

Does COO really Matter in Value Co-Creation of Cross-Border E-Commerce?

(Full Paper)

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ABSTRACT

The purpose of this paper is to explore the cross-border e-commerce value co-creation mechanism. We believe that the most significant factor affecting consumers' cross-border online shopping is online service quality. And the country of origin(COO) effect also plays an important role in the cross-border purchase intention. Therefore, this study built a proposed model of cross-border online purchase intention based on co-create theory and two-side market theory. For the case of online cross-border shopping, perceived value is very important which can directly determine the purchase intention of customers. Based on the related theory, three significant latent variables that can indirectly determine the purchase intention of customers as follows: consumer resource, platform service quality (or ESQ), and country of origin. According to our positive study, platform service quality is the most important factor, COO is the second one, and consumer expertise is the last one. All of the antecedent variables are significant according to statistical results. Then we made the conclusions and implications.

Keywords: COO, two-side market, value co-create, SEM, CMV.

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INTRODUCTION

Despite recent trade frictions, those hopes have been borne out, with cross-border e-commerce sales through Amazon now raking in \$10, 000 a day on average. Under the background of the rapid development of information technology, e-commerce has become an important driver for the development of the world economy and has drawn great attention from various countries. China's e-commerce has a significant scale advantage in the world. As an important business model and trade method, cross-border e-commerce has become a new engine to promote the stable growth of foreign trade, promote the transformation and upgrading of foreign trade, and promote the overall economic development. Actively participating in and leading the development of international e-commerce rules has become an important strategic task in China's foreign trade field. In the future, digital trade will become the mainstream of international trade commerce, while traditional agriculture and manufacturing will benefit from this. Therefore, how to build a healthy and sustainable cross-border e-commerce value co-creation mechanism is of great significance (Gomez-Herrera, Martens & Turlea, 2014).

In recent years, value co-creation in the two-side market has become the focus of current theoretical and practical research. As the market competition environment changes, the role of customers in value creation has changed. Value is no longer created by the company alone, but is created by the interaction between the company and the customer through the internet platforms. Many domestic companies have achieved strong market competitive advantages through value co-creation. With the development of the network economy, the perspective of value co-creation has shifted from the dual interaction of enterprises and customers to the dynamic network interaction of multiple socio-economic participants.

Value co-creation in the two-side market is a new value creation model, and the influence mechanism of customer resources on the value co-creation ability has gradually attracted the attention of scholars and managers. In the S-D logic, the customer is the main body of value creation, and its role has changed from the passive participant to the dominant creator (Ng, Sweeney & Plewa, 2019). But in the two-side market, the platforms also played a significant role in the value co-created process. And there is less research on the value co-creation ability based on the two-side market, especially in cross border e-commerce market.

CONCEPTUAL BACKGROUND

Consumer Resource

In the case of shopping, consumers take advantage of relevant information previously stored in their brains (e.g., prior knowledge) and compare it to external sources of information search encountered when buying (Underwood, Klein & Burke, 2001). Consumer-related information about consumption products or services in brain memory, also known as consumer expertise (consumer expertise. At this time, consumers will rely less on external information, and instead, make consumption decisions based on their knowledge. When consumers can make consumption decisions, they will rely on their professional knowledge to connect with the external information of the product or service, comprehensively judge the effective filtering of external invalid information, and speed up the consumption decision. However, if consumers have almost prior knowledge,

their brain's ability to process attribute information of products or services will be reduced. Consumers' ability to process information about a product or service depends on how hard they work and their innate ability. The evaluation of the value of an online product or service depends on the consumer's recognition ability and prior knowledge, etc., which varies from person to person (Alba & Chattopadhyay, 1985).

Despite these results, as far as the authors are known, previous literature has not specifically emphasized that the level of consumer expertise can influence online consumption. This study assumes that consumer expertise will play a significant role in the valuation process of online purchasing of products or services.

Under the S-D logic theory, separated resources cannot create value. The value can be created only under the specific conditions of each resource's interaction and integration (Vargo & Lusch, 2008). Therefore, the S-D logic theory believes that consumers and enterprises can improve their situation and co-create value through resource integration. Traditional tangible product producers' single value creation theory is inconsistent with reality now. Even in the traditional tangible product industry, customers and companies are valued co-creation participants, and customers have a dominant position in presenting value propositions. The customers are unique value creators, and companies are only participants of value creation (Grönroos & Gummerus, 2014).

Arnould (2006) first proposed the concept of consumer resources, personal knowledge, technology, and social resources. Vargo and Lusch (2011) adopted a systemic view of value co-creation and reconstructs the concept of consumer resources. Expertise is based on cognitive structure and cognitive processes, which is the ability to perform product-related tasks (Alba & Hutchinson, 1987). There are five dimensions of consumer expertise as follows: cognitive effort, cognitive structure, analytical ability, advancement, and memory. Compared with newcomers, experts have stronger expertise. S-D logic theory argues that consumer expertise is the core of consumer-resource variables. Consumer expertise has a significant impact on consumers' collection and understanding of product or service information and psychological valuation of product and brand, as well as the consumer decision-making behavior.

However, nowadays the situation has been dramatically changed in two-side market. Companies have the opportunity to participate in value creation only by interacting with customers through online platforms, especially in cross-border e-commerce. Customers can obtain new resources in the service exchange system and integrate them into existing resources. In the process of resource integration, the value can be created. This study assumes that the cross-border e-commerce platform is the central hub for customers and companies to integrate resources and create value together.

Firm Resource

Not surprisingly, more and more research literature has developed the ESQ (electronic service quality) scale for e-commerce platforms and studied its relationship with consumer satisfaction, trust, and loyalty. However, the researchers also acknowledge that the nature and strength of the relationship between ESQ and loyalty vary from the context with differences between different cultures, different product categories, and different websites (Gupta, Reetika & Kabadayi, 2010). Therefore, it is important to further study the antecedents of the loyalty of electronic service platforms in different experience environments. Another research direction focuses on the conceptual definition and measurement of key dimensions of ESQ and the development of reflective and informative items of scales (Fassnacht, Martin & Koese, 2006). Moreover, many key unsolved issues have increased the importance of ESQ research. This study will contribute to the theory gap of cross-border e-commerce platform research based on co-create theory and two-side market theory.

Regarding the definition of ESQ, "the extent to which an online platform promotes effective and effective shopping, purchasing, and delivering products and services" was issued (Zeithaml *et al.*, 2002). And "the quality of network platform services is the degree to which network services can effectively and efficiently meet the needs of relevant customers" is more widely accepted, but still has some shortcomings. Therefore, in the context of our research, we define ESQ as the existing users' perception of the overall quality of the online platform.

Madhavaram and Hunt proposed the concept of operational resources in the form of corporate knowledge, technology, and innovation. And they did not make a further comprehensive systematic explanation of high-level enterprise resources variable, nor did they make a discussion from the perspective of e-commerce service quality (ESQ). ESQ is regarded as a significant factor for the success of Internet-based business models such as e-commerce platforms. It requires the full interaction and integration of various basic resources to form a joint force. ESQ's main factor is the enterprise resource. Higher-order enterprise resource is formed in a variety of collaborative tangible and intangible resources, such as market-oriented capabilities, power of pricing to market, consumer feedback response capability (Barrutia, Paredes & Echebarria, 2016).

The specific dimensions of ESQ are still controversial in the following aspects. First, some scholars believe that some of the original dimensions should be proposed, or new dimensions should be added. The two most controversial dimensions are system effectiveness and privacy. In empirical research, its explanatory power is weak, and the dimension of system effectiveness need not be considered. Moreover, e-commerce platform design and information have a significant impact on

ESQ (Fassnacht & Koese, 2006).

Second, In the process of e-commerce consumption, customers and suppliers are geographically separated, that is, customers cannot experience the goods before purchasing. This will lead to an increased probability of inconsistencies between e-commerce consumption results and consumption expectations (increasing quality uncertainty of the results). The probability that the customer's online consumption perception and the post-purchase consumption experience are significantly different increases (Collier & Bienstock, 2006).

Traditional ESQ definition After the rapid development of information technology and the evolution of consumer professional knowledge systems, traditional theories have fallen far behind reality, so ESQ should be redefined. The six dimensions of ESQ are as follows: security, reliability, page design, customer service, information volume, and customization (Theodosiou *et al.*, 2019). Quality is a key element of business success, and service quality is the customer's overall assessment of a customer's specific service. It is derived by comparing the performance of the company with the customer's general expectations of how the company in the industry should perform. Service quality plays a vital role in achieving companies' goals, including building trust, increasing satisfaction, and fostering loyalty, which are considered key factors for a company's competitiveness and success. Therefore, even though the service quality has been extensively studied in the traditional enterprise service environment, some standards for measurement have been changed. It is very important to study the new ESQ in the two-side market value co-create process. Finally, our study uses 3 dimensions to measure the ESQ, namely the platform service quality in this research.

COO

The effect of Country of origin (COO) is that are affected by stereotypes about that country and its products and services when consumers consider purchasing products or services from another country. COO can increase or decrease associations with individual products and brands (Suh, Hur & Davies, 2016). This study intends to conduct an empirical analysis of the country of origin effect of consumers purchasing foreign products on cross-border e-commerce platforms. The basis is the theory of stereotype (Hilton & Hoppel, 1996) and theory of positioning (Davies & Harré, 1990).

A national image (CI) is formed when a consumer's overall stereotype image of a particular country as a representative of a product or brand. This is based on the consumer's previous recognition of the advantages and disadvantages of a country or region's production and marketing. Consumers generate general views and opinions on products and services from this particular country. The impression is the result of a combination of the country's representative products, national characteristics, and political and economic environment. Each country has a unique national image in consumer perception. The national image can reflect both the advantages and disadvantages of the product or brand, and it may affect consumers' attitudes to the products of the country of origin. Consumers will expect products or services from technology-developed countries to be of higher quality and more reliable. In contrast, the national image of developing countries is often low quality, cheap, and not durable. Dichter(1962)first proposed the concept of COO. Country-of-origin effect generally means that consumers' value evaluation of a country's products or services or consumption intention is affected by consumers' stereotypes about the country, while country image (CI) generally refers to increased consumer willingness to buy (Correia & Kaufmann, 2017).

The impact of COO is important for countries that need to increase exports of manufactured goods (especially for resource-poor developing countries) and for companies purchasing products in different countries. First, the country of origin effect affects consumers' assessment of product quality, and ultimately affects their purchase possibilities and their willingness to pay. First, when consumers are unfamiliar with the product, they use the national image as a reminder. Second, when consumers are familiar with the product, they use the image to summarize their impression of the product in the country of origin and directly affect their attitude towards the product (Bhamjee, 2019). Based on the above discussion, this study uses COO as one of the independent variables.

Perceived Value

Consumer's perceived value refers to the overall evaluation of the effectiveness of the product or service obtained. Consumer's perceived value is S-D Logic result of the integration of consumers and enterprise resources. The above proposal is based on the S-D Logic. Value is perceived and determined by the beneficiaries. It is unique and phenomenological in the two-side market context, the concept of consumer perceives value can be divided by the significant factors which can affect customers, such as convenience, currency value, effort, and timeliness (Mpinganjira & Maduku., 2019).

Perceived value is defined as the overall assessment of the customers' utility of products and services. This study believes that consumer perceived value is the result of service and service encounters on the basis of value co-creation after enterprises and consumers have integrated their respective resources. Therefore, in this study, value is related to consumer perception in specific contexts. This view is consistent with the perspective of service science, and the value is always determined by the beneficiary based solely on phenomenology (Peng *et al.*, 2019). Then we measure perceived value with four items: convenience, cost performance, effort, and timeliness. These items are all based on the two-side market theory.

Purchase Intention

The willingness to buy online reflects the desire of customers to buy over the Internet. It is generally believed that when e-commerce websites or mobile applications provide shoppers with satisfactory services, consumers are more likely to purchase goods or services from virtual online stores. These services include product/service directories, search functions, online-trust, price comparison service, shopping cart service, online payment system, etc. (Grewal & Stephen, 2019). Therefore, considering the importance of each service in attracting consumers online, purchase intention is the psychological result of a particular behavior when a consumer decides to purchase a product or service. (Qin, Zhao & Ni, 2019) In terms of personality, the two main determinants of willingness to buy are as follows: customer attitudes and subjective norms. Online shopping willingness is the direction in which consumers tend to have specific behaviors in specific contexts (ie, online virtual stores). Combining the personality traits of internet users with their online technology cognition can better understand consumers' online shopping behavior (Frik & Mittone, 2019). On the basis of previous papers, this study combined with expert suggestions to give online purchase willingness items.

HYPOTHESIS DEVELOPMENT

Consumer Expertise is the Antecedent of Perceived Value

There are two differences between primary consumers and senior consumers: first, the knowledge structure is different; second, they use different knowledge in searching and choosing tasks and decision-making behaviors. Compared with novices, senior consumers know more about product categories, their cognitive structure is richer, and they are organized around more information. In an e-commerce environment, consumers have many choices, and consumers who lack the necessary knowledge and technology will be a loser at first. However, consumers with certain experience and knowledge can complete the purchasing task faster and more effectively through the e-commerce platform. Experienced customers get more value because they spend less energy (and cognitive effort) during the purchase process and can make better decisions. From a cost and workload perspective, experienced customers can perform online shopping tasks faster and easier. Moreover, experienced customers will better understand the meaning of product information and make informed decisions. Therefore, we assume:

H1: Consumer expertise will have a significant positive impact on consumers' perceived value.

Platform Service Quality is the Antecedent of Perceived Value

As mentioned in the previous section, this study takes the platform service quality as electronic-service quality. Cross-border e-commerce research shows that there is a positive correlation between the ESQ construct and customer value perception. Based on online interactive processes, e-commerce terminal descriptions of products or services, and logistics, the consumer can assess the perceived value of online shopping. We, therefore, propose the second hypothesis as follows.

H2: The quality of the platform service has a significant positive impact on the perceived value of consumers.

COO is the Antecedent of Perceived Value

The country of origin effect affects consumers' assessment of product quality, and ultimately affects their purchase possibilities and their "willingness to pay." First, when consumers are unfamiliar with the product, they use the national image as a reminder. When consumers are familiar with the product, they use the image to summarize their impression of the product in the country of origin and directly affect their attitude towards the product. In this study, the third hypothesis as proposed as followed,

H3: The COO has a significant positive impact on the perceived value of consumers.

The Mediation Effect of Perceived Value between the Antecedents and Purchase Intention

From a utilitarian perspective, perceived value is a trade-off between a bundle of benefits that buyers get. Given the intense competition and lower entry and exit barriers on the Internet, it is essential to study purchase intentions. We adopt this view and extend it by incorporating the effect of the above constructs as antecedents of perceived value. Therefore, we expect that:

H4: In two-side markets, the perceived value of a purchase is directly related to the willingness to buy; the higher the level of perceived value, the higher the level of willingness to buy.

H5: In two-side markets, there is the full mediation effect of perceived value between the antecedents and purchase intention

DATA COLLECTION AND RESEARCH METHODOLOGY

We developed preliminary measurement items and questionnaires based on previous research literature, and then made appropriate modifications under the guidance of experts based on the actual environment of this study. The purpose of the questionnaire is to analyze the impact of consumer resources, platform resources, and country of origin on consumer online shopping willingness under the value co-creation theory.

This research involves the collection of data about online cross-border purchase questionnaires. The study population is online cross-border shoppers in China. We use truncated sampling techniques to collect data. The sample size is calculated based on a 95% confidence level. According to the latest National Economic and Social Development Statistical Bulletin of Wuhan, Beijing, Shanghai, Guangzhou, and Shenzhen, Using those cities' population. According to the method of Frik & Mittone(2019): $n = N / (1 + Ne^2)$, at the significance of 5%, a survey sample size of 400 or more should be selected. Therefore, this study selected 525 samples in Beijing, Shanghai, Guangzhou, Shenzhen, and Wuhan based on sampling techniques. There were 469 valid samples, and the effective rate was 89.33%.

This study then used the social science statistical software packages SPSS22, AMOS22 and R to analyze the data. Perform descriptive statistical analysis, common method variation test, exploratory factor analysis (EFA), and confirmatory factor analysis (CFA) to identify latent variables (factors), Cronbach's alpha reliability test, composite reliability test, convergent validity test, and discriminant validity test. Finally, the mediating effects and the structural equation model were calculated.

Consistent with previous literature, our measurement of e-commerce platform service quality concepts includes multiple angles. Moreover, we use a second-order technique to build the construct. More specifically, the quality of e-commerce platform service is calculated as a second-order construct composed of dimensions of efficiency, design, and information accuracy.

For the measurement of consumer resources, we adopted the four-dimensional measurement standards proposed by Alba and Hutchinson, including cognitive effort, analysis, elaboration, and memory. We used these scales in combination with expert advices to adapt to new cross-border e-commerce scenarios.

In this study, various constructs in the more mature scale measurement models are selected. In order to ensure the validity of the questionnaire, each scale uses backward translation and contextualization methods to determine the description of each question. At the same time, the initial questionnaire for the study was formulated using cross-border e-commerce platform customer group interviews, etc. Based on the results of the pre-survey, combined with in-depth interviews with the experts, the questionnaire was further adjusted to form the final questionnaire for this study. The Likert five-point scale measures from the strongest disagreement to the strongest agreement with values from 1 to 5.

The research framework is shown in figure 1 as follows,

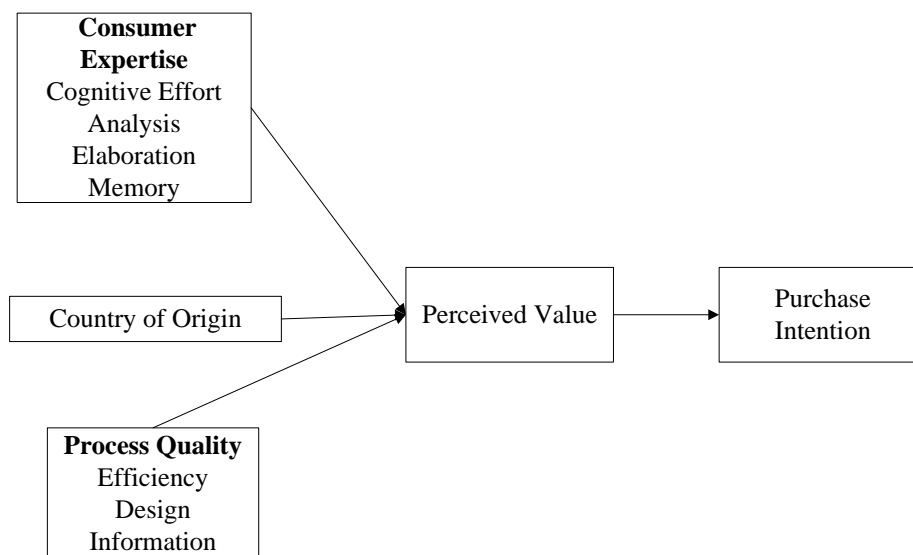


Figure 1: Research framework

EMPIRICAL RESULTS

Demographic Characteristics of the Sample

In this study, a total of 525 samples were collected from Chinese consumers. After removing invalid questionnaires such as incomplete filling and repeated filling, there were 469 valid samples, and the effective rate of collection was 89.33%. The descriptive analysis results of the Respondents were as follows: females accounted for 70.1%, males 29.9%, with a mean of

1.70 and a standard deviation of 0.49. Respondents had an average age of 35.61, a standard deviation of 3.63, and a mean cut-off of 35.19. Income is a categorical variable, with a mean of 3.95, a standard deviation of 0.39, and a tail-cut mean of 4.01. Respondents' educational background was classified as a categorical variable: junior high school or below, high school or junior high school, junior college, undergraduate, graduate, and above. The average educational background was 3.96, the standard deviation was 0.72, and the cut-off average was 3.79.

Table 1: Descriptive demographics of sample

Variable	n	mean	standard deviation	trimmed	min	max
Gender	469	1.70	0.49	1.75	1	2
Age	469	35.61	3.63	35.19	18	65
Education	469	3.95	0.39	4.01	1	5
Income	469	3.96	0.72	3.79	1	6

The Test and Control of Common Method Variance

The survey data was collected from July to August in 2019, and the respondents were located in Wuhan, Shanghai, Guangzhou, Shenzhen, and Beijing. The specific collection method is as follows: design and produce an electronic version of the questionnaire star website (<https://www.wjx.cn>). Through acquaintance relationships, teacher-student relationships, and campus-enterprise partnerships, we used WeChat electronic cash rewards to let their friends fill out online questionnaires. And we can use a special technique to identify the location of the respondents. For the sake of occurring probability of the common method variance in the study, the following methods were used in the process of questionnaire data collection for process control: First, the study used anonymous filling methods to allow respondents to fill in with confidence. Secondly, acquaintances who are directly looking for are not allowed to issue questionnaires in their work department or study class, to avoid suspicion of the interviewees that may affect the quality of the survey. Then, the respondents were asked to report whether they had seen or filled out this questionnaire before. This solution can avoid one person repeatedly filling in due to acquaintance relationships. Finally, there is no minimum requirement for the facilitator to collect questionnaire copies, so as not to put pressure on them.

Moreover, this study also uses statistical methods to test common method variation. Our study performed a Harman one-way test. The basic assumption of this technique is that if the common method variation problem is serious, when factor analysis is performed, either a single factor or a common factor accounts for most of the variable variation would be analyzed. If only one factor is isolated or a certain factor has great explanatory power, it can be determined that there is a serious common method variation problem. In this study, Harman's single factor test was performed first, and it was found that under the condition of no rotation, the variance (25.26) of the first principal component explanation of factor analysis did not account for the half (64.58%) of the total variance, which was less than the critical criterion. This shows that the common method deviation problem of this study is not obvious.

But it is only a diagnostic technique to evaluate the severity of the common method variation, and it is an insensitive test method, which does not have any effect to control the method effect. Therefore, the first common factor that has not been rotated is separated by exploratory factor analysis, and then the partial common relationship between the first common factor variable and the effect standard variable is calculated, and it is compared with the correlation coefficient of each variable of the original model. If the originally significant correlation coefficients are still significant, the effect of common method variation can be ignored. After analyzing the above steps, it was found that the variation of the common method in this study was not significant.

Table 2: Correlation coefficient matrix

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Cognitive effort	0.773									
Analysis	0.349	0.654								
Elaboration	0.586	0.542	0.759							
Memory	0.451	0.594	0.448	0.732						
Efficiency	0.385	0.541	0.673	0.624	0.735					
Design	0.485	0.482	0.591	0.640	0.765	0.715				
Information	0.503	0.453	0.626	0.697	0.620	0.769	0.852			
COO	0.347	0.354	0.477	0.463	0.262	0.283	0.404	0.789		
Perceived value	0.417	0.492	0.641	0.607	0.505	0.467	0.555	0.365	0.757	
Purchase intention	0.559	0.619	0.659	0.614	0.677	0.625	0.644	0.489	0.574	0.686

Exploratory Factor Analysis

We employed the EFA first, the results are as followed in Table 3. Reliability and validity tests are very important for latent variable analysis. The Cronbach's alpha coefficient calculated by reliability analysis can measure the degree of internal consistency. If the Cronbach's alpha coefficient is between 0.6 and 0.8, the factor load should be 0.5 or higher, and the results at this time are credible. If the alpha coefficient value exceeds 0.8, it is more believable. Reliability results show that all variable values are reliable.

Validity testing is done through exploratory factor analysis. Exploratory factor analysis is considered as an important tool for the study of latent variable models. As shown, all factor loadings are above 0.5. The KMO value, which measures the adequacy of sampling, is higher than 0.6. The chi-square statistic value is significant at the level of 0.001. Therefore, the test results of this model show that all variables are valid and can be further analyzed.

Table 3: Exploratory factor analysis and reliability results

Variable	items	mean	Std.	Factor loading	Cronbach's α	KMO
CE	CE1	3.97	0.67	0.831	0.817	0.707
	CE2	2.99	0.99	0.873		
	CE3	2.85	0.96	0.742		
AN	AN1	3.76	0.90	0.891	0.871	0.691
	AN2	3.85	0.88	0.883		
	AN3	3.37	0.89	0.702		
EL	EL1	3.56	0.87	0.781	0.823	0.723
	EL2	3.57	0.89	0.863		
	EL3	3.00	0.90	0.861		
ME	ME1	4.06	0.75	0.812	0.809	0.699
	ME2	3.09	0.91	0.622		
EF	EF1	3.95	0.75	0.851	0.802	0.802
	EF2	3.81	0.82	0.776		
	EF3	3.70	0.81	0.691		
DE	DE1	3.77	0.79	0.744	0.882	0.782
	DE2	3.45	0.85	0.821		
	DE3	3.23	0.93	0.783		
IN	IN1	3.50	0.84	0.774	0.896	0.746
	IN2	3.63	0.78	0.883		
	IN3	3.95	0.95	0.636		
	IN4	3.54	0.82	0.684		
COO	COO1	3.25	0.99	0.866	0.813	0.903
	COO2	3.22	0.96	0.854		
	COO3	3.49	0.96	0.733		
	COO4	3.00	0.98	0.807		
	COO5	3.19	0.98	0.702		
PV	PV1	3.51	0.92	0.69	0.817	0.81
	PV2	3.38	0.86	0.79		
	PV3	3.36	0.88	0.80		
PI	PI1	3.98	0.71	0.653	0.824	0.724
	PI2	3.45	0.97	0.892		
	PI3	3.19	1.03	0.682		

Confirmative Factor Analysis

In this study, AMOS software was employed to perform confirmatory factor analysis (CFA) on the variables of the model. The results are shown in Table 4. The advantage of using CFA is that you can perform a factor loading test to check statistical significance. We tested the factor structure extracted by confirmatory factor analysis to improve the overall goodness of the model's fit. The result of confirmatory factor analysis showed that $(\chi^2/df) = 2.471$. The goodness of fit of the model GFI is 0.925, and the comparative fit index 0.971, GFI and CFI are higher than 90%, indicating that our model fits very well. The value of the Tucker-Lewis coefficient (TLI) is close to 1, and greater than 0.9, indicating that the fit is good. Besides, the approximate root means square error (RMSEA) of this model is 0.04, which is less than 0.05, indicating that the model fits well. All indicators show that the model fits well.

Table 4: Goodness of fit test results of CFA

GOF index	Acceptable value	CFA model
χ^2/df	<3	2.471
P	P<0.01	0.000
CFI	>0.9	0.971
TLI	>0.9	0.955
GFI	>0.9	0.925
AGFI	>0.9	0.912
SRMR	≤ 0.05	0.048
RMSEA	≤ 0.05	0.031

Composite reliability is a measure of internal consistency in scale items. Convergent validity refers to the convergence of items

of a certain variable or a high proportion of common variation. Convergent validity can be tested by observing the loading of the measurement items in the CFA test results. CR is an index that measures reliability and internal consistency based on the factor loading square of a variable. AVE is a measure of the convergence of the variable. This value should be greater than 0.7 and at least higher than 0.5. In addition to CR and AVE, there are tools that can be used to test reliability and validity. Such as MSV, Max R, and Max r of the model. Discriminant validity can be tested by the ratio of AVE and MSV. When this value is greater than 1, it indicates that the discriminant validity test has been passed. The results are shown in Table 5. The results show that implying that all four variables indicate strong composite reliability, convergent validity, and discriminant validity.

Table 5: Composite reliability, convergent validity, and discriminant validity tests

Variable	CR	AVE	MSV	AVE/MSV
Cognitive effort	0.845	0.697	0.315	2.213
Analysis	0.803	0.628	0.308	2.039
Elaboration	0.839	0.613	0.374	1.639
Memory	0.743	0.683	0.342	1.997
Efficiency	0.761	0.547	0.259	2.112
Design	0.843	0.691	0.394	1.754
Information	0.775	0.525	0.214	2.453
COO	0.895	0.689	0.304	2.266
Perceived value	0.712	0.536	0.218	2.459
Purchase intention	0.785	0.574	0.278	2.065

Note: CR > 0.7; AVE > 0.5; MSV < AVE.

Assessment of the Structural Model

The results of the structural equation model goodness of fit test results are shown in Table 6. In this study, AMOS software was used to estimate the structural equation model. The structural equation model goodness of fit test results showed that (χ^2/df) = 2.545. The goodness of fit of the model GFI is 0.912, and the CFI (comparison fit index) is 0.956. Both GFI and CFI are higher than 90%, indicating that our model fits very well. The Tucker-Lewis coefficient (TLI) is 0.941, and the value is close to 1, which is greater than 0.9, indicating that the fit is good. Also, the approximate root means square error (RMSEA) of this model is 0.033, which is less than 0.05, indicating that the model fits well. All indicators showed that the estimated results of the structural equation model meet the minimum requirements for acceptable values, indicating that the conceptual model in this study is consistent with the empirical data and the model fits well.

Table 6: Goodness of fit test results of SEM

GOF index	Acceptable value	SEM model
χ^2/df	<3	2.545
P	P<0.01	0.000
CFI	>0.9	0.956
TLI	>0.9	0.941
GFI	>0.9	0.912
AGFI	>0.9	0.908
SRMR	≤0.05	0.046
RMSEA	≤0.05	0.033

Results of the structural model estimations are shown in the Table 7 as follows. This model takes four factors of perceived value as independent variables and uses consumers' cross-border online purchase intention as the dependent variable to perform empirical analysis to test the impact of consumer resources, cross-border e-commerce platform services and COO on purchase intention through the perceived value. Through regression analysis, it is found that the value of the adjusted R-square is acceptable according to statistical standards, the Significant value of consumer resources is 0.003, the Significant value of cross-border e-commerce platform services is 0.004, the Significant value of COO is 0.002, and the Significant value of perceived value is 0.000. All of which are less than 0.01.

This conclusion further verified that customers' cross-border online purchase willingness will be affected by customers' expertise, platform service quality, and COO through perceivable value. From the regression coefficient, the three variables have indirect positive effects on customers' cross-border online shopping willingness. The coefficient of platform service quality is 0.322, the largest one among three variables, indicating that there is an increase on the consumer's willingness to purchase across borders when the platform delivers a higher level of service quality. The coefficient of COO is 0.322, indicating that there is the stronger the consumer's willingness to purchase across borders and perceived value when the effect of COO is stronger. Therefore, it is assumed that H1, H2, H3, and H4 are verified.

Table 7: Results of the structural model estimations

Hypothesis	Description/Path	Estimate B	P value	Results
H1	Consumer Expertise→PV	0.234	0.003	Supported
H2	Platform Service Quality→PV	0.322	0.004	Supported
H3	COO→PV	0.293	0.002	Supported
H4	PV→PI	0.893	0.000	Supported

Mediation Effect Test

The mediation effect mainly explores the indirect relationship between variables, that is, the dependent variable can be influenced by independent variables through one or more intermediate variables. For the theoretical model of this research, we can easily find that consumers' perceived value is a mediating variable between consumer's expertise, platform service quality, COO, and consumer's cross-border online shopping intention.

Therefore, we use the regression method as shown in Table 8 to test the mediation effect. Regression analysis is performed on the independent variable and the mediate variable simultaneously with the dependent variable. It is found that there is fully mediation effect between perceived resources, consumer resources, platform service quality, COO, and consumers' willingness to purchase online across borders. Table 15 shows the full mediating effect of perceived value between consumer expertise and willingness to buy.

Table 8: Fully mediating effect of perceived value between consumer expertise and purchase intention

	Dependent variable	Independent variables	Sig.
Model 1	Purchase intention	(Const)	0.000
		Consumer expertise	0.000
Model 2	Purchase intention	(Const)	0.0969
		Consumer expertise	0.9120
		Perceived Value	0.000

CONCLUSIONS AND IMPLICATIONS

Conclusions

The main purpose of this paper is to explore the influencing factors of consumers' willingness to purchase in the cross-border e-commerce websites and apps. We believe that the most significant factor affecting consumers' cross-border online shopping is online service quality. And the country of origin effect also plays an important role in the cross-border purchase intention. Therefore, this study built a proposed model of cross-border online purchase intention. For the case of online cross-border shopping, perceived value is very important which can directly determine the purchase intention of customers. Based on the related theory, there are three significant latent variables that can indirectly determine the purchase intention of customers as follows: consumer resource, platform service quality (or ESQ), and country of origin. According to our positive study, platform service quality is the most important factor, and COO is the second one. All of the antecedent variables are significant according to statistical results. Empirical test results are consistent with theoretical assumptions.

Firstly, the above empirical results show that platform service quality of the cross-border online websites and apps will significantly affect consumers' perceived value and their willingness to purchase, and both of which are significant at a high level. At the same time, consumers' perceived value has a fully mediating effect on the relationship between online service quality and cross-border online purchase intention. The validity of this conclusion has also been proved by some other scholars. Nowadays, cross-border online shopping is very hot, and a lot of related cross-border e-commerce platforms and small and medium-sized cross-border e-commerce companies are emerging one after another. After all, the development of a cross-border online shipping eco-system is too fast to be a mature one. Some cross-border e-commerce platforms and companies lack experience and prospects. Therefore, some customers are not satisfied with some cross-border e-commerce platforms and companies. Some customers maybe give up the shopping on the cross-border e-commerce websites and apps for the sake of low-quality level.

But for young or high-income groups, cross-border online shopping is easy to be accepted because of buying global and high-quality goods. In addition, the group who are pursuing new things feel that cross-border online shopping is a very fashionable shopping method. This group of the population will also perceive the value of cross-border online shopping. According to the above analysis, we found that different people have different perceptions of the value of cross-border e-commerce, which indirectly affects the online shopping intentions of different consumers.

Secondly, the effect of country of origin is crucial to the purchase willingness of cross-border e-commerce users. Through the

above data analysis, it can also be found that country of origin has a positive impact on consumers' perceived value and cross-border online purchase intention, and both of which are at a significantly high level. Then consumers' perceived value has a fully mediating effect on the relationship between country of origin and purchase intention.

For cross-border e-commerce websites and apps, the transaction process is more complicated than traditional domestic online shopping. Consumers need to provide more detailed information, such as payment information and logistics clearance information. Due to the international logistics and customs clearance, consumers need to verify the accuracy of the information, which puts a great challenge on the perceived value of the websites and apps' service. Then variable international tax rules also make the cross-border online shopping process more complicated than that of traditional one. The developed country can give consumers more sense of security, a high level of logistics and service quality, etc. So how to improve the country image is very important for the developing country which wants to export more from cross-border e-commerce platforms.

Finally, consumer expertise is also a very important impact factor to the purchase willingness of cross-border e-commerce customers. We also found that the consumer expertise has a positive impact on consumers' perceived value and online purchase intention, and both of which are at a significantly high level. Then consumers' perceived value has a fully mediating effect on the relationship between consumer expertise and purchase intention.

Compared with domestic online shopping, cross-border online shopping needs more expertise and experience as follows: the knowledge of authenticity and quality of goods sold on cross-border e-commerce platforms, the knowledge of logistics security issues (Customs maybe seize the goods in case of not fully clearance information, etc.), the knowledge of payment security and qualification verifying of cross-border e-commerce. Therefore, expertise and experience are important factors affecting consumers' cross-border perceived value and purchase intention.

Implications

According to the research conclusions obtained in the paper, based on the characteristics of domestic cross-border e-commerce platforms and companies, the implications are as follows.

Firstly, we found that it can improve online service quality by expanding the range of products and promoting the customer service level offered by cross-border e-commerce platforms and companies. The mainstream cross-border e-commerce platforms in China basically only provide hot-selling products such as maternal and child, cosmetics, and clothing as well. The single-selling products mainly based on "explosive product" are often sold in hot-selling categories, so that consumers are difficult to feel the value of cross-border e-commerce for a wider range of other products. And online cross-border platforms and companies need to pay attention to the following issues: the websites and apps design, order processing efficiency, better products featured, and customer service quality.

Secondly, we found that it can improve online service quality and country image by simplifying the cross-border shopping process on related websites and apps. Because cross-border online shopping will inevitably increase the complexity of shopping process due to the difficulties of product listing, the comprehensiveness of customs clearance, and the restrictions on payment terms. Therefore, it is necessary to simplify the cross-border online shopping process.

Thirdly, it can improve the country's image by increasing qualification displaying of the cross-border online shopping websites and apps. Consumers' perceived security will have an impact on their cross-border online shopping intentions. So cross-border online platforms and companies can cooperate with the famous brand and official brand to reduce the perceived risk of cross-border e-commerce consumers.

Finally, it is crucial to help customers to form the expertise of cross-border e-commerce brands which is focused on word-of-mouth promotion. Purchase intention is significantly affected by consumers' online, and online trust is also influenced by branding and word of mouth. As a cross-border e-commerce platform or company, it should increase its brand recognition level through different communication channels. On the other hand, for the reviews function inside the websites or apps, they should strengthen the customer service capabilities, responding promptly to problems generated by consumers, and giving consumers a positive brand impression through online reviews, etc.

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