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Research on Influencing Factors of Rural E-commerce Public Participation in Digital Economy

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Abstract: *"The 14th Five-Year Digital Economy Development Plan" was released, which further deployed the development of digital economy. The digital economy has released strong vitality, and the development of rural e-commerce has ushered in new opportunities. Therefore, from the perspective of public participation, combined with the theory of planned behavior, this paper explores the influencing factors of rural e-commerce public participation willingness in digital economy. Through empirical research, the research hypothesis is tested with the help of structural equation. According to the test results and conclusions, the corresponding countermeasures are put forward to further promote the public participation of rural e-commerce, and help the development of rural e-commerce under the digital economy.*

Keywords: *Digital economy, Public participation, Rural e-commerce*

1. Introduction

In January 2022, the State Council promulgated the "14th Five-Year" Digital Economic Development Plan, which further deployed the development of digital economy. In the era of digital economy, the development of rural e-commerce in China has ushered in an opportunity. However, the development quality of rural e-commerce is uneven, which is ultimately caused by the different levels of participants. Under the background of digital economy, to further develop rural key business, the public must be called to participate.

Rural e-commerce is an important part of digital village, and the two dimensions of external environment information, network, digital construction, and farmers' own modern information skills are closely related to farmers' e-commerce participation. The research on public participation is not only beneficial to individuals, but also can drive the construction of digital villages with electronic commerce. In this respect, it is of great significance.

2. Literature Review

Many literatures point out that the development of rural e-commerce has an important impact on rural development, and realize that more people should be involved. For example, Batte and Ernst (2007) found when studying the impact of e-commerce on rural communities that when farmers experience the convenience brought by e-commerce and believe that merchants are reliable, they are more willing to participate in e-commerce [1]. Vipul et al. (2016) found that public participation, especially the participation of farmers, is very important to the development of e-commerce when exploring the development of e-commerce market in India [2]. Ghoshal et al. (2021) stressed the importance of consumers in rural areas when researching the online economic task of Indian start-ups [3].

Chinese research focuses on the influencing factors of farmers' e-commerce participation, and mostly starts from the perspective of e-commerce entrepreneurship. For example, Xiong Wandan (2017) pointed out in his research on rural e-commerce entrepreneurship that to promote survival entrepreneurship plays a leading role in farmers' e-commerce entrepreneurship, in which economic level is the main influencing factor [4]. Cao Xiang and Cao Jiamin (2021) pointed out in an analysis of the survey on the impact of farmers' willingness to participate in e-commerce entrepreneurship in Nantong City, Jiangsu Province that farmers do not have sufficient professional skills in the e-commerce industry and the e-commerce entrepreneurship model is single, which restricts the rural e-commerce entrepreneurship [5].

At present, there are many related researches on rural e-commerce at home and abroad, which provide

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theoretical and practical basis for this research. However, the research on the willingness to participate in rural e-commerce based on the perspective of public participation is still rare. With the help of the theory of planned behavior, it is beneficial to further expand the research in this field.

3. Model Development and Research Hypotheses

3.1. Theory of Planned Behavior

Theory of Planned Behavior (TPB) is a social psychology theory, which successfully predicts and explains the relationship between willingness and behavior. This theory has been widely used in many fields of behavior, and it has high explanatory and predictive power for behavior. This theory holds that the antecedent factor of behavior is willingness, which is the most direct factor of whether an individual performs a certain behavior, and it is influenced by behavior attitude, subjective norms and perceived behavior control, and other factors influence behavior intention through these three factors. Therefore, this study chooses to use this theory to explain the public participation behavior of rural e-commerce under the digital economy, and further understand its influencing factors.

3.2. Research Hypothesis and Model

3.2.1. Participation Cognition

Rural e-commerce participation cognition refers to the public's ability to understand, judge and evaluate rural e-commerce, which consists of the basic cognition of rural e-commerce and the availability cognition of tools under the digital economy. Xu Yingnan and Liu Yi (2019) pointed out in their research on e-commerce participation of new professional farmers that farmers' e-commerce cognition has a positive impact on their participation attitude. And in the digital economy environment, the academic and practical circles have generally recognized the application value of the tools born in the digital economy in electronic commerce [6]. Therefore, the following assumptions are made:

H1: Participation cognition has a significant positive impact on participation attitude.

3.2.2. Participation Motivation

Participation motivation refers to the driving force necessary to arouse and sustain the public participation behavior of rural e-commerce, which consists of internal and external motivation. Wandan Xiong (2017) pointed out in his research that when farmers' entrepreneurs have strong internal or external motives, he will not exclude rural e-commerce entrepreneurs [4]. Therefore, the following assumptions are made:

H2: Participation motivation has a significant positive impact on participation attitude.

3.2.3. Participation Attitude

Participation attitude refers to the public's emotion and stand towards rural e-commerce in Nantong. Yingnan Xu and Yi Liu (2019) pointed out in their research that when farmers hold positive emotional stance on e-commerce, they are usually willing to participate in e-commerce [6]. As a result, the following assumptions are made:

H3: Participation attitude has a significant positive impact on desire;

H3a: Participation attitude plays an intermediary role between cognition and desire;

H3b: Participation attitude plays an intermediary role between motivation and desire.

3.2.4. Subjective Norms

Subjective norms are the public's perception of rural e-commerce participation in management and control, which consists of mandatory norms and exemplary norms. Xin Wang and Xinyi Zheng (2022) believe that farmers' participation in rural e-commerce will be affected by the macro environment, and the call of policies and the behavior of relatives and friends will all affect their willingness to participate[7]. Baloch and Thapa (2014) found in their research that when the local government has supportive policies, agricultural science and technology talents are more willing to participate in rural e-commerce[8]. Therefore, the following assumptions are put forward:

H4: Subjective norms have a significant positive impact on desire.

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3.2.5. Perceived Behavior Control

Perceived behavior control refers to the public's perception of the ease and difficulty of rural e-commerce in the digital economy, which consists of self-efficacy and control. Shuo Zhang et al. (2022) found in the research of e-commerce to help farmers to help the poor that participants are more willing to participate in rural e-commerce when they have confidence in themselves and the ability to conduct e-commerce [9]. Therefore, the following assumptions are put forward:

H5: Perceived behavior control has a positive impact on desire.

To sum up, the influencing factor model of rural e-commerce public participation willingness constructed in this paper is shown in Figure 1.

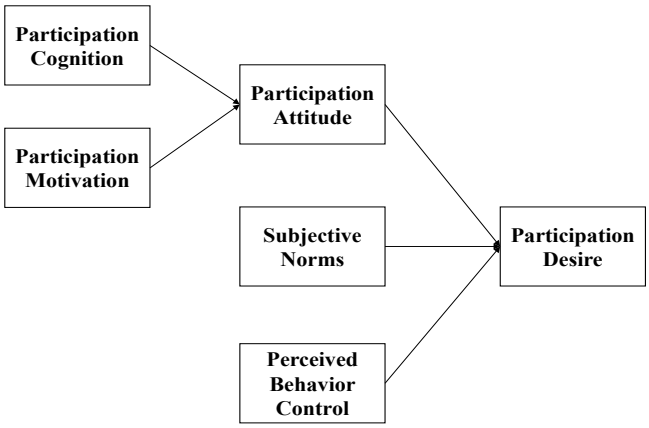

Figure 1: Research model of this paper.

4. Empirical Research

4.1. Data Collection and Statistical Analysis

A total of 250 questionnaires were distributed and 221 were collected. Among them, 159 valid questionnaires were obtained by eliminating the invalid ones according to the back test items, with an effective rate of 71.94%. Among them, most of the people surveyed are urban people, accounting for 94.33%, but most of them have lived in rural areas, accounting for 72.32%.

4.1.1. Descriptive Statistical Analysis

Descriptive statistics of the sample data are shown in Table 1. It can be seen that in this survey, men accounted for more than half (54.1%). In terms of age distribution, there are the most people in the age group of 31-40, which is also related to the fact that this group is the main labor force in the family. In the distribution of academic qualifications, universities/colleges are the majority, followed by high schools/higher vocational colleges.

Table 1: Descriptive statistics.

variables		frequency	percentage
Gender	male	86	54.1%
	woman	73	45.9%
age	Under 20	6	3.8%
	21-30	60	37.7%
	31-40	66	41.5%
	41-50	22	13.8%
	Over 50	5	3.2%
academic degree	Primary school or under	3	1.9%
	junior school	32	20.1%
	High school/higher vocational education	50	31.4%
	A university/college	71	44.7%
	Postgraduate and above	3	1.9%
Are you engaged in rural e-commerce?	Yes	144	90.6%
	No	15	9.4%

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4.1.2. Reliability and Validity Analysis

In this paper, Cronbach's α coefficient is used to test the reliability of the scale. When the coefficient is greater than 0.7, it indicates that the reliability of the questionnaire is high and can be further analyzed. In this study, SPSS26.0 is used for data processing. The specific description is shown in Table 2. All dimensions Cronbach's α are above 0.7.

Table 2: Test results of reliability and aggregation validity.

Latent variables	Numbers	Cronbach‘s Alpha	AVE	CR
Participation Cognition	3	0.939	0.837	0.939
Participation Motivation	6	0.898	0.601	0.899
Participation Attitude	3	0.816	0.626	0.829
Perceived Behavior Control	4	0.898	0.702	0.903
Subjective Norms	4	0.922	0.751	0.923
Participation Desire	3	0.926	0.808	0.927

As for the aggregation validity, this study uses Average Variance Extracted (AVE) and Composite Reliability (CR) to test and analyze. The results show that, as shown in Table 2, the CR value of each potential variable is greater than 0.8, indicating that the reliability of each potential variable is good; AVE of each potential variable is greater than 0.5, which indicates that the aggregation validity of each potential variable is good. As for the discrimination validity, this study compares the square root of AVE with the correlation coefficient of factors. As shown in Table 3, the results show that the square root of AVE of each potential variable is larger than the correlation coefficient of each potential variable, which indicates that each potential variable has good discrimination validity. To sum up, the scale used in this paper has good validity.

Table 3: Test Results of Discriminant Validity.

Factors	Participation Cognition	Participation Motivation	Participation Attitude	Perceived Behavior Control	Subjective Norms	Participation Desire
Participation Cognition	0.837					
Participation Motivation	0.487	0.601				
Participation Attitude	0.296	0.295	0.626			
Perceived Behavior Control	0.485	0.564	0.324	0.702		
Subjective Norms	0.455	0.493	0.281	0.722	0.751	
Participation Desire	0.487	0.477	0.331	0.540	0.511	0.808

4.2. Hypothesis Testing

4.2.1. Path Relation of Each Variable

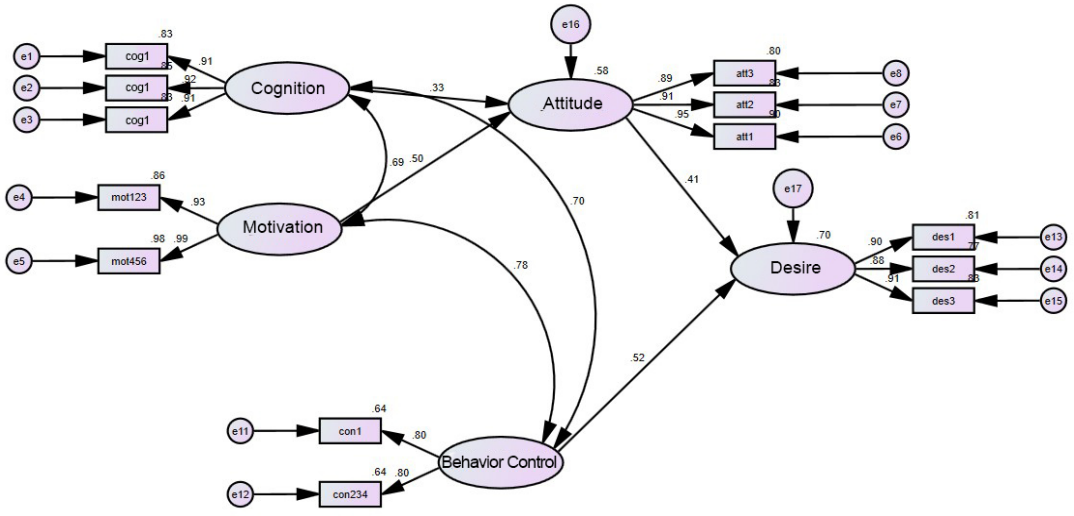

Figure 2: Modified structural equation model.

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In this paper, AMOS is used to validate the model. According to the revision suggestion given by AMOS, the path is revised. Based on the comprehensive consideration of the rationality of the relationship between variables, the relevant path is added between participating cognition and participating motivation, participating cognition and perceived behavior control, participating motivation and perceived behavior control, and the subjective norm of variables is deleted. Finally, the modified model analysis results are shown in Figure 2.

The final fitting index results of the modified structural equation are shown in Table 4. All criterias except RMSEA meet the recommended standard, but considering the complexity of the model and RMSEA<0.1, according to previous expert research recommendations, the modified model in this study is acceptable. At the same time, it can be seen from the table that except for the assumption that H4 is false, all other assumptions are true.

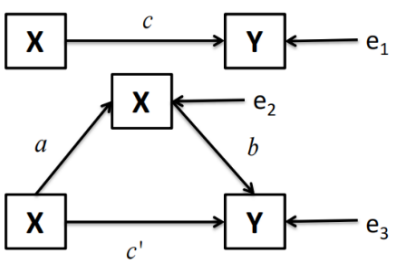
Table 4: Structural equation analysis fitting index results

path			Standardized coefficient		P	Significant		Conclusions
Attitude <--- Cognition			0.327		***	√		H1: T
Attitude <--- Motivation			0.498		***	√		H2: T
desire <--- Attitude			0.407		***	√		H3: T
desire <--- Subjective Norms			0.665		0.912	×		H4: F
desire <--- Perceived Behavior Control			0.519		0.001	√		H5: T
Fit criterias	CMIN/DF	RMR	GFI	AGFI	RMSEA	IFI	TLI	CFI
Value	2.155	0.032	0.897	0.839	0.086	0.969	0.957	0.968

Note: * * * means p<0.001.

4.2.2. Test of Mediating Effect of Participation Attitude

If the independent variable X influences the dependent variable Y by influencing the variable M, the variable M is called an intermediate variable. The path diagram shown in Figure 3 and the corresponding equation can be used to illustrate the relationship between the variables. C is the total effect of X on Y, A and b are the intermediary effects through the intermediary variable M, and c' is the direct effect.



$$Y = cX + e_1$$

$$M = aX + e_2$$

$$Y = c'X + bM + e_3$$

Figure 3: Mediating effect model.

In this paper, regression equation is used to test the existence of intermediary effect. The mediating effect test results of willingness to participate are shown in Table 5, and the mediating effect analysis involves the following three models:

Desire =0.729+0.192* cognition +0.637* motivation

Attitude =1.134+0.169* cognition +0.579* motivation

Desire =0.114+0.100* cognition +0.323* motivation +0.542* attitude

Table 5: Test of intermediary effect model

	Desire	Attitude	Desire
constant	0.729**(3.218)	1.134**(5.995)	0.114(0.507)
Cognition	0.192**(2.608)	0.169**(2.753)	0.100(1.486)
Motivation	0.637**(7.451)	0.579**(8.107)	0.323**(3.544)
Attitude			0.542**(6.325)
R^2	0.542	0.580	0.636
Justified R^2	0.536	0.575	0.629

* p<0.05 ** p<0.01 There are T values in brackets.

Table 6 is sorted out according to Table 5 as follows, so it is considered that suppose H3a, H3b are true.

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Table 6: Results of mediation effect quantity

Items	Conclusions	Total effect	Mesmeric effect	Direct effect	Formulas	percentage
COG=>ATT=>DES	complete mediation	0.192	0.092	0.100	-	100%
MOT=>ATT=>DES	partial mediation	0.637	0.314	0.323	a * b / c	49.281%

To sum up, the verification of this research hypothesis is shown in Table 7.

Table 7: Verification of this research hypothesis

NO.	Hypothesis	Conclusion
H1	Participation cognition has a significant positive impact on attitude.	T
H2	Participation motivation has a significant positive impact on attitude	T
H3	Participation attitude has a significant positive impact on desire.	T
H3a	Participation attitude plays an intermediary role between cognition and desire.	T
H3b	Participation attitude plays an intermediary role between motivation and desire	T
H4	Subjective norms have a significant positive impact on desire	F
H5	Perceived behavior control has a positive impact on desire.	T

5. Conclusions

H1 and H3 point out that participation cognition has a positive impact on public participation attitude, while participation attitude has a positive impact on participation willingness. When the public knows more about rural e-commerce tools and rural e-commerce in the digital economy, they will pay more attention to rural e-commerce, thus enhancing their willingness to participate in rural e-commerce. Therefore, to improve the public participation willingness of rural e-commerce, we can strengthen the information and knowledge dissemination of rural e-commerce under the digital economy, and subtly make the importance of rural e-commerce participation deeply rooted in the hearts of the people. At the same time, the government should pay attention to encouraging and supporting the public to conduct rural e-commerce, and guide the change of public attitude.

H2 and H3 point out that participation motivation has a positive impact on public participation attitude, while participation attitude has a positive impact on willingness to participate. When the public has a strong motivation to participate, it usually translates into a better attitude to participate, thus being more willing to engage in rural e-commerce under the background of digital economy. Therefore, on the one hand, from the perspective of internal incentives, we can set up rural e-commerce groups to dispel public participation concerns in tangible form, actively use existing applications and software to create a platform that can only communicate, so that the public with strong internal motivation can have a stage to play, thus creating a good overall participation atmosphere; On the other hand, from the perspective of external incentives, the government encourages public participation, sets up corresponding incentives, strengthens the construction of demonstration villages, and reduces the obstacles to participation.

Hypothesis H5 points out that perceived behavior control has a positive impact on the public's willingness to participate. When the public has strong self-efficacy and control in rural e-commerce under the digital economy, they are usually more willing to participate. Therefore, the government can: (1) attach importance to the supply of resources, and enhance the access of public resources. For example, in the supply of goods, the government can make full use of credibility to reach an agreement with producers on the purchase price of products, so that rural e-commerce participants can get stable product supply at the lowest price; Or pay attention to the tilt of educational resources, hold regular training, and enrich the public's knowledge of rural e-commerce. (2) Pay close attention to the establishment of rural e-commerce risk compensation mechanism, take the lead in setting up rural e-commerce householders' associations, raise failure relief funds for rural e-commerce participants, and provide them with re-employment training or jobs at the same time, so as to eliminate the worries of public participation.

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