

Analysis of Factors Influencing the Sustainable Willingness of Imported Cross-border E-commerce Live Streams: Based on TAM-ECM Expansion Model

Lixia Lin, Wang He*

Jiangxi University of Finance and Economics, Jiangxi, China

* Corresponding author: Wang He

Abstract: Imported cross-border e-commerce platform is an important platform for consumers to conduct seafood panning and overseas shopping, among which the live-streaming interactive function has received a lot of attention from users. This study obtained data-based feedback from 213 cross-border e-commerce users on the live-streaming function by distributing an online questionnaire, based on which the TAM-ECM expansion model was successfully constructed, and the data was calculated by Amos software to obtain the factors influencing the willingness to continuously use live-streaming in imported cross-border e-commerce. The results of the study found that: marketing perception, perceived usefulness and expectation confirmation are the keys to improve user satisfaction and thus increase users' willingness to continue using the service. Finally, based on the analysis results, suggestions are made for imported cross-border e-commerce platforms in terms of pre-publicity, real-time live streaming and post-service.

Keywords: import cross-border e-commerce; direct broadcasting; sustained usage intention; TAM-ECM expansion model

1. Introduction

Imported cross-border e-commerce, a major channel to drive domestic consumption in China, has been the subject of in-depth research by a number of scholars since 2014. Chen Yan [1] conducted a case study on the current situation of imported cross-border e-commerce retail at that time and put forward the e-commerce dilemma. And in the face of economic globalisation and breakthroughs in traditional trade methods, innovative trade methods represented by cross-border e-commerce are gradually accelerating in the face of the rapid development of information networks today. With the continuous expansion of the scope and depth of cross-border e-commerce transactions, the cross-border e-commerce industry has maintained a high growth rate in the past decade. 2020's new crown epidemic has brought impact to many entities' international trade, but

the import and export transactions of cross-border e-commerce platforms have been boosted instead. According to official customs data, China's cross-border e-commerce imports and exports reached 1.69 trillion yuan in 2020, an increase of 31.1% year-on-year. On the other hand, with the rapid boom of live streaming platforms such as "Tik Tok", "Kwai" and "Hu Ya", live streaming has empowered the development of various industries and the integration of industries across borders has become a new trend. This is a new trend. As one of the new media marketing methods, live broadcast has a strong communication, wide audience and sharing nature. If the major cross-border e-commerce platforms want to gain a larger market share, break the game, attract more customers and increase consumers' willingness to continue to use, the new marketing model of "live broadcast + e-commerce" is a key point that cannot be ignored. And whether the cross-border integration of "live streaming+" and the imported cross-border e-commerce industry can be favoured by consumers and whether cross-border e-commerce live streaming can be used continuously is a problem that needs to be solved on the road of cross-border e-commerce development.

Wang Ting and Deng Yue investigated the positive contribution of the live webcast e-commerce model to the future development of e-commerce in "An investigation of the live webcast e-commerce model in the context of the webcast era" [2]. In "Exploring the transformation path of consumer satisfaction to consumer loyalty in cross-border import e-commerce platforms" [3], Yin, Xiajun and Xie, Ting used Jingdong Global Shopping and Tmall International as research objects to conduct an in-depth study on the behavioural path of consumer satisfaction to consumer loyalty transformation in cross-border import e-commerce platforms. Based on the research results related to cross-border e-commerce, this study constructs a TAM-ECM expansion model from the perspective of cross-border e-commerce users, designs, distributes and collects questionnaires, and conducts model validation and path analysis through data feedback from survey respondents to identify the problems and bottlenecks in the development of the live streaming

function of imported cross-border e-commerce platforms, and proposes research questions on the factors influencing the willingness to continuously use live streaming in imported cross-border e-commerce. And on the basis of the research results, suggestions for improving the live streaming function of imported cross-border e-merchants are discussed.

2. Research Hypothesis and Theoretical Model

2.1. Expectation Confirmation Model

Oliver proposed the Expectation confirmation theory (ECM), which is used to study consumer satisfaction with a product or service and is used in marketing cases. The theory compares consumers' pre-purchase expectations of a product or service with their post-purchase experience of the actual product or service, and then determines whether they are satisfied with the product and predicts their next purchase. Using this model, Bin Li [4] for Weibo and Xueqin Zhao and Shaochun Wang [5] for WeChat applets measured users' intention to continue using them. In this study, the following five hypotheses were formulated based on the model.

H1: The degree of confirmation expected by users of live cross-border e-commerce applications can have a positive impact on their perceived usefulness.

H2: The degree of confirmation of users' expectations of live cross-border e-commerce applications can have a positive impact on their satisfaction.

H3: The perceived usefulness of live cross-border e-commerce applications by users can have a positive impact on their satisfaction.

H4: The perceived usefulness of live cross-border e-commerce applications by users can positively influence their intention to continue using them.

H5: User satisfaction with a live cross-border e-commerce app can positively influence their intention to continue using it.

Although the Expectation Confirmation Model (ECM) currently enjoys a mainstream position in predicting consumer behaviour in IS contexts, the ECM has some shortcomings in that there are fewer external influences discussed in the model. Expectation confirmation, perceived usefulness and satisfaction are all likely to be influenced by external factors, therefore this study introduces the Technology Acceptance Model (TAM) on top of this model by introducing external variables.

2.2. Technology Acceptance Model

The Technology Acceptance Model (TAM) was proposed by Davis, who used the Theory of Rational Behaviour to study users' acceptance of certain information software or functions. The theory has been widely applied in various technological contexts such as driverless cars [6], university teachers and students for online teaching [7]. In this study, considering that in cross-border e-commerce activities, in order to obtain higher viewing and purchase rates for live streaming, major cross-border e-commerce platforms tend to enhance the perception of the usefulness and ease of use of the feature through promotional activities such as live

streaming pre-event, the exogenous variable "marketing perception" is introduced in this study to more accurately and specifically measure This is why the exogenous variable 'marketing perception' is introduced in this study to more accurately and specifically measure consumers' intention to use and predict their behaviour. Based on this model, the following four hypotheses were made.

H6: The perceived ease of use of live cross-border e-commerce applications by users can have a positive impact on their satisfaction.

H7: The perceived ease of use of live cross-border e-commerce applications by users can have a positive impact on their perceived usefulness.

H8: The extent to which users' perception of the marketing of live cross-border e-commerce applications can have a positive impact on their perceived usefulness.

H9: Users' perception of the marketing of live cross-border e-commerce applications can positively influence their perceived ease of use.

2.3. Theoretical Models

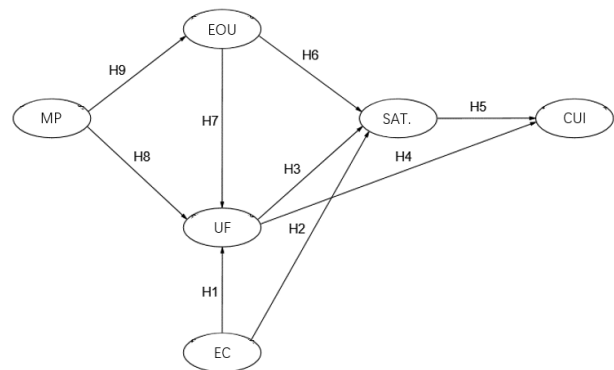


Figure 1. TAM-ECM Expansion Model

On the basis of the nine basic assumptions proposed, this study integrates the TAM model with the ECM model, introduces the external influence factor of "marketing perception", constructs six constructs such as "perceived usefulness", "perceived Six dimensions such as "perceived usefulness" and "perceived ease of use" were constructed, and an extended theoretical model of the factors influencing the continuous use of cross-border e-commerce live applications was proposed, as shown in Figure 1.

3. Study Design

3.1. Survey Respondents

According to the analysis of China's cross-border e-commerce user profile in 2020 by AiMediaData.com, China's imported cross-border e-commerce users are mainly concentrated in the group of young people living in first- and second-tier cities and with an age distribution of 24 years old and below. Taking into account the survey method, survey time and other conditions, the survey scope of this study was determined in Jiangxi Province universities. The preliminary survey results were collected through the online release of the electronic

questionnaire on the Questionnaire Star platform and its dissemination within the university groups of Jiangxi University of Finance and Economics, Nanchang University, Jiangxi University of Technology and Jiangxi Institute of Foreign Languages and Trade. A total of 213 questionnaires were returned, of which 204 were valid and 9 were invalid, with a valid return rate of 95.77%.

3.2. Questionnaire Design

The questionnaire for this study used the seven-point Likert scale to measure six constructs: “marketing perception”, “perceived usefulness”, “perceived ease of use”, “expectation confirmation”, “satisfaction” and “intention to continue using”. “expectation confirmation”, “satisfaction” and “intention to continue using”. Questions 1-7 represent Strongly Disagree, Disagree, Somewhat Disagree, Unsure, Somewhat Agree, Agree and Strongly Agree respectively. There were no less than three questions per facet. To ensure that the questionnaire was reasonable and efficient, the study first pre-surveyed a random sample of 20 subjects from different grades. Some similar questions were eliminated or changed through the pre-survey. A number of questions were also set for the basic information of the respondents, including gender, age, education level, disposable income, frequency of doing seafood and watching live streaming, etc. The questionnaire distribution process relied on the Questionnaire Star platform to conduct the online questionnaire.

3.3. Sample Characteristics

The population of this study is mainly the group of college students in the age group of 18-25 years old. Among them, 34.27% were male and 65.73% were female; 79.81% were earning less than RMB 3,000 and 20.19% were earning more than RMB 3,000. The most

used cross-border e-commerce platform among the university student group is Tmall International, followed by Suning Overseas Shopping, Kaola Haibao and Shunfeng Haibao. In terms of frequency of use, 45.07% of university students will make 3-5 purchases per month, and more than 16% will make more than 8 purchases per month. However, when they use cross-border e-commerce platforms, the frequency of watching live streaming is relatively low, with only 22.54% of users choosing to watch live streaming for their overseas purchases.

4. Data Analysis

4.1. Data Cleaning

The data for this study was filtered and refined on Excel and SPSS software, and nine extremes were excluded. Further items were packaged and processed for model validation in Amos software.

4.2. Confidence and Convergent Validity

Questionnaire reliability, or reliability, is the use of a measurement instrument and requires that the results obtained need to have a certain degree of consistency or stability. In this study, the alpha coefficient (i.e. Cronbach’s Alpha), was used to measure the reliability of the questionnaire. The larger the measured alpha coefficient, the higher the reliability of the questionnaire, that is, the more credible the questionnaire is, and the more stable it is. The alpha coefficients for the CR (Component Reliability) in Table 1 all lie between 0.8 and 0.95, indicating that the questionnaire works very well and that the measurement model has sufficient internal consistency reliability for the next step of the analysis.

Table 1. Indicators related to reliability and convergent validity

Structure	Title	Parameter significance estimates				Factor loadings	Question Reliability	Component Reliability	Convergent validity
		Unstd.	S.E.	t-value	P				
Marketing Perceptions MP	MP1	1.000				.854	.729	.852	.669
	MP2	1.117	.090	12.455	***	.989	.978		
	MP4	.605	.071	8.562	***	.548	.300		
Perceived Usefulness UF	UF1	1.000				.842	.709	.916	.689
	UF2	1.059	.061	17.287	***	.925	.856		
	UF3	1.033	.066	15.557	***	.865	.748		
	UF4	.852	.068	12.531	***	.753	.567		
Perceived ease of use EOU	UF6	.948	.076	12.453	***	.750	.563		
	EOU1	1.000				.818	.669	.923	.751
	EOU3	.998	.063	15.840	***	.898	.806		
	EOU4	1.100	.065	16.915	***	.945	.893		
Satisfaction SAT	EOU5	1.022	.077	13.206	***	.796	.634		
	SAT1	1.000				.864	.746	.945	.812
	SAT2	1.003	.054	18.696	***	.918	.843		
	SAT3	1.003	.056	17.821	***	.897	.805		

	SAT4	.996	.053	18.882	***	.923	.852		
Expectation Confirmation Degree EC	EC1	1.000				.908	.824	.942	.844
	EC3	.936	.046	20.183	***	.901	.812		
	EC4	1.026	.046	22.357	***	.947	.897		
Ongoing use of the Intentional CUI	CUI1	1.000				.918	.843	.944	.850
	CUI2	1.055	.045	23.527	***	.950	.903		
	CUI3	.967	.047	20.539	***	.896	.803		

Note: *** indicates that the p-test is significant at the 1% level

Questionnaire validity implies the validity of a questionnaire and refers to the degree that can be achieved by using a measurement instrument or tool that accurately measures the thing to be measured. In the convergent validity test, this study follows the recommendations of Hair et al. in validity assessment, the absolute value of the standard factor loading estimates should be at least 0.5, the value of the average variance extracted (AVE for short) indicator should be above 0.5, and the value of the synthetic reliability (CR for short) indicator should be above 0.7 to indicate a good convergent validity of the measurement model.

As can be seen from Table 1, the standard factor loadings for each measure item under marketing perception, perceived usefulness, perceived ease of use, satisfaction, expectation confirmation, and intention to

continue using are all above 0.7, and the CR value for each construct is greater than 0.8, the AVE value is greater than 0.6, and the p-test for each construct is significant at the 1% level therefore, indicating that the convergent validity of the measurement model meets the requirements.

4.3. Distinct Validity Analysis

Discriminant validity means that when different methods are used to measure different facets, the observed values should be distinguishable from each other, i.e. different enough to indicate that the facets are not similar or repetitive and can be better differentiated from each other.

Table 2. Differential validity scale

	AVE	CUI	SAT	EC	UF	EOU	MP
Continuous use of the Will CUI	.850	.922					
Satisfaction SAT	.812	.843	.901				
Expected Confirmation_EC	.844	.825	.893	.919			
Perceived Usefulness_UF	.689	.720	.746	.822	.830		
Perceived Ease of Use_EOU	.751	.742	.798	.807	.764	.867	
Marketing Perception_MP	.669	.427	.465	.509	.539	.423	.818

Note: The diagonal is the square root of AVE

In the test of discriminant validity, this paper uses the method proposed by Fornell-Larcker, whether the square root of AVE is higher than the correlation coefficient seen in the two factor constructs to determine whether there is discriminant validity. As can be seen from Table 2, the correlation coefficients for continued willingness to use, satisfaction, expectation confirmation, perceived usefulness, perceived ease of use, and marketing perception, along with the square root of AVE, are greater than their corresponding correlation coefficients.

Therefore, it indicates that the discriminant validity of the measurement model is good.

4.4. Testing of the Structural Model

The structural model was tested in this study using Amos software. The estimation of the path coefficients resulted in a standardised data report (as shown in Figure 2), through which the following conclusions can be drawn.

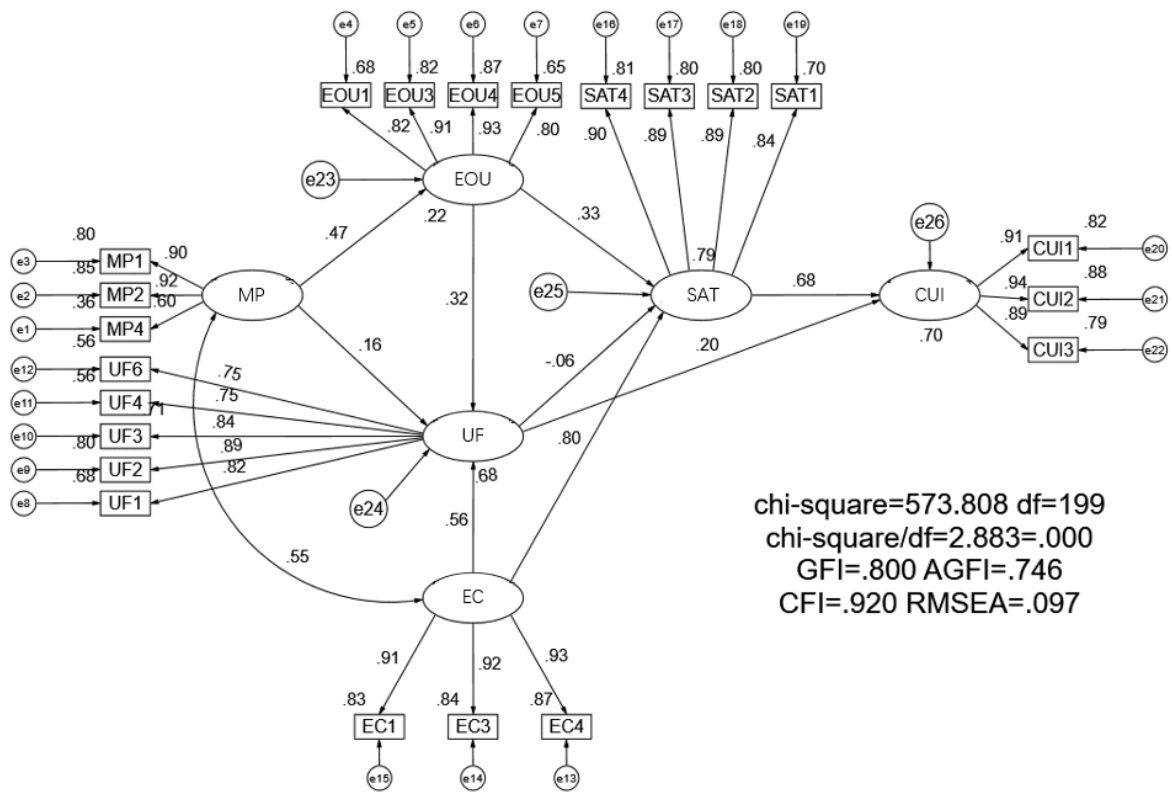


Figure 2. Standardised reporting diagram

Table 3. Model test results

Hypothetical relationships	Non-standardized coefficients	Standardisation factor	Structural model of SMC	P	Is the hypothesis valid
H1:EC→UF	.48	.56	.68	***	H1 established
H2:EC→SAT	.66	.80	.79	***	H2 is established
H3:UF→SAT	.06	.06	.79	.452	H3 does not hold
H4:UF→CUI	.22	.20	.70	***	H4 established
H5:SAT→CUI	0.2.79	.68	.70	***	H5 established
H6:EOU→SAT	.29	.33	.79	***	H6 established
H7:EOU→UF	.30	.32	.68	***	H7 established
H8:MP→UF	.19	.16	.68	.018**	H8 established
H9:MP→EOU	.58	.47	.22	***	H9 established

The R2 values for perceived ease of use (EOU), perceived usefulness (UF), satisfaction (SAT) and continued intention to use (CUI) in the measurement model are 0.22, 0.68, 0.80 and 0.70 respectively, with most of them greater than 0.67 and the smallest being 0.22, which also achieves a small explanatory power. It indicates that the frontal explanatory power of the conformation surface is good and the predictive effect of this measurement model is good.

According to Table 3, we find that, on the one hand, hypothesis H3: UF→SAT of the nine hypotheses of the study is not significant in the p-test and the hypothesis does not hold. This means that the hypothesis that users' perceived usefulness of live streaming has a positive effect on satisfaction is not valid and does not actually

have an effect on it. On the other hand, the other hypothesis holds and the standardisation in the table is its impact coefficient. For example, the expectation confirmation (EC) of the cross-border e-commerce users in the study can positively influence the perceived usefulness (UF) and satisfaction (SAT), with each unit increase in the expectation confirmation (EC) of the cross-border e-commerce users on live streaming increasing the perceived usefulness (UF) by 0.56 units and the satisfaction (SAT) by 0.8 units, respectively.

According to the hypothesis, user satisfaction and perceived usefulness have a direct impact on users' intention to continue using and the hypothesis holds at the 1% level of the p-test significant and with an explanatory power of up to 0.7. The impact coefficients

are 0.2 and 0.68 respectively, indicating that cross-border consumers' perceived usefulness has the most dramatic impact on users' intention to continue using, while the impact of satisfaction on users' intention to continue using is relatively small.

5. Conclusions and Recommendations

5.1. Conclusions of the Study

This study combines the expectation confirmation model with the technology acceptance model, introduces the exogenous variable "marketing perception", and uses this extended model to analyse the factors influencing the continued use of cross-border e-commerce live streaming.

(1) Of the nine hypotheses made in this study, those that hold true are H1, H2, H4, H5, H6, H7, H8, and H9, i.e., an increase in marketing perception can simultaneously increase users' perceived ease of use and perceived usefulness; expectation confirmation and perceived ease of use to contribute more to the increase in perceived usefulness and satisfaction; and satisfaction and perceived usefulness to positively influence users' continued Both satisfaction and perceived usefulness can positively influence users' intention to continue using. This finding is consistent with Gong Feng's [8] analysis of the factors influencing Chinese consumers' purchase intentions from the perspective of cross-border e-commerce imports.

(2) Hypothesis H3 does not hold, i.e. although users perceive that the live streaming function of imported cross-border e-commerce is very easy and practical can directly and positively increase users' willingness to continuously use the live streaming function, this does not lead to an increase in user satisfaction. This is also in line with the findings of scholars such as Zhang [9] who conducted a study on the factors that influence the persistence of short videos. And the reason for this finding is due to the low number of external influences introduced by the model. To further validate the relationship between perceived ease of use and satisfaction could be further refined in terms of the constructs to be hypothesised.

(3) In terms of the degree of influence of different paths, the greatest influence on users' willingness to continue using is satisfaction (influence coefficient of 0.68), while expectation confirmation has the greatest influence on satisfaction (influence coefficient of 0.80) and marketing perception has a significant positive influence on expectation confirmation (influence coefficient of 0.55). It is clear that marketing perception is an indispensable consideration for increasing users' willingness to continue using the service.

5.2. Recommendations

With the domestic and international economic environment affected by the new crown pneumonia, logistics, transportation and customs clearance are difficult, and the advantages of cross-border e-commerce over other forms of physical international trade come to the fore. Yu Yuemei [10] believes that new media such

as short videos and social media can enhance the efficiency of information dissemination on cross-border e-commerce platforms and provide new ways for cross-border e-commerce development. The combination of imported cross-border e-commerce and live broadcast can improve the traffic conversion rate of e-commerce platforms. On this basis, in order to improve the willingness of China's imported cross-border e-commerce users to continuously use the live streaming function, this study analyses the factors influencing the continuous use of live streaming in imported cross-border e-commerce platforms through specific data, and based on the statistical findings above, the following recommendations are made for the live streaming function of imported cross-border e-commerce platforms in terms of marketing perception, perceived usefulness and expectation confirmation.

(1) The simplification and upgrading of the live operation interface. On the cross-border e-commerce platform, the live broadcast entrance should be set up with eye-catching channels, as well as the interactive function and purchase function in the live broadcast can be smooth and precise. Instant interaction during live broadcasts can enable the specialised live operations of cross-border e-commerce to create higher conversion rates.

(2) The marketing activities in the pre-streaming period need to reach the people's hearts and minds, taking the product hotness, the strength of the offer and even the style of the anchor as the starting point for publicity, and aiming to attract more fans into the live broadcast. Careful design of the curated content and the novel and lively mode of publicity can create a unique brand value for cross-border e-commerce on the basis of attracting new users.

(3) The price, quality and service of the goods sold during the live broadcast are guaranteed, and there is no contradiction with the pre-publicity in order to meet the user's expectation of confirmation and retain the user to the maximum extent.

In conclusion, through this model study, the live-streaming application of cross-border e-commerce APPs can better meet users' willingness to continue using cross-border e-commerce live-streaming, both in terms of marketing campaign strength, and in terms of product information quality and platform tracking services.

Acknowledgment

This research was funded by the 15th Student Research Project of Jiangxi University of Finance and Economics (No: 2020061721310865).

References

- [1] Chen, Y. Analysis of the current situation of cross-border import retail e-commerce in China. *Business*, **2015** (05): 100-101.
- [2] Wang, T.; Deng, Y. The analysis of the net red live e-commerce model in the context of the webcasting era. *Modern economic information*, **2017** (15): 334.

- [3] Yin, M.J.; Xie, T. Exploring the transformation path from consumer satisfaction to consumer loyalty in cross-border import e-commerce platforms. *Business Economics Research*, **2021** (01): 90-93.
- [4] Qin, H.X.; Zhou, J.H.; Li, Z. A study on the differences in the willingness of teachers and students in higher education to use online teaching consistently. *Higher Education Research*, **2021**, 42(01): 83-93.
- [5] Wei, X.X.; Zhong, S.Q. A study of driverless car acceptance based on TAM and cognitive theory. *Comprehensive Transportation*, **2019**, 41(11): 79-84.
- [6] Li, B. Research on factors influencing microblog users' willingness to continue to use. Zhejiang University, **2012**.
- [7] Zhao, X.Q, Wang, S.C. Exploring the influencing factors of WeChat applet users' willingness to use consistently. *Modern intelligence*, **2019**, 39(06): 70-80+90.
- [8] Gong, F, Zhong, C.H. Factors influencing consumers' purchase intention in China from the perspective of cross-border e-commerce imports. *Special Economic Zone*, **2021** (01): 83-87.
- [9] Zhang, D.W.; Chen, Y.X.; Wang, M. Expectation and confirmation: A preliminary investigation of the factors influencing the sustained use of short video platforms - a study based on SEM and fsQCA. *Modern Communication (Journal of Communication University of China)*, **2020**, 42(08): 133-140.
- [10] Yu, Y.M. Research on the application of new media marketing methods for cross-border e-commerce. *Modern marketing (lower journal)*, **2020** (03): 75-76.