper, the 17 indicators involved in the scale were analyzed with the help of software SPSS 22.0, and the results of the analysis are shown in Tables 6.

Table 6. Results of reliability analysis of the scale

Item	CITC	Cronbach'sAlpha if Item Deleted	Cronbach's α coefficient for each dimension	Cronbach's α coefficient for all items
Website experience 1	0.546	0.881	0.878	0.888

Website experience 2	0.614	0.878	
Website experience 3	0.591	0.879	
Product experience 1	0.708	0.873	
Product experience 2	0.641	0.876	0.803
Product experience 3	0.569	0.880	
Logistics experience1	0.619	0.877	
Logistics experience2	0.615	0.878	0.799
Logistics experience3	0.656	0.876	
Payment experience1	0.519	0.882	0.745
Payment experience 2	0.511	0.887	
Service experience1	0.521	0.885	
Service experience2	0.505	0.884	0.768
Service experience3	0.531	0.883	
Customer loyalty 1	0.611	0.896	0.896
Customer loyalty 2	0.566	0.897	0.729
Customer loyalty 3	0.525	0.899	

From the data in the table, we can see that the Cronbach's alpha coefficients of all items and each dimension and each item were greater than 0.7, which proves that the reliability of the questionnaire is acceptable and it can be further analyzed,. In addition, the CITC coefficients of all items, each dimension and each item were greater than 0.5, so it also proved that the reliability of the questionnaire met the criteria of the study.

(2) Validity examines whether the collected data results meet the content to be measured by the questionnaire, and the higher the validity, the higher the quality of the data. Validity consists of three main aspects, namely content, structure, and criterion-related validity.

At present, factor analysis is mainly used to explore the validity of the questionnaire, and KMO and Bartlett's test of sphericity are needed before factor analysis. Firstly, a KMO test design as well as Bartlett's test of sphericity was conducted for the analysis of 8 latent variables with the help of software SPSS22.0 in this paper, and if the KMO value is greater than 0.7, then the questionnaire validity can be analyzed by factor analysis.

A. The results of KMO as well as Bartlett's test for the customer experience scale are shown in Tables 7.

Table 7. KMO and Bartlett's test results of the customer experience scale

KMO value	0.840	
Bartlett's test of sphericity	Chi-squared approximation	874.310

	df	91
	Significance	0.000

From the above table, the KMO value of the customer experience scale was greater than 0.7, which was 0.840, while the value of Barlett's test of sphericity was less than 0.01, which was 0.000. Therefore, this scale could be subjected to factor analysis, and the results are shown in Table 8.

Table 8. Factor analysis results of the customer experience scale

	Component				
	1	2	3	4	5
Website 1	0.887				
Website 2	0.772				
Website 3	0.856				
Product 1				0.660	
Product 2				0.625	
Product 3				0.795	
Logistics 1		0.781			
Logistics 2		0.747			
Logistics 3		0.686			
Payment 1			0.834		
Payment 2			0.813		
Service 1					0.837
Service 2					0.690
Service 3					0.791

The data in the table showed that the customer experience scale always has five factors, which is in line with the hypothesized expectation, and in addition, the factor loading coefficients of the measurement questions of the five factor dimensions were all greater than 0.5, so the validity of the scale was considered to meet the research criteria.

B. The results of the validity analysis of the customer loyalty scale are shown in Table 9.

Table 9. KMO and Bartlett's test results of the customer loyalty scale

KMO value	0.708	
Bartlett's test of sphericity	Chi-squared approximation	132.917
	df	3
	Significance	0.000

From the data in the above table, it can be seen that the KMO value of customer loyalty was greater than 0.7 and was 0.708, while the p-value of Bartlett's test of sphericity was less than 0.001 and was 0.000, indicating that the customer loyalty scale can be subjected to factor analysis. The results of the factor analysis of the customer loyalty scale are shown in Table 10.

Table 10. Factor analysis results of the customer loyalty scale

	Component	
	1	2
Customer loyalty 1	0.871	
Customer loyalty 2		0.860
Customer loyalty 3		0.944

The table showed that the customer loyalty scale always has 2 factors, which meets the hypothesized expectations. The data in the table showed that the factor loading coefficients of the

measured question items for each factor were greater than 0.5, so the validity of the scale was considered to meet the research criteria.

3.2.3 Correlation between customer experience and customer loyalty

In the regression analysis of each variable to test the hypotheses, the first step is to check whether there is a correlation between the variables. If the correlation is weak or even absent, the regression analysis between the variables is meaningless. The results of the correlation analysis between customer experience and customer loyalty are shown in Table 11.

Table 11. Results of correlation analysis between customer experience and customer attitude loyalty

Customer experience		Customer behavioral loyalty	Customer attitudinal loyalty
Website experience	Pearson Correlation Coefficient	0.243	0.262
	Significance (Bilateral)	0.008	0.016
	N	192	192
Product experience	Pearson Correlation Coefficient	0.366	0.295
	Significance (Bilateral)	0.000	0.005
	N	192	192
Logistics experience	Pearson Correlation Coefficient	0.306	0.325
	Significance (Bilateral)	0.006	0.003
	N	192	192
Payment experience	Pearson Correlation Coefficient	0.345	0.273
	Significance (Bilateral)	0.000	0.032
	N	192	192
Service experience	Pearson Correlation Coefficient	0.463	0.405
	Significance (Bilateral)	0.000	0.000
	N	192	192

From the data in Table 3-9, it can be seen that the Pearson coefficients between the five aspects of website, product, logistics, payment and service experience and the two factors of customer behavioral loyalty and customer attitudinal loyalty were all greater than 0. Also, they were all found to be correlated at the 5% level of significance, indicating that customer experience positively influences customer loyalty.

3.2.4 Regression analysis and hypothesis testing of customer experience and customer loyalty

Based on the above determination of variable correlations, a regression analysis is performed in this section between the two factors of customer experience and customer loyalty. In the regression analysis, R^2 is used to measure the fit of the equation, and it is best if it is close to 1. In addition, the degree of regression is measured using regression coefficient and P-value. The smaller the P-value, the more representative the regression coefficient is.

(1) The regression analysis results of customer experience and customer behavior loyalty are shown in Table 12.

Table 12. Regression analysis results of customer experience and customer behavioral loyalty

	Unstandardized coefficient	Standardized coefficient	t	Sig	R2	F

		B	Standard error	Beta				
1	(Constant)	2.030	0.359		5.687	0.000		
	Website experience	0.285	0.092	0.271	3.087	0.003	0.066	9.529
	Product experience	0.422	0.095	0.377	4.463	0.000	0.135	19.919
	Logistics experience	0.532	0.095	0.456	5.610	0.000	0.201	31.477
	Payment experience	0.433	0.095	0.384	4.551	0.000	0.140	20.712
	Service experience	0.727	0.098	0.561	7.422	0.000	0.309	55.079

From the data in the table, it can be seen that the Sig values of website, product, logistics, payment and service experience for customer behavioral loyalty were all less than 0.01, and the regression coefficients were all greater than 0, indicating that all five dimensions of customer experience significantly and positively affected the dependent variable. The adjusted R^2 values were 0.066, 0.135, 0.201, 0.140, and 0.309, indicating that they were able to explain 6.6%, 13.5%, 20.1%, 14.0%, and 30.9% of the data. Customer attitudinal loyalty = 0.309 * website experience + 0.414 * product experience + 0.396 * logistics experience + 0.345 * payment experience + 0.639 * service experience + 2.11

(2) The regression analysis results of customer experience and customer attitudinal loyalty are shown in Table 13.

Table 13. Results of regression analysis of customer experience and customer attitudinal loyalty

Model		Unstandardized coefficient		Standardized coefficient	t	Sig	R2	F
		B	Standard error	Beta				
1	(Constant)	2.11	0.322		6.564	0.000		
	Website experience	0.309	0.081	0.329	3.811	0.000	0.101	14.523
	Product experience	0.414	0.083	0.414	4.987	0.000	0.172	24.874
	Logistics experience	0.396	0.088	0.380	4.504	0.000	0.137	20.283
	Payment experience	0.345	0.087	0.342	3.991	0.000	0.110	15.932
	Service experience	0.639	0.088	0.552	7.261	0.000	0.299	52.725

From the data in the table, it can be seen that the Sig values of product, logistics, payment and service experience for customer attitude loyalty were all less than 0.01 and the regression coefficients were all greater than 0, indicating that all five dimensions of customer experience significantly and positively contributed to the dependent variable of customer attitudinal loyalty. The adjusted R2 are 0.101, 0.172, 0.137, 0.110 and 0.299 respectively, indicating that they could explain 10.1%, 17.2%, 13.7%, 11.1% and 29.9% of the data, respectively. Therefore, the hypotheses H1f, H1g, H1h, H1i, H1j were validated as true. Customer behavioral loyalty = 0.285 * website experience + 0.422 * product experience + 0.532 * logistics experience + 0.433 * payment experience + 0.727 * service experience + 2.03

4. Conclusion

The main content of this chapter is to summarize the conclusions of this paper and make corresponding business recommendations based on the model set up, hypotheses presented and data analysis in the previous chapter.

The five dimensions of customer experience on cross-border e-commerce platforms for imports (website experience, product experience, logistics experience, payment experience and service experience) have positive and significant effects on customer behavioral and attitudinal loyalty, but these five dimensions do not have the same effect on customer loyalty. From the above data analysis, we can see that whether it is attitudinal loyalty or behavioral loyalty, the customer experience with the greatest impact is service experience, accounting for half of the total, while the one with the least impact is website experience. Therefore, the key for cross-border e-commerce platforms for imports to enhance customer loyalty is to improve the service experience of customers in the shopping process. Secondly, it is also necessary to focus on the experience of logistics, products and payment of the platform. As for the website experience which takes up the smallest proportion, the main reason is that contemporary computer technology and e-commerce website design technology have become relatively mature, and there is little fluctuation in the difference of experience perceived by customers during the shopping process.

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