Research of Willingness to Use Digital Currency in International Trade Based on SOR Theory and Structural Equation Model

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ABSTRACT: International trade is an important part of the digital economy. Digital RMB is essential to promote national economic development and paperless development. In this study, SOR theory and perceived value model were integrated to construct an influencing factor model for using digital RMB. The innovation of this paper lies in the use of structural equation model to verify the influence path of assumptions and variables, and analyze the condition configuration that affects willingness to use digital currency from the perspective of factor combination. The empirical results show that the stimulus variables positively affect the willingness to use digital RMB through perceived usefulness. The desire to use digital RMB is negatively affected by perceived risk.

Keywords: International trade, Structural equation model, Digital currency, SOR theory, Mathematical modeling, Economic management，E-commerce

1. INTRODUCTION

Willingness to use is defined as the willingness of users to perform various behaviours, which is the most influential factor in predicting usage behaviours [1].

Willingness to use digital RMB refers to the willingness of users to use digital RMB online and offline, participate in digital RMB related activities, and recommend others to use digital RMB in the future.

Existing studies on user intention focus on the different influences of users' internal and external environmental factors on users' choice to use. The objects involved include information integration platforms, mobile software apps, and self-service university libraries [2-4]. However, the existing ongoing studies rarely involve the field of digital RMB, so they cannot explain users' willingness to use it in the new payment environment. Therefore, this study proposed the influencing factor model of users' desire to use digital RMB and enriched the existing relevant research on willingness to use based on introducing new stimulus factors.

The SOR model is the stimulus-body-response model [5]. The prototype is the S-R model, which is mainly used to explore the influence of external environmental factors on individual behaviour [6]. Later, Mehrabian and Russell added O to represent the organism based on S-R, which became the current S-O-R model. According to the model, individuals receiving external environmental stimuli will produce internal changes in the organism's emotions and eventually

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form external responses [7]. This indicates that individual psychological states, such as cognitive emotion, play a mediating role in the process from external stimulus to reaction [8].

At first, the SOR theory was mainly applied in environmental psychology. Scholars introduced it into the study of consumer behaviour. This theory has been widely used to research the purchase intention of clothing, books, electronic products and agricultural products, and its validity and practicality have been widely verified [9]. Based on SOR theory, this paper intends to select the use scenarios of digital RMB and build relevant models.

User perceived value (UPV) refers to users' subjective cognition and Value judgment on service effectiveness based on personal expectation satisfaction in participating in information, knowledge and skills services, showing diversified, hierarchical, dynamic and extended characteristics [10].

At present, scholars have abundant researches on perceived value, from which specific dimensions such as perceived usefulness, perceived ease of use, perceived trust and perceived risk have been expanded [11]. This study intends to select the perceived benefit and perceived risk in the case of digital RMB and introduce external stimulus variables to analyze users' willingness to use digital RMB.

2. RESEARCH MODELS AND HYPOTHESES

2.1 Model building

Structural equation models usually consist of three equations：

$$\begin{aligned} y &= \mathrm{D}_y h + e \\ x &= \mathrm{D}_x x + d \\ \mathrm{D} &= B\mathrm{D} + \mathrm{G}x + x \end{aligned} \tag{1}$$

Where, the top two equations are measurement equations (ME), and the last one is structural equation (SE). h and x are endogenous variables and exogenous variables respectively. D_y、D_x is the load matrix. e、d is the path coefficient. E is cancha.

In this study, the structural equation model (SEM) was used to explore the relationship among seven variables: promotion intensity, welfare preference, convenience, substitution effect, perceived usefulness, risk, and willingness to use. Promotion intensity, welfare preference, convenience and substitution effect were used as stimulus variables (***S***), perceived benefit and perceived risk as intermediate variables (***O***), and willingness to use was used as the outcome variable (***R***). The model relationship is shown in Figure 1 below.

2.2 Stimulating factors and organism factors

Promotion intensity refers to the degree of measures the promoter takes to promote a product or service, including the diversity of promotion forms, the richness of content and the interaction of activities [12].

Welfare preference refers to the reduction of direct or indirect economic and financial costs that users can enjoy using digital RMB [13].

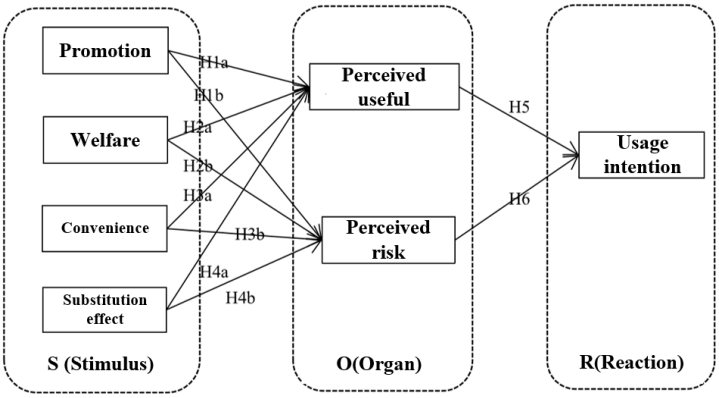

Figure 1. Factors of willingness to use digital RMB

The degree of convenience refers to how easy it is for users to enter the payment interface, apply for transfer and remittance, and make anonymous offline payments using digital RMB [14].

Substitution effect refers to the degree of substitution of exponential RMB as a new payment method for traditional payment methods, such as paper RMB, WeChat Pay and Alipay payment.

Therefore, the following hypothesis is proposed:

H1a: Promotion intensity has a positive impact on perceived usefulness

H2a: Welfare offers have a positive effect on perceived usefulness

H3a: Convenience has a positive impact on perceived usefulness

H4a: Substitution utility positively affects perceived usefulness.

Users' perceived risks of digital RMB usually come from the following aspects:

1.They think that learning new things and using new things is a risk of wasting their time and energy.

2.There are financial security risks in the early stage of new things due to imperfect technical development.

3.The emergence of new things, in the state of information asymmetry or opacity, due to the strange stuff challenging to control the loss of security.

When the promotion efforts of the country or bank are high, and the forms are diverse and accepted by users, more information about digital RMB can be conveyed to users to bridge the

information gap between users on digital RMB and reduce the uncertainty of users on the use of digital RMB. Generally speaking, economical price incentives can relax people's perception of risk [15] and make up for users' loss of security for strange things. Similarly, the easy operation of digital RMB can reduce the time and energy spent by users on learning and daily application [14], and the reduction of user cost can bring convenience to users and weaken their perceived risks. When users have formed a fixed habit of using digital RMB in their daily lives, they will be more inclined to believe in how they are accustomed to continuing to use everyday activities.

Therefore, the following hypothesis is proposed:

H1b: Promotion intensity negatively affects perceived risk

H2b: Welfare preference negatively affects perceived risk

H3b: Convenience degree negatively affects perceived risk

H4b: Substitution utility negatively affects perceived risk

2.3 Organism factors and reaction factors

Perceived usefulness, that is, the value that users can bring to themselves by using a specific technology, is a factor in the TAM model proposed by Davis [16]. He believes that the more robust users perceive new technology's usefulness, the stronger their willingness to use it. At present, some scholars have found a significant positive correlation between perceived usefulness and behavioural intention through demonstration in fields such as new energy vehicles, clothing and agricultural products [3]. In this paper, perceived usefulness refers to users' expectation of economic preference and convenience in the payment process when they use digital RMB payment. The greater the expectation of users, the stronger their behavioural intention to use digital RMB payment. Therefore, the following hypothesis is proposed:

H5: Perceived usefulness positively affects willingness to use

Perceived risk arises because the actions taken by consumers may have unexpected results, and these results may be unpleasant. Dan [10] believes that perceived risk is a kind of loss expectation, and the greater the grasp of loss expectation, the greater the risk consumers will feel. Consumers will perceive various risks when making decisions, and the perceived risks will directly affect consumers' purchase intention. Therefore, the following hypothesis is proposed:

H6: Perceived risk negatively affects willingness to use.

3. DATA ANALYSIS AND HYPOTHESIS TESTING

3.1 Reliability and validity test

Amos 26.0 was used for confirmatory factor analysis (CFA). The chi-square ratio measured the model's fair degree to the degree of freedom χ^2/df, the relative fit index CFI, the non-standard appropriate index TLI, and the root mean square of approximate error RMSEA (Gerbing and Anderson). We can find that Table **1.** indicators meet the requirements and the fitting degree of the measurement model is good.

3.2 Direct effect test

AMOS 26.0 was used to test the structural equation model, and path analysis was carried out by establishing the stimulus-body-response structural equation model. The test results are shown in Table 2:

1. The standardized path coefficients of promotion intensity, preferential welfare, substitution effect and convenience degree to perceived usefulness were 0.468, 0.788, 0.153 and 0.761, respectively, which were all significant. Therefore, it is assumed that H1a, H2a, H3a and H4a all pass the test.

2. The standardized path coefficients of promotion intensity, preferential welfare, substitution effect and convenience on perceived risk were -0.484, -0.153, -0.178 and -0.145, respectively, which were all significant.

3. The standardized path coefficients of perceived usefulness and perceived risk on willingness to use were 0.696 and -0.254, respectively, significant. Therefore, both H5 and H6 are supported by empirical data.

Table 1. Fit index value of structural equation model

Adaptation index	Fitting values	Recommended value
$\chi 2$	427.248	
$\chi 2$/df	2.261	<3.0
CFI	0.944	>0.9
TLI	0.931	>0.9
GFI	0.913	>0.9
RMSEA	0.056	<0.08
IFI	0.944	>0.9

Table 2. Path coefficient and hypothesis testing results.

Assumption	Variable meaning	Explained variable	Estimate	Standard deviation	Z	P	Result
H1a	Promotion	Perceived usefulness	0.468**	0.063	4.236	0.000	Support
H2a	Preferential benefits		0.788**	0.059	3.199	0.001	Support
H3a	Substitution effect		0.153**	0.058	2.648	0.008	Support
H4a	How easily		0.761**	0.056	4.638	0.000	Support
H1b	Promotion	Perceived risk	-0.484**	0.056	3.281	0.001	Support
H2b	Preferential benefits		-0.153**	0.053	2.903	0.004	Support
H3b	Substitution effect		-0.178**	0.052	3.405	0.100	Support
H4b	How easily		-0.145**	0.049	2.948	0.003	Support
H5	Perceived usefulness	Usage intention	0.696**	0.058	3.385	0.000	Support
H6	Perceived risk		-0.254**	0.067	3.822	0.000	Support

Ps: *p < 0.05, * * p < 0.01; N= 487

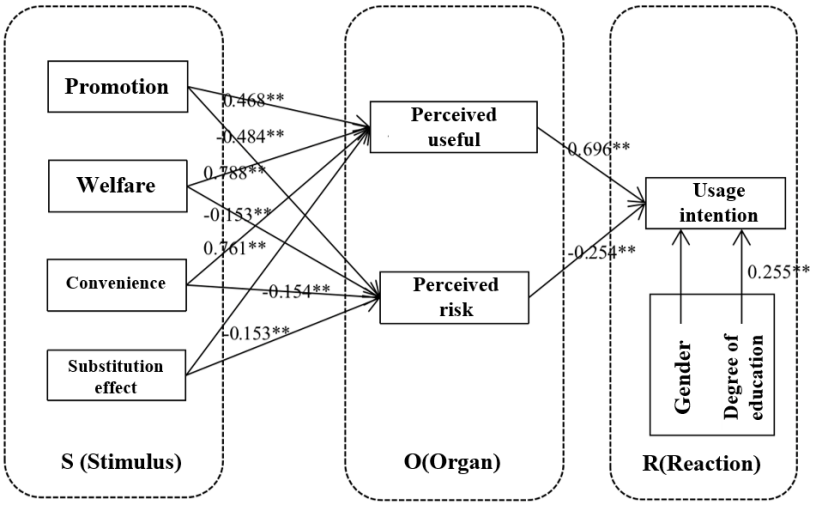

Figure 2. Analysis of structural equation model results

4. CONCLUSION

Based on SOR theory and the perceived value model, this study designed the influencing factors model of willingness to use digital RMB. We use the structural equation method to explore the influencing factors and path strength of the desire to use digital RMB.

In terms of structural equation analysis: (1) All hypotheses passed the test, and promotion intensity, preferential welfare, convenience and substitution effect all positively affected use intention through perceived usefulness, among which preferential interest and convenience had a more significant impact. (2) Promotion intensity, preferential benefits, convenience and substitution effect negatively affect users' willingness to use digital RMB through perceived risk, among which promotion intensity has the most significant influence. Users are more focused on believing in the authenticity of the promoted content, thus making up for the asymmetry and lack of information.

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