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The Influencing Factors on Consumers' Purchase Intention under the Cross-border E-commerce Platforms

(Full Paper)

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ABSTRACT

The 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 trust. Therefore, this study divided online trust of cross-border e-commerce platforms into four dimensions, and extracted four independent variables which are perceived usefulness, perceived easy to use, perceived security and consumers' trust propensity according to the TAM theory. Moreover, we used consumers' online trust as a mediator variable, constructed an expanded TAM research model to explore the mechanism and determinants of consumers' cross-border online shopping. Finally, the conclusions and implications were given according to the empirical analysis.

Keywords: Cross-border E-commerce, purchase Intention, TAM, online trust, influencing factors

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INTRODUCTION

China's cross-border e-commerce industry has demonstrated stable and rapid development thanks to the implementation of appropriate policy support and the progressive establishment of e-commerce platforms. The industry's prosperity suggests unique advantages of cross-border e-commerce, which are a result of promoting industrial transformation and accelerating economic restructuring.

In July 2018, Premier Li Keqiang of China's State Council announced a new initiative to upgrade China's Opening Up policy; boosting cross-border e-commerce and upgrading foreign trade. Building on previous experience, China's trade departments and city-level government aim to streamline approval, upgrade administrative procedures in logistics and storage, and speed up customs clearance. It will further facilitate international trade, stimulate business innovation, and encourage healthy competition. More zones will boost the volumes of imports and expand the range of competitive foreign products available to Chinese consumers.

According to iiMedia Research, Chinese cross-border e-commerce transactions reached 6.7 trillion yuan (\$1.01 trillion) in 2016, and increased significantly to 7.6 trillion yuan in 2017. The overall transaction scale (including retail and B2B) was growing considerably and jumped to 9 trillion yuan in 2018.

There are different platforms popular among Chinese consumers with different challenges and benefits. Kaola.com. Tmall, the giant of e-commerce, JD, Little Red Book, Yangmatou, Wechat store etc. On the retail sector, where new business models help retailers and suppliers meet the ever changing and demanding needs of retail shoppers. One example of this business model innovation is multi-sided digital platforms, which have become popular as they connect consumers with suppliers from around the world with a large ecosystem to support the retail platform.

Chinese government agencies have introduced a number of policies in support of rapidly growing cross-border e-commerce to promote China's international trade. Reducing transaction costs by means of policy intervention could generate comparative advantages and contribute to the growth of international trade.

As e-commerce is steadily increasing every year, trust building has become an important research topic in e-commerce research especially in developing countries. Some scholars pointed out that trust in intermediary and trust in online sellers are separated. Antecedents of trust and trust transference between online sellers and the intermediary are also explored.

This article presents a model based on Technology Acceptance Model(TAM) and an exhaustive examination of the model which is used to analyze the impact of online-trust on cross-border online purchase intention, and particularly research that addresses the four impacting factors of online trust of cross-border e-commerce. Consumer online trust is an important construct that has been frequently studied in the e-commerce literatures. Online trust is typically conceptualized as a mediator in research models between selected antecedents and consequences. Antecedents of online trust are studied to determine the extent to which they influence online trust. Consequences of online trust are studied to determine the extent to which online trust influences consumers' intention to use, use, or continue to use an e-commerce website.

Moreover, cross-border online transactions are more complex than domestic online transactions. Therefore, inconsistent results

create a quandary when attempting to generalize the existence, nature, and magnitude of online trust-related relationships. This study examines the antecedents and consequences of consumer cross-border online-trust in China. We built a cross-border online purchase intention model based on TAM model which considered online-trust as a mediator variable and other four variables as antecedents. Four antecedents are perceived usefulness, ease of use, perceived security and trust propensity.

CONCEPTUAL MODEL AND HYPOTHESIS DEVELOPMENT

Conceptual Model

There are many research papers that analysed influence factors of consumer online trust to explain consumers' willingness to purchase, such as websites or apps factors (security, ease of use, etc.), business factors (size, reputation evaluation), consumer factors themselves (trust propensity, online shopping experience) and trading environment (ethics, information technology). But there is no study based on the systematic and basically model to analyse the purchase intention of consumer through cross-border e-commerce websites or apps in general.

Although sales growth suggests that the number of online consumers is growing, diverse research findings do not conclusively determine which online shopping attributes influence consumer attitudes towards online shopping. From the perspective of customers' purchase intention, there are some mainstream theories, such as theory of reasoned action (TRA), theory of planned behaviour (TPB), technology of acceptance model(TAM), theory of customer perceived value maximization etc.

The technology acceptance model (TAM) provides a conceptual framework for the study of users' willingness. TAM suggests the belief-attitude-intention-behaviour causal relationship for explaining and predicting technology acceptance among potential users. TAM proposes that two beliefs about a new technology, perceived usefulness and perceived ease of use, determine a person's attitude toward using that technology, which in turn determine their intention to use it. Perceived usefulness is the degree to which one believes that using the technology will enhance his or her performance.

Based on TAM, this paper adopt perceived usefulness, perceived ease of use, perceived security, and trust propensity as the independent variables, online trust as the mediator and purchase intention as the dependent variable. And then we constructed a model of cross-border online shopping intention model.

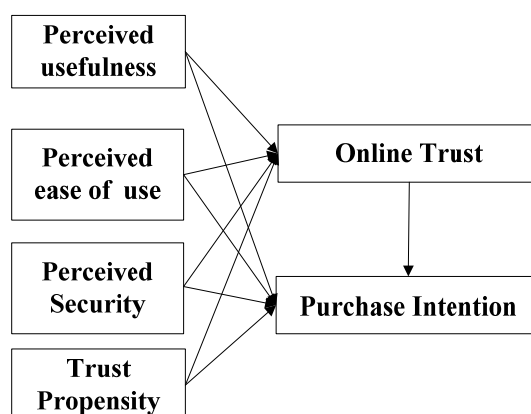


Figure 1 Conceptual model of the purchase intention

Perceived usefulness is defined as the subjective probability that a user improves their work performance in an organizational environment due to the use of a technology application system. In online cross-border shopping, perceived usefulness refers to the extent to which consumers perceive the use of cross-border online shopping to increase the output of their purchases. Compared to traditional international trade methods, the network can provide richer product information, reduce shopping costs, reduce shopping time, provide 24-hour service and enforce the controlling force that consumers perceive during the cross-border shopping process.

In the technology acceptance model, perceived ease of use is defined as the degree to which users can easily use the technical system without trouble. In cross-border online shopping, ease of use means that consumers perceive cross-border online shopping convenience and believe that shopping on the network can take less effort. It will make customers feel convenient through effective interaction between buyers and sellers, clear and easy-to-understand trading interface, convenient ordering and fast payment method. In general, when individuals feel that the difficulty of adopting a new technology is higher, the possibility of using this technology is lower, therefore consumers are willing to accept and trust such shopping only when they feel that cross-border online shopping is the easy way.

Perceived security is an expectation of safety and privacy of customers' personal funds, information and other aspects of cross-border online transactions. Because of the virtual nature of cross-border online purchase, consumers have great concerns about the security of trading and information transmission through the internet. There are some determinants which can affect consumers' trust in cross-border online shopping, such as the credit card information during the transaction, the security of

funds during the process of transaction, the protection of the user's personal information and privacy, etc. Moreover, there is a very significant factor whether the products received are consistent with the commitment of the online seller after payment. Cyber security issues can cause customers to worry about the loss of their personal and financial information when they are compromised on the cross-border e-commerce websites or apps, which can affect their decisions of purchase online. Previous technical acceptance model research has found that the impact of consumer perceived security on cross-border online shopping intention has become an important factor in consumers' acceptance of cross-border online shopping.

Trust propensity of customer can affect the consumer's purchase intention and actual decision, in addition to common demographic variables such as gender, age, occupation, education and income level. Trust propensity is a willingness to rely on other people because of different education backgrounds, personality types, and growing environments of individual. In cross-border e-commerce, consumers' trust propensity tends to have a direct impact on online trust which has been confirmed by some research papers.. Consumers' trust propensity is the kind of their personal characteristics, and a person with a high level of trust propensity is more willing to trust others than that of low level.

With a plethora of cross-border e-commerce websites and apps that consumers can choose from, online trust has become an important construct to investigate in the context of e-commerce purchase intention. Online trust is generally regarded as reliance on a specific firm by its stakeholders with respect to the firm's business activities in the electronic medium generally, and specifically on its website.

Consumers' online trust plays a significant role in the customer's purchase intention. Firstly, the formation of consumer online trust is based on the long-term repeated purchase of customers on the cross-border e-commerce websites and apps. Secondly, customers' online trust is relied on the word-of-mouth of their circles of friends. Therefore, customers in the cross-border online shopping situation who are affected by the subjective norms can form an initial trust in the purchased websites or apps. When the initial trust is continuously strengthened by the surrounding influence, the consumer's online trust will be strengthened.

A large number of studies have shown that improving and resolving network security perception will also have a positive impact on trust generation; while consumer security perception is generated, consumer network trust will also occur. In the cross-border e-commerce environment, online trust is an important factor affecting behaviour of consumers. Moreover, relevant research showed that in the online cross-border shopping situation, the consumers' online trust is positively related to their purchase intention, which can lead to repeated purchase behaviour. In summary, it can be inferred that factors will affect their network trust, and thus affect their willingness to purchase through the channels of cross-border e-commerce, such as perceived usefulness, perceived ease of use, perceived security and trust propensity.

Hypothesis Development

Online trust can positively influence consumers' willingness to purchase based on cross-border e-commerce websites and apps. That is, for cross-border e-commerce websites and apps, online trust of consumer will increase the willingness to purchase cross-border online products.

First, people tend to use an application of cross-border online shopping to the extent they believe it will help them perform their purchase better. We refer to this first variable as perceived usefulness. Second, even if potential users believe that a given application is useful, they may believe that the systems is too hard to use and that the performance benefits of usage are outweighed by the effort of using the application at the same time. That is, in addition to perceived usefulness, usage is theorized to be influenced by perceived ease of use. Perceived usefulness is defined here as the degree to which a person believes that using a particular system would enhance his or her purchase performance. This follows from the definition of the word useful which is capable of being used advantageously. Within an organizational context, people are generally reinforced for good performance by raises, promotions, bonuses, and other rewards. A cross-border online shopping website or application in highly perceived usefulness, in turn, is one for which a user believes in the existence of a positive use-performance relationship.

Online shopping website or application should be designed to be easy to use and have good functionality. The structures of the product display and the tips of website and apps will have significant impact on the trust of consumers. The consumers' perceived usefulness and perceived ease of use are constructed by the elements of the design, merchandise display and search fluency of these specific cross-border e-commerce websites and apps.

No one would argue, we think, perceived security of cross-border e-commerce websites and apps is the influencing factor that really affects the consumers' online trust.

From the consumer's personal point of view, personal traits are a long-term stable feature that is not easily changed by the environment. The personal trait of consumers is generally measured by the consumer's trust propensity. This paper also believes that the personal traits of consumers are the antecedent of consumer trust. Consumers who have high level of trust propensity should have high level of online trust in cross-border e-commerce websites and apps. The eleven hypotheses developed according to our concept mode are as follows:

H1: Perceived usefulness of cross-border ecommerce websites and apps will have a significant positive effect on consumer online trust.

H2: Perceived ease of use for cross-border ecommerce websites and apps will have a significant positive effect on consumer online trust.

H3: Perceived security for cross-border ecommerce websites and apps will have a significant positive effect on consumers' online trust.

H4: Trust propensity will have a significant positive effect on consumer online trust.

H5: Perceived usefulness of cross-border ecommerce websites and apps will have a significant positive effect on consumers' purchase intention.

H6: Perceived ease of use for cross-border ecommerce websites and apps will have a significant positive effect on consumers' purchase intention.

H7: Perceived security for cross-border ecommerce websites and apps will have a significant positive effect on consumers' purchase intention.

H8: Trust propensity will have a significant positive effect on consumers' purchase intention.

H9: the effect of perceived ease of use on consumers' purchase intention is mediated by online trust.

H10: the effect of perceived usefulness on consumers' purchase intention is mediated by online trust.

H11: the effect of perceived security on consumers' purchase intention is mediated by online trust.

H12: the effect of trust propensity on consumers' purchase intention is mediated by online trust.

From the first hypothesis to the fourth one, they are the influencing factor hypotheses of online trust. From the fifth hypothesis to the ninth one, the model was designed to verify the direct impact on purchase intention of four independent variables, which are perceived usefulness, perceived ease of use, perceived security and trust propensity. From the tenth hypothesis to the twelve one, they are the four antecedents variables hypotheses of purchase intention.

SCALE, QUESTIONNAIRE AND DESCRIPTION STATISTICS

According to the above, the variables in this study are as follows: perceived usefulness, perceived ease of use, perceived security, trust propensity, online trust, return policy and consumer's purchase intention. The above variables are mainly designed based on the scale in the existing research papers, and the specific content and references are shown in table 1 below:

Table 1 Scale design

Variables	Measurement	Reference
Perceived usefulness	<ol style="list-style-type: none"> 1. This website has enough overseas products for me to choose. 2. Compared with Haitao, purchasing, etc., shopping on this website is cheaper. 3. This website can provide perfect after-sales service, delivery is timely 4. This website shopping can keep me up to date with the fashion. 5. This website can provide detailed and sufficient shopping help information. 	Paul A. Pavlou (2003) Urvashi Tandon, Ravi Kiran, Ash Sah (2017)
Ease of use	<ol style="list-style-type: none"> 1. Shopping on this site can take less time 2. Worries about not buying fakes on this website 3. The trading process of this website is very simple 4. This website can easily search for the products I need. 5. The interface of this website is friendly and easy to operate. 	David Gefen, Detmar W. Straub (2000)
Perceived security	<ol style="list-style-type: none"> 1. The product quality of this website is reliable 2. The product information on this website is authentic and reliable. 3. The payment process of this website is safe and reliable. 4. The product package purchased on this website is in good condition. 5. This website will not reveal my personal information. 	Andrew Rohm, Vanitha Swaminathan. (2004)
Trust	<ol style="list-style-type: none"> 1. I easily trust a person or thing 	David Gefen, Detmar W. Straub

propensity	2. I have a high probability of trusting a person or thing 3. In most cases, people's interaction with him is honest.	(2000)
Online trust	1. This website will fully consider the interests of customers. 2. I believe that the information provided by the website 3. The website will fulfill its commitment to customers	D. Harrison McKnighta, Vivek Choudhuryb, Charles Kacmarc. (2002)
Purchase intention	1. If the website has the goods I need, I will buy it on the website. 2. I think it is more willing to buy on this website than other websites. 3. I will recommend other people to shop on this website.	William Boulding, Ajay Kalra, Richard Staelinet al. (1993) Ilias O. Pappas Panos E. Kourouthanassis Michail N. Giannakos George Lekakos (2017)

Firstly, we selected the scale mainly referring to the previous literature research. And they were appropriately modified according to the characteristics of cross-border e-commerce. Secondly, we modified the questions based on the scientific discussion and other scholars' suggestion. Thirdly, after the basic design of the questions was completed, an in-depth interview was conducted to investigate its fitness of cross-border e-commerce as well as the respondents' feelings of completing the questionnaire. Then we continued to make corresponding modifications. Finally, the questionnaire design specification was appropriately formed, and the final questionnaire is finished.

This study used the Likert five-point scale, which mainly considers that it is difficult for consumers to measure the accuracy of the 7-point scale when filling out the questionnaire. For the three-point scale, the measurement is not very accuracy. Therefore, it was decided that the study used a 5-point scale.

We distributed the questionnaire based on the stochastic rules. According to the goal of study, the sample group of this research is mainly based on the mainstream population covering cross-border online shopping consumers. Considering of relevant research papers, it is found that the cross-border online shopping group is mainly composed of young and middle-aged groups such as students and young white-collar workers. The most popular category of cross-border e-commerce is female related, so the female group is also the main target of our research.

Therefore, this study used the Questionnaire Star as a tool to fill in our questionnaire via mobile apps such as WeChat and Weibo. At the same time, female white-collar workers are the main consumer groups of cross-border online shopping, so we also issued paper questionnaires in commercial areas with large number of offline customers on weekends and holidays as complements.

DATA ANALYSIS AND RESULTS

Descriptive Statistical Analysis

The questionnaire was distributed in the form of a web-linked questionnaire, and 276 valid responses were collected. The questionnaires linked to the webpage are mainly shared by WeChat. Table 2 below is a descriptive statistics of the respondents.

Table 2 The result of descriptive statistical analysis

Descriptive indicator	Category	Frequency	Proportion
Sex	Male	88	31.9%
	Female	188	68.1%
Age	Under 18 years old	8	2.9%
	18-25 years old	193	69.93%
	25-35 years old	59	21.38%
	35-50 years old	15	5.43%
	Over 50 years old	1	0.36%
Education	High school and below	5	1.81%
	College degree	40	14.49%
	Bachelor degree	219	79.35%
	Master degree and above	12	4.35%
Occupation	Student	158	57.25%
	Enterprise employee	86	31.16%
	Government employee	18	6.52%
	Freelance	14	5.07%
	other	0	0%
Disposable income	1500 yuan and below	96	34.78%
	Between 1500 and 3000 yuan	69	25%
	Between 3000 and 5000	73	26.45%

Online shopping frequency	yuan		
	Between 5000 and 8000 yuan	25	9.06%
	Above 8000 yuan	13	4.71%
	sometimes	49	17.75%
	occasionally	122	44.2%
	often	105	38.04%

The result descriptive statistics of the table **Table 2** is as follows: Female consumers accounted for nearly 70%; 18-25 years old accounted for nearly 70%; undergraduate and graduate students accounted for nearly 85%; students and enterprises accounted for nearly 90%. The questionnaire was distributed in line with the current mainstream characteristics of online shopping.

Disposable income is concentrated between 1,500 and 5,000 yuan, which is in line with the income characteristics of respondents. The frequency of online shopping accounted for 38% of cross-border online shopping, and this result indicated the current trend and research feasibility of cross-border online shopping.

Through the above simple analysis, we can see that the respondents of questionnaire are basically in line with the research purpose. The labels of cross-border online consumers are young and female. It provided our research a good data foundation.

Reliability Test And Validity Test

This paper will use the Cronbach' Appha coefficient to verify the consistency of the scale. The reliability analysis test results are specifically shown in table 3 below:

Table 3 Reliability Analysis Results

Variables	Items	Cronbach's Aolpha if if item Deleted	Cronbach's Aolpha
Perceived usefulness	A1	0.776	
	A2	0.766	
	A3	0.762	
	A4	0.812	
	A5	0.828	
	Five		0.827
Ease of use	B1	0.762	
	B2	0.751	
	B3	0.749	
	B4	0.751	
	B5	0.757	
	Five		0.797
Perceived security	C1	0.851	
	C2	0.843	
	C3	0.882	
	C4	0.861	
	C5	0.872	
	Five		0.893
Trust propensity	D1	0.803	
	D2	0.762	
	D3	0.698	
	Three		0.819
Online trust	E1	0.803	
	E2	0.652	
	E3	0.792	
	Three		0.818
Purchase intention	G1	0.839	
	G2	0.769	
	G3	0.779	
	Three		0.860

As can be seen from the above table, the reliability values of each variable are greater than 0.7, and the Cronbach Bahrain alpha coefficient after each item is deleted is lower than the variable reliability value. The result indicated that the scale had a very good reliability, that is, various measurement items the questionnaire can be used to describe the variables in a stable and

realistic explained.

Validity analysis is composed of analysis of content validity and analysis construct validity. Content validity can also be referred to as surface or logical validity, primarily as a subjective and systematic assessment of the measurement tasks performed on the necessary measurement of scales. The measurement scales for different variables of this questionnaire are based on domestic and foreign research papers that have been verified several times.

The construct dimension is a major indicator of the validity test. This paper used factor analysis to verify the construct validity of the scale. Generally speaking, before performing validity test, the KMO and Bartlett spherical test must first be performed on the questionnaire. When the KMO value exceeds 0.89, it means that the factor analysis of these variables is better. When the value is between 0.75 and 0.89, then this means that the model is very suitable for factor analysis. When it is between 0.55-0.65, factor analysis can be performed. When it is between 0.45-0.59, this means poor effect. The data of questionnaire should be abandoned when it is less than 0.45. The KMO and Bartlett spherical test result of this paper is shown in Table 4. The overall KMO value is 0.929, and the Bartlett test is 0.000. It means that there is a significant correlation between the data. Combined with the above two indicators, it can be judged that the data sample is suitable for the factor analysis method.

Table 4 KMO and Bartlett Test

Kaiser-Meyer-Olkin measurement of sufficient Sample		.929
Bartlett's sphericity test	Approximate chi square	5776.663
	df	357
	Sig.	0.000

Table 5 shows the result of KMO measure of online trust variable and the Bartlett sphere test. The value of KMO is 0.669, and the P value is $0.000 < 0.001$, which means that this variable is suitable for factor analysis. The conclusion of factor analysis is that the factor loading of different items of online trust exceeds 0.79, and the variance explained by this factor is 73.04%. So it means that the construct validity test result of the variable is very good.

Table 5 Component Matrix, KMO and Bartlett test of online trust

Variable	Item	Factor loading	KMO	Bartlett test
Online trust	E1	0.829	0.669	0.000
	E2	0.897		
	E3	0.829		

The result of KMO test and the Bartlett sphere test of purchase intention is shown in Table 6, and the factor analysis also showed that the construct validity of this variable is good. Then the rest variables of the model passed the construct validity test, such as perceived usefulness, perceived ease of use, perceived security and trust propensity. We didn't show the test result of them due to the length of the paper.

Table 6 Component Matrix, KMO and Bartlett test of purchase intention

Variable	Item	Factor loading	KMO	Bartlett test
Purchase intention	G1	0.862	0.721	0.000
	G2	0.914		
	G3	0.902		

Empirical Analysis Of Factors Affecting Purchase Intention

Correlation analysis between variables

As can be seen from Table 7, the correlation coefficients between usefulness, ease of use, security, trust tendency and online trust are 0.701, 0.607, 0.692 and 0.802 respectively. The above coefficients are significantly correlated at the 0.001 level. Therefore, the preliminary judgement can be made that H1, H2, H3, and H4 are established.

Table 7 Correlation analysis between online trust and its determinants

		Perceived usefulness	Ease of use	Perceived security	Trust Propensity	Online trust
Perceived usefulness	Pearson correlaton	0.979	0.641***	0.639***	0.741***	0.701***
	Significance (two sides)		0.000	0.000	0.000	0.000
Ease of use	Pearson correlaton	0.641***	1	0.602***	0.619***	0.611***
	Significance (two sides)	0.000		0.000	0.000	0.000
Perceived security	Pearson correlaton	.638***	.613***	1	.723***	.683***
	Significance (two sides)	0.000	0.000		0.000	0.000
Trust Propensity	Pearson correlaton	0.752***	0.618***	0.713***	1	0.826***
	Significance (two sides)	0.000	0.000	0.000		0.000
Online trust	Pearson correlaton	0.701***	0.612***	0.683***	0.805***	1

	Significance (two sides)	0.000	0.000	0.000	0.000	
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Note: ***Represents a significant correlation at the 0.1% level (both sides).

It can be found that the correlation coefficients between usefulness, ease of use, safety, trust tendency and purchase intention are 0.661, 0.638, 0.651 and 0.751 respectively in the Table 8. The above coefficients are significantly correlated at the 0.001 level. So, the preliminary judgement can be made that H5, H6, H7, and H8 are established.

Table 8 Correlation analysis between purchase intention and its determinants

		Perceived usefulness	Ease of use	Perceived security	Trust Propensity	Purchase intention
Perceived usefulness	Pearson correlaton	1	0.641***	0.639***	0.741***	0.661***
	Significance (two sides)		0.000	0.000	0.000	0.000
Ease of use	Pearson correlaton	0.641***	1	0.602***	0.619***	0.639***
	Significance (two sides)	.000		0.000	0.000	0.000
Perceived security	Pearson correlaton	0.639***	0.602***	1	0.712***	0.651***
	Significance (two sides)	.000	.000		0.000	0.000
Trust Propensity	Pearson correlaton	0.752***	0.619***	0.723***	1	.746***
	Significance (two sides)	0.000	0.000	0.000		0.000
Purchase intention	Pearson correlaton	0.662***	0.648***	.652***	.756***	0.986
	Significance (two sides)	0.000	0.000	0.000	0.000	

Note: ***Represents a significant correlation at the 0.1% level (both sides).

It can be found that the correlation coefficients between online trust and purchase intention are 0.747, 0.747 respectively in the Table 9. The above coefficients are significantly correlated at the 0.001 level. So, the preliminary judgement can be made that H9 is established.

Table 9 Correlation analysis between purchase intention and online trust

		Online trust	Purchase intention
Online trust	Pearson correlaton	0.967	.747***
	Significance (two sides)		0.000
Purchase intention	Pearson correlaton	0.747***	0.988
	Significance (two sides)	0.000	

Note: ***Represents a significant correlation at the 0.1% level (both sides).

Regression analysis of influencing factors

According to the previous analysis results, some hypotheses of this paper have obtained preliminary verification, but the correlation analysis can only analyze the dependence and tightness between different variables. Moreover, it cannot explain the causal relationship. The paper used the method of multiple regression to study the causal relationship and mediating effects of the research hypothesis.

Firstly, the four influencing factors of online trust are taken as independent variables, and online trust is used as the dependent variable to carry out regression analysis to test the influence of usefulness, ease of use, security and trust propensity on online trust. The result of regression analysis in Table 10 showed that the value of the adjusted R-square is 0.679, the Sig value of Perceived usefulness is 0.019, the Sig value of ease if use is 0.011, the Sig value of perceived security and trust propensity are 0.000. All of variables' Sig value are less than 0.05, so the overall regression effect is significant.

Regression analysis further proved that online trust is affected by usefulness, ease of use, security, and trust propensity. In the table 10, the four independent variables have positive effects on online trust, and the weight of trust propensity to be the largest

one (0.499), indicating that the consumer's trust propensity is the strongest one. The remaining independent variables from large to small according to influence which are sorted as follows: perceived security (0.183), perceived usefulness (0.172) and ease of use (0.131). Therefore, it was showed that H1, H2, H3, and H4 were verified.

Table 10 Regression results of impact factors and online trust

Dependent variable	Independent variables	Non-standardized coefficients		Standardized coefficients	t	Sig.
		B	Stand error			
Online trust	Const	0.221	0.139	0.214	1.551	0.119
	Perceived usefulness	0.172	0.051	0.159	3.061	0.019
	Ease of use	0.131	0.051	0.131	2.901	0.011
	Perceived security	0.183	0.052	0.201	3.721	0.000
	Trust propensity	0.499	0.059	0.501	8.742	0.000

Secondly, the four influencing factors of purchase intention are taken as independent variables, and purchase intention is used as the dependent variable to carry out regression analysis to test the influence of usefulness, ease of use, security and trust propensity on purchase intention. The result of regression analysis in Table 11 showed that the value of the adjusted R-square is 0.631, the Sig values of Perceived usefulness and perceived security are 0.039, the Sig values of ease of use and trust propensity are 0.000. All of variables' Sig value are less than 0.05, so the overall regression effect is significant.

Regression analysis further proved that purchase intention is affected by usefulness, ease of use, security, and trust propensity. In the Table 11, the four independent variables have positive effects on online trust, and the weight of trust propensity to be the largest one (0.480), indicating that the consumer's trust propensity is the strongest one. The remaining independent variables from large to small according to influence which are sorted as follows: ease of use (0.237), perceived security (0.172) and perceived usefulness (0.109). Therefore, it was showed that H5, H6, H7, and H8 were verified.

Table 11 Regression results of impact factors and purchase intention

Dependent variable	Independent variables	Non-standardized coefficients		Standardized coefficients	t	Sig.
		B	Stand error			
Purchase intention	Const	0.059	0.171	0.048	0.370	0.708
	Perceived usefulness	0.109	0.061	0.100	1.741	0.039
	Ease of use	0.237	0.062	0.221	4.349	0.000
	Perceived security	0.172	0.063	0.1619	2.909	0.039
	Trust propensity	0.480	0.071	0.428	6.981	0.000

Finally, the regression model used online trust as an independent variable, and the consumer's willingness to purchase is a dependent variable in the Table 12. It is found that the value of R-square is 0.571, the Sig value of online trust and consumer's willingness to purchase is 0.000 less than 0.001. So the regression effect is significant. The regression coefficient of the online trust is 0.819, indicating that the significant influence on dependent variable is positive, and the hypothesis of H9 was verified.

Table 12 Regression results of online trust and purchase intention

Dependent variable	Independent variables	Non-standardized coefficients		Standardized coefficients	t	Sig.
		B	Stand error			
Purchase intention	Const	0.652	0.1628	0.568	4.178	.000
	Online trust	0.819	0.038	0.751	19.357	.000

The mediating effect of online trust

The mediation effect mainly explores the indirectly relationship between variables, that is, 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' online trust is a mediating variable between usefulness, ease of use, security, trust propensity and consumer's cross-border online shopping intention. For the inspection of mediating effect, the main analysis methods are as follows:

There are four influencing factors of online trust in the model, namely perceived usefulness, ease of use, perceived security and trust propensity. Online trust is a mediating variable, and consumers' purchasing intention is the dependent variable. Therefore, the variables are regression according to the above method. The analysis results are as follows in the Table 13.

Table 13 Mediating effect test of perceived usefulness

	Dependent variable	independent variable	Non-standardized coefficients		Standardized coefficients	t	Sig.
			B	Standard error			
Model 1	Purchase intention	Const	0.851	0.201	0.798	4.451	0.000
		Usefulness	0.721	0.052	0.660	14.671	0.000
Model 2	Purchase intention	Const	0.279	0.171	0.216	1.670	0.096
		Usefulness	0.282	0.059	0.247	4.811	0.000
		Online trust	0.631	0.063	0.581	11.020	0.000

From the regression results in the Table 13, it can be seen that after the second variable is added, the online trust is significant at the level of $p=0.001$, and the usefulness factor is still significant at the level of $p=0.001$. However, the standard regression coefficient decreases from 0.721 to 0.282, it shows that online trust has a partial mediate effect on the relationship between perceived usefulness and consumer purchase intention.

From the regression results in the Table 14, it can be seen that after the second variable is added, the online trust is significant at the level of $p=0.001$, and the ease of use factor is still significant at the level of $p=0.001$. However, the standard regression coefficient decreases from 0.691 to 0.272, it shows that online trust has a partial mediate effect on the relationship between ease of use and consumer purchase intention.

Table 14 Mediating effect test of ease of use

	Dependent variable	independent variable	Non-standardized coefficients		Standardized coefficients	t	Sig.
			B	Standard error			
Model 1	Purchase intention	Const	1.247	0.168	1.198	7.401	0.000
		Ease of use	0.718	0.047	0.638	14.151	0.000
Model 2	Purchase intention	Const	0.272	0.161	0.210	1.719	0.091
		Ease of use	0.318	0.047	0.302	6.448	0.000
		Online trust	0.632	0.047	0.583	12.591	0.000

From the regression results in the Table 15, it can be seen that after the second variable is added, the online trust is significant at the level of $p=0.001$, and the trust propensity factor is still significant at the level of $p=0.001$. However, the standard regression coefficient decreases from 0.829 to 0.449, it shows that online trust has a partial mediate effect on the relationship between trust propensity and consumer purchase intention.

Table 15 Mediating effect test of trust propensity

	Dependent variable	independent variable	Non-standardized coefficients		Standardized coefficients	t	Sig.
			B	Standard error			
Model 1	Purchase intention	Const	0.533	0.158	0.508	3.208	0.001
		trust propensity	0.829	0.0439	0.751	19.062	0.000
Model 2	Purchase intention	Const	0.252	0.1619	0.204	1.593	0.108
		Ease of use	0.449	0.072	0.448	6.790	0.000
		Online trust	0.472	0.070	0.428	7.118	0.000

In summary, online trust has partial mediating effects between the four independent variables (perceived usefulness, ease of use, perceived security, trust propensity) and dependent variables (purchasing intention). Therefore, it was showed that H9, H10, H11, and H12 were verified.

Based on the above empirical analysis, the following conclusions are drawn: the perceived usefulness, ease of use, perceived security and consumer trust propensity of the cross-border e-commerce websites and apps will significantly affect online trust, and will also positively affect consumers' willingness to cross-border online shopping. Consumers' online trust will also

significantly affect their willingness to purchase, and have a partial mediating effect between the above four independent variables and purchase intention.

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 distrust. Therefore, this study divided online trust of cross-border online shopping into four dimensions, and extracted four independent variables which are perceived useful, easy to use, perceived security and consumer trust propensity according to the TAM theory. Moreover, we used consumers' online trust as a mediator variable, constructed an expanded TAM research model to explore the mechanism and determinants of consumers' cross-border online shopping.

Firstly, the above empirical results show that the usefulness of the cross-border online websites and apps will significantly affect consumers' online trust and their willingness to purchase, and both of which are significant at the 0.001 level. At the same time, online trust has a partial mediating effect on the relationship between the perceived usefulness and 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 cross-border online shopping eco-system is too fast to be a mature one. Some cross-border e-commerce platforms and companies lack of 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 lacking trust.

But for young or high-income groups, cross-border online shopping is easily 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 ease of use of the websites and apps is crucial to the purchase willingness of cross-border e-commerce users. Through the above data analysis, it can also be found that the ease of use of the websites and ease has a positive impact on consumers' online trust and online purchase intention, and both of which are significant at the 0.001 level. Then online trust has a partial mediating effect on the relationship between ease of use 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 ease of use of the websites and apps. Then variable international tax rules also make the cross-border online shopping process more complicated than that of traditional one. So how to make the transaction process of the cross-border online shipping less complicated is very important.

Thirdly, the perceived security is very important impact factor to the purchase willingness of cross-border e-commerce customers. We also found that the perceived security has a positive impact on consumers' online trust and online purchase intention, and both of which are significant at the 0.001 level. Then perceived security has a partial mediating effect on the relationship between ease of use and purchase intention.

Compared with domestic online shopping, cross-border online shopping has many risks as follows: the risk of authenticity and quality of goods sold on cross-border e-commerce platforms, the risk of logistics security issues (Customs maybe seize the goods in case of not fully clearance information, and etc.), the risk of payment security and qualification verifying of cross-border e-commerce. Therefore, security considerations are an important factor affecting consumers' cross-border online trust.

Fourthly, the trust propensity of customers of the websites and apps is crucial to the purchase willingness of cross-border online shop. Moreover, this factor is a relatively stable internal personality trait that is difficult to change with the external environment. We find that consumers' trust propensity can affect consumers' online trust and their willingness to buy, even if it tends to be difficult to change. In daily life, we can explain it easily: Consumers of risk-averse personality traits will basically have reservations about emerging things, and will not change their mind to the extent even if cross-border e-commerce platforms and companies make a lot of efforts.

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 the perceived usefulness of customers by expanding the range of products offered by cross-border e-commerce platforms and companies. The mainstream cross-border e-commerce platforms in China basically only provides 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.

Secondly, we found that it can improve the ease of use by simplifying the cross-border shopping process on the 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 perceived security 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 form the cross-border e-commerce brand 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 the 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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