

# Research on Farmers' Use Behavior of Short Video Live Broadcast from the Perspective of Platform Economy: Based on TAM Model

Dekuan Liu, Xianyun Wu\*  
2297011920@qq.com, \*xianyun1109@163.com

Dalian Polytechnic University. China

**Abstract:** In the context of big data and the Internet giving rise to the "Internet of everything", platform economy has become a new economic model integrating industrial chain. The economic environment of agriculture and rural areas is undergoing reshaping and subversion. The combination of "short video live streaming + agriculture" has become a new form of agricultural development. This combination has developed rapidly with low threshold and strong interaction. Based on the perspective of platform economy, this paper takes "Douyin platform" as the research object, uses TAM model to analyze, and carries out empirical research on farmers' use behavior of short video live broadcast. Research shows that teaching medium, quality content and interface perception have important effects on user behavior. On the one hand, the short video live broadcast platform should keep pace with The Times to improve the perception. On the other hand, it should seize the characteristics of accuracy and real-time, promote the development of regional agriculture, promote the transformation and upgrading of agricultural industry, and make it a "new engine" for the development of agricultural economy.

**Keywords:** platform economy; TAM model; Behavior of use; Short video live broadcast.

## 1 INTRODUCTION

Platform economy is an important driving force to promote the upgrading and transformation of industrial structure at present, and will become an important pillar of strategic transformation of most enterprises in the future. In 2018, the short video live streaming platform experienced a blowout development, and the combination of "short video live streaming + agriculture" provided a new path for agricultural development (FU, 2021). Many farmers combine short video live broadcast with agriculture to learn agricultural technology, sell and publicize agricultural products through short video live broadcast. The rapid development of short video live broadcasting platform is of great significance for the dissemination of agricultural technology knowledge, the promotion of agricultural informatization modernization, and the realization of sustainable agricultural development. According to the China Internet Network Information Center (CNNIC), there were about 617 million users of short video live streaming in China by the end of 2020. As a representative of the short video live broadcasting platform, Douyin platform has a daily activity of over 580 million. It has the live broadcasting function of rural households in the same city, which meets the development requirements of regional agricultural real-time teaching. Therefore, taking Douyin platform as an example, this paper intends to conduct an empirical analysis of the

platform economy by investigating farmers' usage behavior of Douyin short video live broadcast, which is different from the qualitative analysis on the role and concept of short video live broadcast at home and abroad. In this paper, TAM model was used to explore the factors affecting farmers' use behavior of Douyin platform, and the relationship between potential variables at the cognitive level and adoption intention was analyzed.

## **2 LITERATURE REVIEW**

### **(1). Research on platform economy and user behavior**

Platform economy is a new business model that takes data as the production factor and creates value for customers through digital resource allocation. As for the new "business model", Yi Xianrong, Chen Yingying et al believe that platform economy is mainly based on big data, using the characteristics of comprehensive and objective information to create value for customers, and overturning the information constraint of traditional economy (Yi, Chen, Yu, 2020). Zhao Yu et al. also briefly described the new framework of platform economy research on the background of big data, and believed that big data is the foundation of platform economy development. Most scholars are based on the theoretical paradigm and concept of traditional economics, lack of empirical analysis of platform economy, and cannot reveal the essential characteristics of platform economy (Zhao, 2020). In view of the methods of user behavior research, American scholar Fred J. Fowler once proposed the questionnaire method. He believes that the questionnaire method has the characteristics of "how fast is good and save" in user behavior research, and it is applied to quantitative processing of data in a short time. The limitation is that the investigators need to answer actively and truthfully to ensure the validity of the questionnaire. Pruitt & Adlan believes that through the concept of PersonaLifecycle, in-depth analysis of users can be carried out. Users' characteristics and needs can be understood through user portrait method, and user prototypes can be integrated into the whole process of product design (Conrad Frederick, Keusch, Schober Michael, 2021). Based on the questionnaire method, this paper uses the statistical analysis method to process, summarize and calculate the data collected by the survey target, and combines the relevant elements of TAM model with the PLS algorithm to conduct detailed research on the data to form a conclusion.

## **3 RESEARCH DESIGN**

### **(1). Research theory and model**

In this paper, the TAM model of Venkatesh and Davis et al is selected as the basic model, and the external variables are improved, in which the external variables affect the perceived ease of use and perceived usefulness respectively (Special Issue of International Journal of Action Research, 2021). Perceived ease of use affects perceived usefulness; Perceived ease of use and perceived usefulness as mediating variables affect adoption intention. Referring to the original theory of technology acceptance model and the research variables proposed by Lu Qiang and Chen Limei, four external variables including high-quality content, teaching media, interface perception and additional services were selected to explore the influencing factors of farmers' Douyin live streaming platform use behavior.

## (2). Research hypothesis

Based on the research of Venkatesh and Davis et al., and based on the adjusted TAM model as the framework, this study intends to obtain the pre-influencing factors of farmers' willingness to adopt short video live streaming on Douyin platform through empirical analysis (Chen, Chen, 2019).

According to the research of Chen Limei and Chen Dongping et al., high-quality content is a key factor affecting the adoption intention of farmers, and the influence of high-quality content on perceived usefulness and perceived ease of use is proposed. High-quality content refers to the characteristics of regional agriculture on Douyin platform, such as high real-time performance and strong accuracy.

Hypothesis 1: Quality content has a significant positive impact on perceived ease of use.

Hypothesis 2: Quality content has a significant positive impact on perceived usefulness

According to the research of Yang Yiweng et al and Zhao Hang, teaching medium is an important factor affecting perceived ease of use, and interface perception is an important factor affecting perceived usefulness and perceived ease of use (ZHAO, 2019). The medium of instruction refers to the operation of Tiktok client and the local network situation. Interface perception refers to the clear and comfortable appearance of Douyin live streaming and reasonable interface arrangement.

Hypothesis 3: The medium of instruction has a significant positive impact on perceived ease of use

Hypothesis 4: Interface perception has a significant positive impact on perceived ease of use

Hypothesis 5: Interface perception has a significant positive impact on perceived usefulness

Based on the original variables of TAM model and UTAUT model, Zhang Pei et al. proposed hypothesis 7, Hypothesis 8 and hypothesis 9 in their research. In order to be more consistent with the object of this empirical study, the influence of additional services on perceived usefulness is put forward. Additional services refer to Douyin Live's ability to sell agro-chemical products and provide offline guidance.

Hypothesis 6: Additional services have a significant positive impact on perceived usefulness

Hypothesis 7: Perceived ease of use has a significant positive impact on perceived usefulness

Hypothesis 8: Perceived ease of use has a significant positive impact on adoption intention

Hypothesis 9: Perceived usefulness has a significant positive impact on adoption intention

## **4 QUESTIONNAIRE DESIGN AND DATA COLLECTION**

In addition to the option system for the sample population information statistics, the rest of the questionnaire adopts the internationally accepted Likert five-level scoring method. Seven variables, quality content, teaching media, interface perception, additional services, perceived ease of use, perceived usefulness and adoption intention, were assigned to two questions respectively, and each question was scored separately on a scale of 1-5, with 5 representing

completely agree and 1 representing completely disagree. A total of 14 questions were asked. In order to make the survey more relevant to the theme, the practical application of the technology acceptance model by Sun Tong and Li Yuehong et al. was referred to set up items to obtain the behavioral characteristics of Douyin use by farmers, and the final scale 1 was obtained. In this study, the online viewers of Douyin agriculture live broadcast in Dalian City were selected as the survey objects, and questionnaires were distributed in batches in three periods of morning, afternoon and evening every day. After 3 months, 121 questionnaires were collected, and 98 were valid, with an effective rate of 80.99%.

**Table 1** Variable definition table

variable	Multi-item content
Quality Content (AA)	Douyin agriculture live broadcast content is accurate, high implementation Douyin agriculture live content is in line with the current situation of local agriculture
Medium of Delivery (BB)	Douyin client is simple to operate Local network stability
Interface perception (CC)	The Douyin Live interface is clearly displayed The interface of Douyin live streaming is reasonably arranged and comfortable to watch and feel
Additional Services (DD)	Douyin mall farm fertilizer recommendation reasonable After the live class, we will provide agricultural production programs for ourselves
Perceived Ease of Use (EE)	Douyin doesn't require much effort to learn The course is interactive and barrier-free
Perceived Usefulness (FF)	You can learn more about agriculture in the Douyin class Douyin teaching helps its own agricultural production and management
Willingness to Adopt (GG)	Willing to learn agricultural knowledge on Douyin Live Apply the agricultural knowledge learned in Douyin Live to actual agricultural production

## 5 DATA ANALYSIS AND HYPOTHESIS TESTING

### (1). Reliability and validity test

In this study, partial least square structural equation algorithm is used, and the software is SmartPLS. Factor loading and reliability test are shown in Table 2, in which factor loading is greater than the restriction standard of 0.6, Cronbach $\alpha$  and CR are greater than 0.7, which meet the reliability standard according to the statistical principle. Good reliability ensures the consistency, stability and reliability of the results of this study.

**Table 2** Reliability and validity test table

Latent variables	multi-item	Factor loading	Reliability coefficient	CR	AVE	Cronbach $\alpha$
AA	A1	0.901	0.743	0.884	0.792	0.738

	A2	0.879				
BB	B1	0.900	0.757	0.891	0.804	0.756
	B2	0.894				
CC	C1	0.887	0.665	0.850	0.739	0.650
	C2	0.832				
DD	D1	0.916	0.807	0.912	0.838	0.807
	D2	0.915				
EE	E1	0.891	0.711	0.872	0.773	0.707
	E2	0.867				
FF	F1	0.882	0.760	0.890	0.801	0.752
	F2	0.908				
GG	G1	0.938	0.863	0.936	0.880	0.863
	G2	0.938				

According to the statistical principle, the convergent validity meets the requirement that the factor loading amount is greater than 0.5, AVE is greater than 0.5, and the reliability coefficient is higher than 0.65. It can be seen from Table 2 that the minimum factor loading value of each question is 0.832, much higher than the standard value of 0.5, and the minimum extracted average variance value (AVE) is 0.739 and greater than 0.5. The reliability coefficients were all higher than 0.65, so all variables met the requirements of convergent validity. The discriminant validity is that the square root of the extracted average variance value of the latent variable itself is greater than the variance value of other variables, that is, if the measurement model meets the requirements of the same row and the same column, it is considered that the measurement model has good discriminant validity. As shown in Table 3, the scale meets the requirements, so it can be considered that the measurement model has good discriminant validity. Good validity indicates that the measurement results of each variable are consistent with the test content, ensuring the accuracy and authenticity of this study.

**Table 3** Discriminant validity test table

	AA	BB	CC	DD	EE	FF	GG
AA	<b>0.890</b>						
BB	0.833	<b>0.897</b>					
CC	0.837	0.776	<b>0.860</b>				
DD	0.869	0.856	0.821	<b>0.915</b>			
EE	0.845	0.807	0.835	0.845	<b>0.879</b>		
FF	0.847	0.759	0.845	0.826	0.854	<b>0.895</b>	
GG	0.882	0.894	0.833	0.883	0.857	0.842	<b>0.938</b>

Note: THE values in bold on the diagonal are the AVE square root values of each facet, and the rest are the correlation coefficients between facets.

## (2). Test of fit degree

The smaller the SRMR value of the absolute goodness of fit index, the better the fit degree of the model. In statistical principles, it is generally believed that less than 0.1 indicates the reasonable fit degree of the model, and the more stringent requirement is less than 0.08. According to Dijkstra and Henseler, the fit criterion of d\_ULS and d\_G is less than 0.95, which is considered as good fit. According to Bentler and Bonett et al. the value of NFI is between 0 and 1, and the closer the value is to 1, the better the fitting degree is, and a value greater than 0.7 can be considered to have a good fitting degree. According to Table 4, the SRMR test result of 0.067 is less than the standard value of 0.08, the d-ULS and d-G values are 0.477 and 0.668 respectively, both less than 0.95, and the NFI value is 0.721 is higher than the standard value of 0.7. Therefore, the evaluation of all indexes in the study is satisfied, and the degree of fit is good.

**Table 4** Test table of fit degree

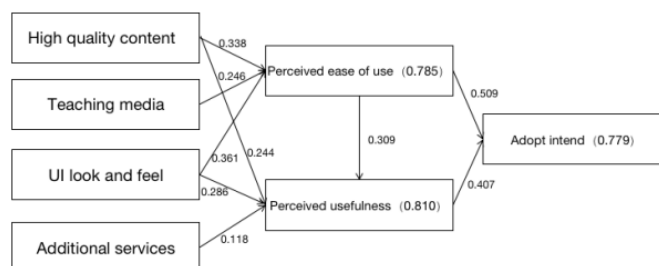
Indicators category	The evaluation index	Adapter standard	The inspection results	Fit of model
Absolute goodness of fit	SRMR	<0.08	0.067	good
Perfect fit index	d-ULS	<0.95	0.477	good
	d-G	<0.95	0.668	good
Specification adaptation index	NFI	>0.7	0.721	good

## (3). Path coefficient

SmartPLS is used to study the path coefficient and significance of the model, as shown in Figure 1 and Table 5, where T value and P value are used to evaluate whether the path coefficient is significant, and the path coefficient is as follows. This text sample size is 5000, obey the normal distribution, in line with the large sample statistics, according to the American statistician Gosset and statistical principle is put forward:  $1.64 \leq |t| < 1.96$ , the mean significant at 0.10 significant level;  $1.96 \leq |t| < 2.58$ , mean significant at 0.05 significant level;  $|t| \geq 2.58$ , indicated in the 0.01 significance level significantly. Therefore, the test results of this paper are as follows: the path coefficients of quality content, teaching media and interface perception on perceived ease of use are 0.338, 0.246 and 0.361 respectively, which are significant at the 0.01 confidence level. Therefore, Hypothesis 1, Hypothesis 3 and Hypothesis 4 are valid. Similarly, the path coefficient of interface perception on perceived usefulness is 0.286, the path coefficient of perceived ease of use on perceived usefulness is 0.309, the path coefficient of perceived ease of use on adoption intention is 0.509, and the path coefficient of perceived usefulness on adoption intention is 0.407, all of which are significant at 0.01 confidence level. Therefore, Hypotheses 5, 7, 8 and 9 are valid. The path coefficient of quality content on perceived usefulness is 0.224 and significant at 0.05 confidence level, so hypothesis 2 is valid. The effect of additional services on perceived usefulness is not significant, so Hypothesis 6 is not valid.

**Table 5** Path coefficient table

Research hypothesis	The model path	Path coefficient	T value	P values	The inspection results
Hypothesis 1	AA-EE	0.338	2.587	0.010	support
Hypothesis 2	AA-FF	0.224	2.168	0.030	support
Hypothesis 3	BB-EE	0.246	3.169	0.002	support
Hypothesis 4	CC-EE	0.361	2.946	0.003	support
Hypothesis 5	CC-FF	0.286	2.624	0.009	support
Hypothesis 6	DD-FF	0.118	1.087	0.277	Does not support
Hypothesis 7	EE-FF	0.309	3.363	0.001	support
Hypothesis 8	EE-GG	0.509	4.477	0.000	support
Hypothesis 9	FF-GG	0.407	3.677	0.000	support



**FIG. 1** Path coefficient diagram of the improved model (Photo credit: Original)

## 6 CONCLUSION AND ENLIGHTENMENT

The results show that all hypotheses are valid except that additional services have no significant positive effect on perceived usefulness. In view of the above research, the following suggestions are put forward for Douyin platform: From the perspective of quality content, enrich the content of agricultural short video live broadcast to ensure its timeliness and authority. From the perspective of interface perception, beautify the platform interface perception and optimize the interface layout. From the point of view of the medium of instruction, the operation steps are simplified and the area network requirements are reduced. From the perspective of perceived ease of use, the operation difficulty of short video live broadcast is reduced and easy to use. From the perspective of perceived usefulness, farmers can personally experience the convenience and benefits brought by short video live broadcast and improve their application enthusiasm. Short video live streaming is a powerful tool for agricultural development in the era of platform economy, and it is the glue between agricultural big data and practical application. In the future research on short video live broadcasting, we should continue to improve the analysis and application system of the platform, expand the scope of work, reduce the difficulty of farmers' use, promote two-way communication between farmers and the platform, and achieve a more complete and

convenient service system.

This study also has some limitations. For example, taking Douyin platform as the research object, it is necessary to carefully consider whether the results of this study can be generalized to other short video live streaming platforms. Future research can conduct empirical analysis for different platforms. The survey objects of this study are mainly farmers in Liaoning Province, and it is necessary to consider whether the research results can represent the situation of other regions in China.

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