



Digital Trust and the Reconstruction of Trust in the Digital Society: An Integrated Model based on Trust Theory and Expectation Confirmation Theory

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Digital trust is born with the evolution of digital society. It is an inescapable topic in the digital society and it is developed from traditional interpersonal trust and institutional trust and has been extensively used in the Internet space. At present, the research on digital trust is rare. Based on the Trust Theory and the Expectation Confirmation Theory, this paper puts forward an integration model with user satisfaction as the intermediary variable. Besides, this paper develops a set of scales for evaluating digital trust combined with maturity scales and points out that digital trust consists of digital cognitive trust and emotional trust. This paper assumed that user perception and user expectation indirectly affect digital trust through user satisfaction and used SPSS 23.0 to do reliability, validity test, and exploratory factor analysis. The results found that user satisfaction plays a mediating role by fitting, evaluating, and optimizing the structural equation model with AMOS23.0. User satisfaction is a partial intermediary between user perception and digital trust, and it is the complete intermediary between user expectation and digital trust. These results demonstrate two things. Firstly, in the digital society, the construction of users' digital trust is based on users' satisfaction. The government should provide diversified and high-quality e-government services as far as possible. Secondly, digital trust is directly or indirectly affected by user perception and user expectation. The government should build a safe, green, and harmonious digital environment for users and make e-government services consistent with users' expectation.

CCS Concepts: • **Social and professional topics** → **Governmental regulations**;

Additional Key Words and Phrases: Digital trust, digital society, digital government, digital environment

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1 INTRODUCTION

Digital technologies dominated by information technologies such as big data, cloud computing, and artificial intelligence are thriving. Driven by digital technology, digital society has been intertwined with people's living spaces, promoting the continuous innovation of public services and social governance. Compared with traditional society, the spatial boundaries are increasingly blurred in digital social form because the Internet

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connects the cities through mobile devices. The connection between cities is no longer limited to the traditional geographical concept, which provides more development opportunities for all stakeholders, including the government. Moreover, all kinds of devices gradually become smaller, and the processing capacity is more potent, the equipment cost is lower, and computing intelligence integrates into people's daily lives [1]. According to statistics, as of June 2021, Chinese netizens reached 1.011 billion, forming the world's largest and most vibrant digital society. Digital services are upgrading from shopping to consumption, tourism to leisure, and transportation to other life scenes. Besides, new digital life forms are constantly emerging in critical areas such as education, medical care, and employment. Digital society makes significant construction progress. Digital technology not only changes the scene of the times but also creates future life. By further optimizing the digital social environment, hundreds of millions of people will have a fuller sense of gain in sharing the development achievements of the Internet.

The arrival of digital society has changed the social situation of trust. Trust has developed from interpersonal trust in the agricultural economy to institutional trust in the industrial economy to digital trust in the Internet age. Digital trust is a new trust relationship among government, individuals, enterprises, and society in the Internet age. It is the reconstruction of the social trust model in the digital economy. In the era of digital society, people are more dependent on digital technology than ever before. Digital technology not only brings convenience to people's lives but also significantly reduces people's ability to control the surrounding environment and increases many risks, such as the risk of property loss and the risk of personal safety being infringed. As a psychological mechanism to reduce the complexity and uncertainty of the digital environment, digital trust affects the development of political, economic, cultural, and social activities in the digital society. Digital technology, as an essential technical means, affects the construction of trust. People need to build trust in digital government and transfer trust to the digital world through the intermediary of technology. Digital technology reconstructs the trust mode in society, and digital trust has become the most critical trust mode in the new Internet era.

Therefore, this paper discusses the influencing factors of users' digital trust in digital government based on user psychological programs and puts forward an integrated model with user satisfaction as the intermediary variable. The research questions are as follows: What influence factors affect digital trust? Does user perception affect digital trust through user satisfaction? Does user expectation affect digital trust through user satisfaction?

2 THEORETICAL BASIS AND LITERATURE REVIEW

2.1 Trust Theory

In the 1950s, Deutsch [2] initiated trust research in social psychology. Since then, trust has attracted the attention of scholars in various disciplines. Although all disciplines are studying "trust," there is no uniform definition of "trust." Scholars have different definitions of trust according to different research fields and different research perspectives. According to Deutsch [2], trust refers to an individual's confidence in the intention and ability of affiliated partners and a belief that affiliated partners will become as they wish. Zand [3] pointed out that trust is the composition of a series of behaviors. When an individual suffers losses, these behaviors are often not controlled by the individual, thus increasing the risk of the trustor. Moorman et al. [4] believe that trust refers to the willingness to rely on trading partners who have confidence in them.

Fishbein and Ajzen [5] put forward a theoretical framework of triple views on trust based on the theory of recreated action and planned behavior. This framework has three parts: belief, attitude, and intention. Belief refers to a simple psychological process that measures the characteristics and attributes of the other party, such as a person's feelings or opinions about something. Attitude refers to the state of readiness for attention or action. The intention is the active possibility that a person will take or carry out the action under consideration. According to the logic of Fishbein and Ajzen, McKnight et al. [6] think that trusting beliefs and trusting intentions can define two aspects of trust. On this basis, Yang [7] added trusting attitudes and defined three aspects of trust. In addition, Lewis and Weigert [8] suggested that trust can be explained by three distinguishing processes:

cognitive, emotional, and behavioral. They pointed out that the foundation of trust development is a cognitive process that distinguishes people and institutions as trustworthy.

McKnight defined the trusting beliefs in 1998 [6], which means that an individual believes that others are kind, capable, honest, or predictable under the circumstances. His definition is based on the definition of trust value studied before, which is the characteristics and attributes of the trustee, such as ability, goodwill and integrity. And integrity includes two aspects: justice and consistency. McKnight conceptualized integrity as two distinguishable structures: honest thoughts and predictable thoughts. In the model of Kim and Tadisina [9], their idea of predictability is put in the column of cognitive attitude because this concept implies a concentrated psychological process, which is closer to the structure of cognitive attitude. Honesty and goodwill are similar to goodwill in this model and constitute one component of trusting beliefs. At the same time, competence is similar to competitiveness in this model and constitutes another component of trusting beliefs. One of the dimensions of trusting attitudes is confidence. Other concepts such as dependence are the same as confidence in the measurement dimension. Confidence reflects the trustor's psychological situation of making decisions in the trustor. This level of trust may require time and contact to confirm the ability and intention of the trustee. Another dimension of trust is the liking tendency, and many researchers have confirmed that this kind of trust based on emotion is one of the dimensions of trusting attitudes. The emotional content of trust is based on emotional connection, and many strong emotions such as liking are part of trust based on emotion. Therefore, trusting attitudes should include confidence trust, and emotional trust. Among them, emotional trust also includes emotions and beliefs [7]. Regarding trust intentions, Zand [3] points out that trust behavior will increase the trustor's vulnerability. This idea implies that trusting someone means being willing to take risks in the relationship with that person. Moorman et al. [4] also believe that trust is the will of the exchange partner. Trust is meaningful when the situation is fragile and uncertain. Therefore, trust intention should be an essential aspect of trust definition [7].

2.2 Digital Trust

At present, scholars have no unified understanding of the concept of digital trust. Mubarak and Petraite [10] think that digital trust can be referred to as stakeholders' trust in the ability of actors, technologies, and processes to build a reliable and secure business network. They found that digital trust significantly improves open innovation. Besides, realized absorptive capacity, potential absorptive capacity, and technological orientation mediate the relationship between digital trust and the open innovation of a firm. Kozhevnikov and Korolev [11] think that digital trust refers to the relationship between a person and the independent intelligence agent existing in the digital environment. In the digital environment, a person trusts an agent, which shows that the agent can meet the daily needs of the principal by trading on behalf of the principal in the digital environment. Because there is no limit to the transaction frequency in the digital environment, optimizing of the interaction between buyers and sellers will inevitably lead to the ambiguity of the transaction concept. The transaction in this environment is not the fact of every transaction but that a person chooses an agent.

Buechner and Tavani [12] developed a trust model. This trust model is one of the first models of the digital agent. In this model, three kinds of trust relationships can be defined: trust between human agents, trust between artificial agents and human agents, and trust between artificial agents. Because this model can define these three different trust relationships, it is a model of digital trust. However, after his further research [13], he found that this model is incomplete in one respect. It didn't say anything about self-confidence. Self-confidence should be a part of digital trust. Wu [14] believes that digital trust is characterized by technicality, relationship, mediation and comprehensiveness. Digital trust is the reconstruction of interpersonal trust and system trust by digital technology, and is the result of "trust transfer" of interpersonal trust and system trust within and between trust channels. The construction mechanism of digital trust includes hard trust construction mechanism and soft trust construction mechanism, and security and system design are the hard trust construction mechanisms. Digital social capital, online reputation system, transparency and response, and result satisfaction are the mechanisms of soft trust construction. The two trust construction mechanisms coordinate and work together to

realize trust reconstruction in the digital society. Summarizing the above scholars' definitions of trust and digital trust's dimension and structure, and combining with the digital social situation, this study defines digital trust as the combination of cognitive trust and emotional trust. Cognitive trust includes practicality, commitment to execution, honesty, benevolence, and so on. Emotional trust includes likes, beliefs, and so on.

Marcial and Launer [15] point out that scientific and technological innovation has changed people's views on the reliability of things. In order to measure people's digital trust in the workplace, they constructed a theoretical framework with a theoretical basis and fundamental principles. They formed the theoretical framework based on the principle of information systems and the input-output model. Hermawan [16] demonstrated the importance of digital trust in e-commerce and how digital trust affects the brand image of e-commerce through the communication between consumers and sellers of e-commerce platforms. In addition, he believes that digital trust has a positive impact on customer loyalty. Mukherjee et al. [17] believe that privacy and security issues will affect public attitudes and intentions towards the adoption process. They study the impact of trust in blockchain by analyzing the public's privacy and security issues through five variables: attitude, privacy, trust, security, and intention.

2.3 Expectation Confirmation Theory

Expectation Confirmation Theory (ECT) was developed in two series of papers written by Oliver in 1977 [18] and 1980 [19]. This theory is the basic theory for studying consumer satisfaction. The main concept is that consumers judge whether they are satisfied with products or services by the comparison between expectations before shopping and perceived performance after shopping, and the satisfaction becomes the reference of repurchase intention next time. The ECT framework shows that the willingness to continue buying is influenced by satisfaction, while satisfaction is influenced by expectation, performance, and confirmation.

The expectation is one of the factors affecting satisfaction because expectation provides a reference standard for consumers to form judgments about product or service evaluation. The so-called expectation is based on the customer's retelling of a previous purchasing experience or others and is the customer's prediction of the quality of products or services. Oliver thinks that the expectation includes the evaluation of occurrence probability and occurrence content. With consumers' judgment on the occurrence probability and content, the formation of expectations is affected. Performance is the standard of comparison. This is used by consumers to compare with expectations and to measure the degree of confirmation. After the purchase behavior occurs, the customer will compare the perceived product performance with the previous expectation, which will produce positive or negative confirmation, affecting the customer's satisfaction. Oliver found through research that the cognition of product performance has a direct impact on consumer satisfaction, and subsequent research also shows that there is a positive relationship between performance and consumer satisfaction. Confirmation is an important factor affecting satisfaction. Confirmation is derived from the difference between actual performance and expectation. In ECT literature, the conceptualization of confirmation can be divided into three categories: objective confirmation, interfered confirmation, and perceived confirmation. Oliver thinks that satisfaction is a general psychological state. Satisfaction occurs when emotions revolve around unconfirmed expectations and consumers' previous feelings about consumption experience. In addition, from the perspective of social and applied psychology, Oliver thinks that satisfaction is a function of the initial standard and the perception and gap from the initial reference point. In other words, satisfaction is regarded as the perceptual function of expectation level and confirmation.

Gupta et al. [20] are the leading representatives of the articles about applying this model to digital technology. They think that the factors of citizens' initial adoption of digital technology will specifically influence their behavior after adopting digital technology. They applied the ECT model to the digital technology model and modified it. They discussed the influence of pre-adoption expectation and confirmation on post-adoption satisfaction and persistence and the role of post-adoption factors, such as perceived user interface quality, security, and self-efficacy. Their research found that pre-adoption performance/effort expectations affect

consumption-driven confirmation, which affects post-adoption proper perception, post-adoption security perception, and user satisfaction. In addition, satisfaction, self-efficacy after adoption, and perceived usefulness after adoption are essential antecedents of users' intention to continue using.

2.4 Model Construction and Theoretical Hypothesis

It has been found that in the expectation confirmation theory, satisfaction will affect users' willingness to purchase continuously, thus building users' digital trust. In other words, satisfaction may positively affect digital trust. In addition, users' expectations for products may also affect digital trust. The influence of users' expectations on digital trust may be direct or indirect. User expectation may indirectly affect digital trust through user satisfaction. Because it is difficult to measure the performance and confirmation in the expectation confirmation theory, this paper eliminates the two dimensions of performance and confirmation while retaining the two dimensions of expectation and satisfaction.

2.4.1 User Perception. Qiu et al. [21] believe that user satisfaction is the psychological state of users to evaluate whether the payment and income are reasonable, and customer perceived value is a sufficient basis to measure user satisfaction. They take The Red Book platform as an example for empirical research: explore the status quo of users' perceived value of The Red Book platform, divide the influencing factors of user satisfaction, and put forward suggestions for the development of the platform. They found that high function, emotion, social value, and low perceived cost positively affect user satisfaction. Therefore, they recommended government and enterprises to improve the quality of notes content, improve user experience, maintain platform reputation and strengthen user protection, so as to improve user satisfaction. Yang [22] started from the study of the perceived value of mobile online game users, and explored the dimensions of the perceived value of mobile online game users and the relationship between each dimension and user satisfaction and user stickiness. Based on perceived value theory and **SOR (Stimulus-Organism-Response)** theory, she constructs the model of perceived value, user satisfaction and user stickiness of mobile online game users and verifies it. She found the perceived value of mobile online game users can be divided into functional value, emotional value, social value, and self-realization value. The dimensions of the perceived value of mobile online game users have a significant positive impact on the satisfaction of mobile online game users. Emotional value has the most significant impact, followed by functional value and social value, and self-realization value. Mobile online game user satisfaction has a significant positive impact on user stickiness. Based on the above literature, this paper puts forward the following assumption:

HYPOTHESIS 1. *User perception has a positive impact on user satisfaction.*

In addition, some studies have found that users' perception affects users' digital trust. If there are risks in the Internet environment, product providers, or product development technologies, it will affect users' digital trust. The impact of user perception on digital trust may be direct or indirect. Based on the conceptual framework of interpretive level theory, Wang and others [23] used the PLS-SEM method to study the influence of time distance and social distance on consumers' perceived risk of the online car-hailing platform and the influence of perceived risk on trust of online car-hailing platform and trust of online car-hailing drivers. They found that time distance and social distance have a significant negative effect on consumers' perceived risk, and perceived risk has a negative effect on online car-hailing platform trust and driver trust. Xiong and Shen [24] take the transactional virtual community as the research object, study the formation path of user trust, and explore the relationship between website perception, business reputation and user personal trust tendency and user initial trust establishment. They introduce the network word-of-mouth characteristics and virtual community perception into the analysis framework of initial trust to continuous trust. They found that the user's website perception, business perception, and trust propensity had a significant positive impact on the formation of initial trust; the word-of-mouth feature of community network partially mediates the impact of users' initial trust on continuous trust; virtual

community perception has a significant positive impact on users' continuous trust, and negatively moderates the impact of community network word-of-mouth on continuous trust. From the analysis of these articles, this paper can draw the following assumption:

HYPOTHESIS 2. User perception has a positive impact on digital trust.

2.4.2 User Expectation. Wang and Wang [25] pointed out that citizens' satisfaction with public services is not only directly determined by the service performance (quality), but also indirectly determined by comparing the service performance with the expectation before the service, namely "disconfirmation". In order to test the causal relationship among expectations, performance and satisfaction, they used the method of investigation experiment, and through a field survey of public transportation services, randomly assigned the survey samples ($n = 230$) to four experimental groups, and received intervention with high expectations or low expectations respectively, followed by intervention with high performance or low performance, and finally measured satisfaction. They found that public expectation is an important predictor of public service satisfaction, which is proved by both direct and indirect effects. Therefore, the improvement of public service satisfaction can be achieved not only by improving service quality, but also by influencing public expectations of service. Huangfu [26] points out that the government portal, as an online bridge linking the government and the public, has narrowed the distance between the government and the public. However, different people have different views on whether the information published on the government portal is actually needed by the public, whether it has good quality, and whether the public is satisfied. Therefore, she made a definition of the government portal information transparency, from the user's point of view, to investigate the user's satisfaction with the Nanning People's Government website information transparency by questionnaire survey. She used the user satisfaction model to explore the impact of government portal information transparency on user satisfaction. Her model has seven potential variables: government website image, user expectation, information transparency perception quality, information quality, information service, user satisfaction, and user trust. Among them, information quality and information service are the quality factors of information transparency perception quality. She found that the image of government websites, user expectations and perceived quality of information transparency had a significant impact on user satisfaction, with the variance explained by the three variables reaching 88%. Among the two information transparency perception quality factors, information quality has a greater impact on information transparency perception quality than information service. According to this research idea, this paper puts forward the following assumption:

HYPOTHESIS 3. User expectation has a positive impact on user satisfaction.

There is a deductive assumption in this article that user expectations may affect user digital trust. For example, before users use e-government websites, they will have an expectation for the website, expecting it to achieve certain functions and provide users with more convenient workflow. So, if this expectation is met, that is, e-government websites meet this requirement, users' digital trust in government will be significantly improved.

HYPOTHESIS 4. User expectation has a positive impact on digital trust.

2.4.3 User Satisfaction. Based on expectation confirmation theory and technology acceptance model, Yang and Feng [27] took satisfaction as the mediating variable to explore the influence of online and offline perceived experience of **OTA (Online Travel Agency)** platform users on behavioral intention. They constructed a structural equation model of the relationship among perceived experience, satisfaction, and behavioral intention. They found that for the user's online experience, perceived usefulness and perceived service quality of the platform have a significant impact on user satisfaction, but the impact of perceived risk on user satisfaction is not significant. For the user's offline experience, the hotel's perceived value and expected confirmation are the determinants of user satisfaction. Users' satisfaction with OTA platform has a significant impact on their behavioral intention, which has a positive impact on the positive network word-of-mouth communication intention

and continuance intention, and has a negative impact on the negative network word-of-mouth communication intention. User satisfaction plays an intermediary role in the relationship between perceived experience and behavioral intention. In other words, perceived experience will improve user satisfaction, and user satisfaction will improve the user's behavior intention. In fact, there is a basic logic that the user's behavior intention is based on their digital trust. That is to say, user satisfaction can improve the digital trust of users, so as to improve their behavior intention. According to the above analysis, this paper makes the following assumptions:

HYPOTHESIS 5. *User satisfaction has a positive impact on digital trust.*

HYPOTHESIS 6. *User satisfaction plays an intermediary role between user perception and digital trust.*

Based on trust theory, user integration technology acceptance model and information system success model, Wang and Fang [28] constructed the influencing factors model of public use intention of Internet medical service platform by using structural equation model. Through the analysis, they found that user satisfaction has a mediating effect between service quality and willingness to use. Service quality, performance expectation, and pay expectation have a significant impact on user satisfaction. They proposed that the public's trust in Internet medical services should be enhanced by strengthening Internet security and platform supervision, and the quality of the medical platform service should be improved by improving the efficiency of Internet medical services, carrying out online health education, and enhancing the interaction between the platform and users, so as to enhance the public's willingness to use the medical platform, thereby enhancing the public's digital trust. Based on the above analysis, this paper proposes the following assumption:

HYPOTHESIS 7. *User satisfaction plays an intermediary role between user expectation and digital trust.*

According to the above analysis, the integration model of this paper is as follows (Figure 1):

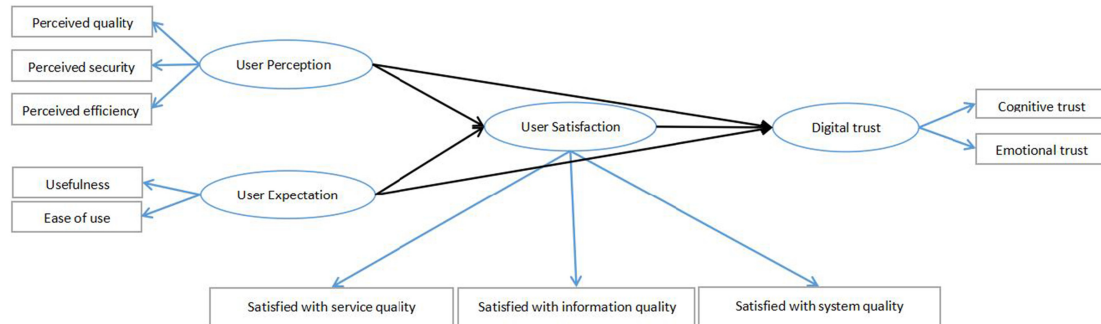


Fig. 1. Digital trust measurement model.

The independent variable of this paper is user perception and user expectation, the mediating variable is user satisfaction, and the dependent variable is user digital trust. The measurable variables of user perception include three items: perceived quality, perceived security, and perceived efficiency. The measurable variables of user expectation include two items: usefulness and ease of use. The measurable items of user satisfaction include satisfied with service quality, satisfied with information quality and satisfied with system quality. Digital trust includes cognitive trust and emotional trust. Besides, the control variables of this paper are gender, age and education, which are used to measure whether there is an impact on digital trust.

3 METHOD

This part mainly discusses the process of questionnaire design, sample collection, and analysis method. We will discuss the influence factors of citizens' digital trust in digital society. For this purpose, we employ survey data collected from citizens who use governments' e-services in Beijing.

Table 1. Questionnaire Detail

Latent variables	Questions	Source
User perception RP	To what extent do you think the e-government platform can perform the government functions well?	Sheng [29]
	To what extent do you think the e-government platform is safe?	
	To what extent do you think the e-government platform is efficient?	
User expectation UE	To what extent do you think the online business of e-government platform can meet your needs?	Self-made Sheng [29]
	To what extent do you think the interface design of e-government platform is clear and easy to use?	
User satisfaction US	To what extent do you think the staff of e-government platform can handle the public's business applications in a timely and effective manner?	Huangfu [26]
	To what extent do you think the information disclosed on the e-government platform is accurate and useful?	
Digital trust DT	To what extent do you think the system of e-government platform is perfect?	Self-made
	To what extent do you think e-government platform can improve your quality of life and is trustworthy?	
	To what extent do you prefer e-government platforms to traditional government affairs, and are willing to trust them?	

3.1 Questionnaire Design and Variable Measurement

In this paper, we used the questionnaire survey to obtain data, and used SPSS25.0 to sort out the data, test the survey's reliability and validity. Then, we use the structural equation model to analyze the data. The questionnaire has two parts: the user's basic information and variable measurement. The basic information part includes gender, age, and educational background. The scale design is based on the Likert 5 level Scale and combines the mature questionnaire and the actual needs of this study. The questionnaire's measurement indicators partly come from the maturity scale and partly are self-made indicators. See Table 1 for questionnaire detail.

3.2 Data Collection

This questionnaire launched on February 10th, 2020, and ended on April 28th, 2020. In order to improve the representativeness of the sample, we scientifically designed the sampling frame, selected the stratified sampling method, and tried to expand the sample size as much as possible. Beijing has 22 million people. It is unrealistic to let them all fill out the survey. Through the stratified sampling method, select some people to investigate, according to their ideas, behavior, and cognition to infer the overall, so that both representativeness and efficiency is relatively high. That is, through the measurement of representative sample groups, the data of the whole group can be inferred. There are 16 districts in Beijing. Residents' committees are drawn based on districts, and residents are drawn based on residents' committees. Such a step by step is representative. Households and respondents are drawn out hierarchically and in stages. Through the investigator's entrance, they are reported and asked one by one according to the requirements of the survey plan and the design requirements of the questionnaire so that the results reflecting public opinion are obtained, and they are also fully representative. We finally selected 600 Beijing citizens from 16 districts in Beijing, a total of 531 questionnaires were collected, and each respondent filled out one. When the survey is going, we set some restrictions to improve the data quality. The questionnaire has the following restrictions: Respondents must use an e-government website or app; The questionnaire sets two fake questions to test whether the respondents are thoughtfully answering the questions. If they choose the wrong answer, the data is invalid; Respondents can only fill out this questionnaire one time. They need to log in to their private account when filling out the questionnaire.

Table 2. Descriptive Statistics

		Frequency	Percentage	Effective Percentage	Cumulative Percentage
Gender	Male	210	39.5	39.5	39.5
	Female	321	60.5	60.5	100.0
Age	Under 18 years old	7	1.3	1.3	1.3
	19–35 years old	386	72.7	72.7	74
	36–59 years old	138	26.0	26.0	100.0
Educational background	High school and below	32	6.0	6.0	6.0
	Undergraduate Degree	278	52.4	52.4	58.4
	Master Degree	138	26.0	26.0	84.4
	Doctoral Degree	83	15.6	15.6	100.0
	Total	531	100.0	100.0	

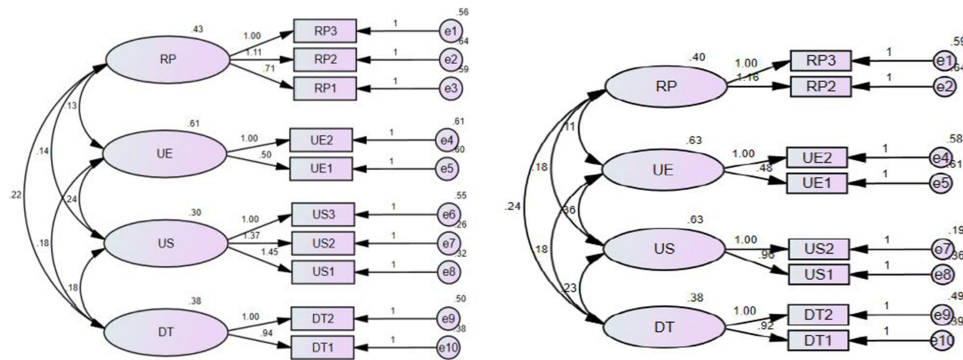


Fig. 2. Initial and revised confirmatory factor analysis.

In addition, there is the problem of self-selection bias. First of all, the samples we choose are residents of Beijing, so they have the same background. Secondly, at the last stage of the stratified sampling phase, when choosing residents, we randomly divided them into equal numbers of male and female. These two steps reduce some self-selection bias. As shown in Table 2, 210 males and 321 females were among the respondents. The respondents are mainly between 19 and 35 years old, and most of the respondents' academic backgrounds are undergraduate degrees.

3.3 Analytical Method

We used AMOS23.0 to build the structural equation model. We used the first-order structural equation model to take user satisfaction as the intermediary variable and gender, age, and educational background as the control variables. Please see Appendix B and C for reliability analysis, validity test, and exploratory factor analysis.

4 DATA ANALYSIS AND RESULTS

4.1 Confirmatory Factor Analysis

In this study, confirmatory factor analysis is used to judge whether the hypothetical relationship between observed variables and latent variables is consistent with the data, that is, the unique validity of each construct. We used AMOS 23.0 to complete the confirmatory factor analysis (Figure 2).

Table 3. Confirmatory Factor Analysis Initial Model Path Coefficient

			Estimate	S.E.	C.R.	P	Standard Estimate
RP3	←	RP	1.000				.661
RP2	←	RP	1.111	.120	9.224	***	.673
RP1	←	RP	.714	.084	8.492	***	.523
UE2	←	UE	1.000				.708
UE1	←	UE	.503	.093	5.419	***	.452
US3	←	US	1.000				.590
US2	←	US	1.375	.107	12.874	***	.826
US1	←	US	1.453	.113	12.852	***	.815
DT2	←	DT	1.000				.657
DT1	←	DT	.941	.107	8.821	***	.681

Table 4. Confirmatory Factor Analysis Revised Model Path Coefficient

			Estimate	S.E.	C.R.	P	Standard Estimate
RP3	←	RP	1.000				.633
RP2	←	RP	1.161	.164	7.088	***	.674
UE2	←	UE	1.000				.722
UE1	←	UE	.484	.088	5.472	***	.443
US2	←	US	1.000				.877
US1	←	US	.959	.075	12.784	***	.785
DT2	←	DT	1.000				.663
DT1	←	DT	.922	.108	8.517	***	.674

The confirmatory factor analysis model results show that the p-value of each path coefficient is far less than the significant level (Table 3). Generally speaking, the model has statistical significance, and the designed theoretical indicators can effectively measure each part. In addition, there are 11 model adaptation indicators in part of the model, and only five of them are near to standard (AGFI = 0.893, NFI = 0.874, IFI = 0.894, TLI = 0.833, CFI = 0.892), among which the number of absolute fitness indicators is two (RMSEA = 0.094, GFI = 0.944), indicating that the model adaptation effect can be improved. After adjustment, we deleted one path and added some paths. As a result, the model was fitted. Table 4 shows the results.

In this study, we revised the index values according to the model parameters, combined with the design assumptions of the SEM model, established the covariant relationship among the errors, and revised the initial confirmatory factor analysis model. After it is modified, the χ^2/df of the model is 3.122. The p-value of each path coefficient is far less than the significance level, which shows that the model has statistical significance. That is, the designed theoretical index can effectively measure each part. Most of the model adaptation indicators have reached the adaptation standard, including 11 model adaptation indicators, of which nine are up to standard, among which all the absolute adaptation indicators are up to standard, which is better than the initial model data, indicating that the overall model adaptation situation of confirmatory factor analysis is good.

4.2 Structural Equation Model

We can clearly see in Figure 3 left picture that the three control variables have no influence on digital trust, and their p-values are all greater than 0.05, which means that the hypothesis is not valid. It means that differences in gender, age, and educational background do not affect digital trust. In addition, the **user expectation's (UE)** p-value is greater than 0.05, which indicates that it has no direct impact on **digital trust (DT)**.

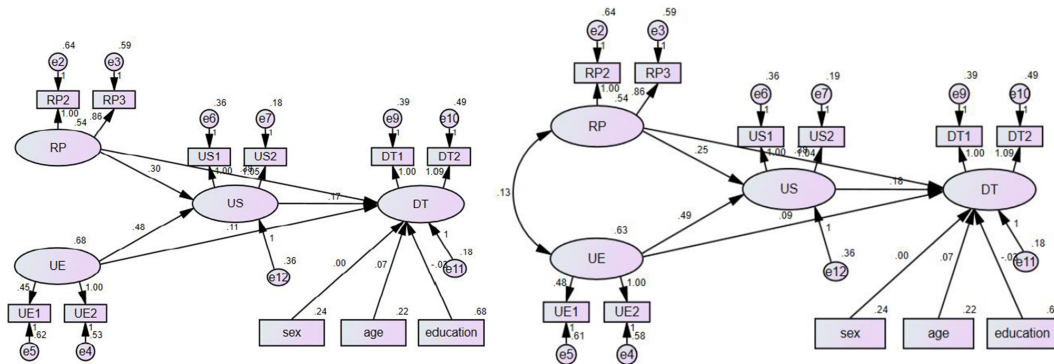


Fig. 3. Initial and modified structural equation model.

Table 5. Initial and Modified Path Coefficient of Structural Model

		Estimate	S.E.	C.R.	P	Standard Estimate
US ← RP	Initial	.298	.066	4.495	***	.291
	Modified	.249	.070	3.567	***	.240
US ← UE	Initial	.476	.099	4.826	***	.525
	Modified	.491	.100	4.910	***	.515
DT ← US	Initial	.172	.066	2.625	.009	.230
	Modified	.176	.065	2.719	.007	.235
DT ← UE	Initial	.111	.065	1.721	.085	.164
	Modified	.091	.068	1.339	.180	.127
DT ← RP	Initial	.384	.072	5.346	***	.501
	Modified	.376	.070	5.368	***	.485
DT ← sex	Initial	-.002	.057	-.034	.973	-.002
	Modified	-.002	.057	-.029	.977	-.001
DT ← age	Initial	.068	.060	1.146	.252	.057
	Modified	.068	.060	1.145	.252	.056
DT ← education	Initial	-.029	.034	-.861	.389	-.043
	Modified	-.029	.034	-.862	.389	-.042

The initial structural equation model results show that the p-values of most path coefficients are less than the significance level, which indicates that the model has statistical significance. However, some path coefficients are not significant, which does not conform to the theoretical assumptions. Moreover, most of the adaptation indicators of the model are not up to standard, and only three of them are up to standard, among which the number of appropriate indicators of value-added allocation is zero, indicating that the adaptation effect of the model needs to be improved. According to the model revision index, we revised the initial model and deleted some paths with a p-value larger than 0.05. Besides, we deleted some paths that do not conform to theoretical assumptions too. Table 5 also shows the factor load and p-value of each path of the revised structural equation model. It can be seen that the three control variables of gender, age, and educational background still have no influence on digital trust. User expectations have no direct impact on digital trust, and other paths have passed the test. In this study, according to the modified index value of model parameters, combined with the design assumption of the SEM model, we established the covariant relationship between errors and modified the initial equation structural model. P-values of all path coefficients are far less than the significance level, which indicates

Table 6. Standardized Effects - Two Tailed Significance

		education	age	sex	UE	RP	US	DT
US	Standardized Indirect Effects	...	...	...	...	...	...	...
	Standardized Direct Effects	...	...	...	.010	.016	...	...
	Standardized Total Effects	...	...	...	.010	.016	...	...
DT	Standardized Indirect Effects	...	...	...	.038	.047	...	...
	Standardized Direct Effects	.374	.351	.999	.283	.010	.037	...
	Standardized Total Effects	.374	.351	.999	.010	.010	.037	...

that the model has a high degree of interpretation. Most of the model adaptation indicators have reached the adaptation standard or critical value. Of a total of 11 model adaptation indicators, 9 are up to standard. The absolute fit indicators are up to standard, better than the initial model data, indicating that the revised model adaptation situation is good.

The above analysis results show that the H4 hypothesis (user expectation has a positive impact on digital trust) failed the test. The exciting discovery in this paper is that user expectation has no effect on digital trust, which is contrary to our hypothesis. However, Hypothesis 7 (User satisfaction plays an intermediary role between user expectation and digital trust) passed the test. This result demonstrated that user satisfaction really plays an intermediary role between user expectation and digital trust, and it is also a complete intermediary role. In addition, Hypothesis 3 also passed the test. User expectation has a positive impact on user satisfaction. A further novel finding is that user satisfaction plays an intermediary role between user perception and digital trust, which means Hypotheses 1 and 2 passed the test. In addition, the control variables (age, gender, and educational background) have no influence on digital trust.

According to the seven hypotheses of the model design, a total of six hypotheses are passed. The standardized direct effect of user perception on user satisfaction is 0.240. The results clearly show that when other conditions are unchanged, every time the “user perception” latent variable increases by 1 unit, the “user satisfaction” latent variable will increase by 0.240 units. This is consistent with what has been found in previous studies [21, 22]. They found that user perception has a positive impact on user satisfaction. In fact, users perceive the characteristics of information security, service quality and efficiency of digital government in the digital environment, which will indeed improve their satisfaction. User perception is the cornerstone of user satisfaction. Without user perception, the measurement of user satisfaction is inaccurate. Since the standardized direct path coefficient of user perception to user satisfaction is 0.240, and the standardized direct path coefficient from user satisfaction to digital trust is 0.235, so the indirect effect of user perception to digital trust is 0.056. This result shows that when other conditions remain unchanged, the latent variable of user perception increases by 1 unit, the latent variable of digital trust will indirectly increase by 0.256 units. The standardized total effects of user perception to digital trust is 0.248. Because the standardized total effect refers to the sum of standardized direct effect and standardized indirect effect. This result indicates that Hypothesis 2 passes the test, that user perception does have a direct positive impact on digital trust. However, previous studies have shown that user perception has a negative impact on digital trust [23]. This is mainly because the composition of user perception is different from his research. In this paper, user perception is composed of perceived security, quality and efficiency, these features are positive words. In previous studies, user perception generally refers to risk perception. Obviously, the greater the risk the user perceives, the smaller the trust is. In addition, user perception also affects digital trust through user satisfaction, which is a very interesting conclusion. Although it is somewhat different from previous studies, it brings infinite enlightenment to the development of digital government.

The standardized direct effect of user satisfaction on digital trust is 0.235. The results clearly show that when other conditions are unchanged, every time the “user satisfaction” latent variable increases by 1 unit, the “digital trust” latent variable will increase by 0.235 units. The standardized indirect effect is 0.00, and the standardize

total effect is 0.235. This result proves that Hypothesis 5 passed the test. This finding is directly in line with previous findings [27]. Yang and Feng found user satisfaction will affect user use intention and digital trust. Considering the reality, users feel satisfied with the use of digital government services, which will build his digital trust in digital government, so that he can use digital government services again and countless times. The standardized direct effect of user expectation on user satisfaction is 0.515. The results clearly show that when other conditions are unchanged, every time the “user expectation” latent variable increases by 1 unit, the “user satisfaction” latent variable will increase by 0.515 units. This result is consistent with the results of Wang and Wang [25] and Huangfu [26]. In fact, users’ expectations for the ease of use and usefulness of digital services are indeed related to user satisfaction. If their expectations are met, their satisfaction will naturally increase. A further novel finding is that user expectations don’t have a direct impact on digital trust, it can only indirectly affect digital trust through user satisfaction, and user satisfaction is the intermediary variable between user expectations and digital trust. This result overturns Hypothesis 4 (User expectation has a positive impact on digital trust) and confirms Hypothesis 7 (User satisfaction plays an intermediary role between user expectation and digital trust). From the practical point of view, it is difficult for user expectations to have a direct impact on digital trust. User expectations only affect user satisfaction, and digital trust is not directly linked.

5 DISCUSSION

In the current research, many scholars have confirmed the impact of user perception on user satisfaction [30]. At the same time, due to the expectation confirmation model being a prevalent model, which scholars widely use, the impact of user expectations on satisfaction is also confirmed in most literature [31]. This idea is in line with our assumptions. In addition, most scholars often combine expectation confirmation theory with users’ continuance intention when applying it and believe that user satisfaction promotes users’ continuance intention [30, 31]. However, this paper argues that user satisfaction should first promote digital trust when promoting users’ continuance intention. User satisfaction first affects digital trust, and then digital trust affects users’ continuance intention. Consistent with the hypothesis, our results now provide new evidence that user satisfaction positively impacts digital trust. The higher the user satisfaction, the higher the digital trust. This is an interesting finding that other scholars can consider digital trust as an intermediary variable between user satisfaction and continuance intention when doing their research. User satisfaction of digital government can be divided into three categories. First, the satisfaction of system quality. It means that users are satisfied with the interface design and operation procedures of digital government. Second, satisfaction with information quality. This means that users are satisfied with the information provided by digital government. For example, the information provided by digital government is not false information, erroneous information or false news, and all government processes are transparent. Third, satisfaction with service quality. It means that after users use the digital government, they believe that the services provided by the digital government can meet their needs and bring convenience to their lives.

In addition, from the above results, it is clear that user perception has a direct positive impact on digital trust. People’s perception depends on the external environment and their ability of understanding. Generally speaking, education level determines people’s comprehension ability. Since people have different education levels, there will be gaps in their understanding. This gap in understanding is often one of the essential causes of the digital divide. People with high digital trust are more likely to use digital technology to maximize their interests. They can understand that the development of digital technology will provide people with a more convenient and efficient way of life. If people’s digital trust level is low, they still live the traditional offline lifestyle and will encounter many inconveniences in life. For example, the Korean Foreigners’ Administration requires that every foreigner must contact the Foreigners’ Administration for registration after entering Korea. Due to a large number of foreigners, it is necessary to reserve a good time online and register directly according to the reservation without waiting. Suppose people are not used to the operation of the digital society and are reluctant to make

an appointment online. In that case, they must queue for more than three hours, resulting in a severe waste of time and energy. A further novel finding is that user expectations indirectly affect digital trust. User satisfaction plays a mediating role between user expectations and digital trust. Although much literature has confirmed that user expectation positively impacts user satisfaction, no research has directly found the mediating effect of user satisfaction between user expectation and digital trust. The government should guide the user's expectations and not focus on solving all user problems. Instead, it should tell users what the digital government can solve for them most simply and directly when users first use them. The government should let users understand the application scenarios and the design goals of this digital government platform when they first use it. Users have their psychological expectations when using digital government websites or Apps and they will have a vague judgment through platform introduction or content classification. Once there is a conflict between the performance and introduction of the platform, user satisfaction will be harmed, thereby reducing digital trust. The introduction of digital government should be consistent with the function of digital government, not blindly grasp the keywords and hot spots. Therefore, the government should avoid unexpected factors conflicting with users' expectations when providing e-government services.

Another interesting conclusion is that user expectations have no direct impact on digital trust, and it needs to indirectly affect digital trust through user satisfaction, which plays a mediating role. The service platform of digital government has been developing continuously, and the expectations of users are also increasing. From interface design to the emphasis and promotion on privacy protection, user experience has been significantly improved. Like many users, digital government also hopes to provide users with excellent e-government service experiences. At the same time, the government also knows that where to solve the problem is not easy. Many researchers have made great efforts to solve this problem. First of all, it is worth the government's attention to realize that the expectations between users are not the same. User expectations are affected by factors such as age, gender, and educational background. For example, older groups want digital governments to adapt to the vision and brains of older people, and they want governments to provide e-government services that are simple, readable, and easy to operate. Disabled people want the digital government to provide services suitable for their group and not exclude them. Adolescents hope that digital government can provide an interesting and knowledgeable interface. For different user expectations, user satisfaction is also different, resulting in different digital trust. On the contrary, the formation of digital trust can promote the construction of digital government. Secondly, user expectations generally include features of usefulness and ease of use. The usefulness includes the functions of the digital government platform (what kind of service can be provided for users), privacy protection (ensuring the safety of users), and other characteristics. The usability includes interface design, operation process, and other parts. Design different digital government platforms according to different groups. To provide fair digital government services and improve user satisfaction and digital trust is an urgent issue for the government.

6 CONCLUSIONS, LIMITATIONS AND FUTURE RESEARCH

The most interesting finding of this paper lies in discovering the new combination of influencing factors of digital trust, and discovering the intermediary role of user satisfaction among user perception, user expectation, and digital trust. In the construction of digital trust, user satisfaction plays a vital role. The construction of digital trust in digital government should focus on the achievement of user satisfaction.

6.1 Theoretical Contributions and Policy Implications

This analysis leads to the following implications:

Firstly, in the digital society, the construction of users' digital trust is based on users' satisfaction. The government should provide diversified and high-quality e-services as much as possible so as to greatly meet the needs of users and enhance the user experience so that users are more satisfied. It is worth noting that governments should provide different e-services according to different user groups. For example, the government should

provide services mainly based on interest and supplemented by practicality for youth groups. For the elderly, the government should provide services primarily based on suitability and supplemented by aesthetics. Older people often have weak hearing and visual systems. So, the user interface should be clear and concise. In this way, the measures to provide different electronic services for other groups will better meet user needs, improve user satisfaction, and enhance users' digital trust.

Secondly, digital trust is directly or indirectly affected by user perception and user expectation. The government should build a safe, green, and harmonious digital environment for users and make digital services consistent with users' expectations. Especially for young people, the government should try to give them a healthy and safe network environment. The cognitive ability of adolescents is still developing through learning. If the digital network they come into contact with is unsafe and risky, it will hinder the construction of their digital trust. In addition, through observation, youth groups will form their expectations for the digital environment. If the digital environment they contact does not meet their expectations, it will also hinder the development of their digital trust.

Finally, the construction of user digital trust is based on the user's information literacy ability. Therefore, the government should strengthen users' information quality ability education and let people realize that digital technology can bring convenience to life. Of course, digital technology is a double-edged sword and needs to teach people how to protect their digital property in the digital environment. The cultivation of information literacy ability can start from the nine-year compulsory education stage, cultivate children's information literacy ability from childhood, teach children how to identify the good and evil in the digital environment, and cultivate children's digital trust. For middle-aged groups, the government can set up adult education tutorial classes to popularize the advantages and disadvantages of digital technology and teach them to protect their digital information while improving their digital trust. Governments should be committed to educating people of all ages on how to distinguish false news, false information, or misinformation and strive to give all users their judgment and ability to analyze events.

In summary, this paper argued that the reconstruction of trust in a digital society should be based on users' satisfaction in the digital environment. The government should provide relevant services to maximize user satisfaction. In addition, digital trust is also indirectly related to user perception and user expectations. How to teach users to improve digital trust while protecting their digital information is a problem that needs to be considered by the government. The government should also try to provide a harmonious and healthy digital environment.

6.2 Limitations and Future Research

The limitations of the present studies naturally include two parts. Firstly, this paper uses a quantitative research method—a structural equation model to analyze the influencing factors of digital trust. Therefore, the results are more macro-biased. The impact of external variables on digital trust is investigated. In future research, scholars can also use qualitative research methods to do face-to-face interviews with respondents, take more analysis of the subjective feelings of respondents, and analyze the influencing factors of digital trust from personal feelings. Secondly, because this article focuses on the user's digital trust in e-government website research, this paper did not profoundly analyze false information, false news, and error information but points out that the government should teach users to distinguish information to improve their information ability. Moreover, this paper has not discussed topics such as e-democracy and public participation in depth. Although these topics are closely related to digital government, this paper can only focus on the construction of influencing factors of user digital trust due to the limited space. In future research, governments should consider building citizens' digital trust in e-democracy and civil rights environments, and let more users support the digital government and participate in digital government services. According to citizens' behaviors, the government can also deeply analyze the reasons that affect citizens' digital trust from the perspectives of behavioral public policy and nudge theory and propose better ways to improve citizens' digital trust.

APPENDICES

A QUESTIONNAIRE

Questionnaire Survey on People's Digital Trust in Digital Government

Part one: basic information

- (1) Do you live in Beijing now? [Single Choice Question] *
 - ☐ Yes ☐ No
- (2) Please select your gender [Single Choice Question] *
 - ☐ Male ☐ Female
- (3) Please select your age range [Single Choice Question] *
 - ☐ Under 18 years old (Juvenile) ☐ 19-35 years old (Youth)
 - ☐ 36-59 years old (Middle age) ☐ After the age of 60 (Old Age)
- (4) Please select your highest education level [Single Choice Question] *
 - ☐ High school education and below ☐ Bachelor's degree
 - ☐ Master's degree ☐ Doctoral degree

Part two: people's digital trust in digital government (From Strongly agree to Strongly disagree, it is 5 to 1 point respectively)

- (5) To what extent do you think the e-government platform can perform the government functions well? [Single Choice Question] *
 - ☐ Strongly Agree ☐ Agree ☐ Neither agree nor disagree ☐ Disagree ☐ Strongly Disagree
- (6) To what extent do you think the e-government platform is safe? [Single Choice Question] *
 - ☐ Strongly Agree ☐ Agree ☐ Neither agree nor disagree ☐ Disagree ☐ Strongly Disagree
- (7) To what extent do you think the e-government platform is efficient? [Single Choice Question] *
 - ☐ Strongly Agree ☐ Agree ☐ Neither agree nor disagree ☐ Disagree ☐ Strongly Disagree
- (8) This is a trap question. If you are seriously answering, please choose Disagree. [Single Choice Question] *
 - ☐ Strongly Agree ☐ Agree ☐ Neither agree nor disagree ☐ Disagree ☐ Strongly Disagree
- (9) To what extent do you think the online business of e-government platform can meet your needs? [Single Choice Question] *
 - ☐ Strongly Agree ☐ Agree ☐ Neither agree nor disagree ☐ Disagree ☐ Strongly Disagree
- (10) To what extent do you think the interface design of e-government platform is clear and easy to use? [Single Choice Question] *
 - ☐ Strongly Agree ☐ Agree ☐ Neither agree nor disagree
 - ☐ Disagree ☐ Strongly Disagree
- (11) To what extent do you think the staff of e-government platform can handle the public's business applications in a timely and effective manner? [Single Choice Question] *
 - ☐ Strongly Agree ☐ Agree ☐ Neither agree nor disagree ☐ Disagree ☐ Strongly Disagree
- (12) To what extent do you think the information disclosed on the e-government platform is accurate and useful? [Single Choice Question] *
 - ☐ Strongly Agree ☐ Agree ☐ Neither agree nor disagree ☐ Disagree ☐ Strongly Disagree
- (13) To what extent do you think the system of e-government platform is perfect? [Single Choice Question] *
 - ☐ Strongly Agree ☐ Agree ☐ Neither agree nor disagree ☐ Disagree ☐ Strongly Disagree
- (14) This is a trap question. If you are seriously answering, please choose Agree. [Single Choice Question] *
 - ☐ Strongly Agree ☐ Agree ☐ Neither agree nor disagree ☐ Disagree ☐ Strongly Disagree

- (15) To what extent do you think e-government platform can improve your quality of life and is trustworthy?
[Single Choice Question] *
- Strongly Agree ○ Agree ○ Neither agree nor disagree ○ Disagree ○ Strongly Disagree
- (16) To what extent do you prefer e-government platforms to traditional government affairs, and are willing to trust them? [Single Choice Question] *
- Strongly Agree ○ Agree ○ Neither agree nor disagree ○ Disagree ○ Strongly Disagree

B RELIABILITY ANALYSIS

Table 7. Reliability Analysis

Variables	Cronbach's Alpha	Number of questions
User perception	0.827	3
User expectation	0.701	2
User satisfaction	0.723	3
Digital trust	0.831	2
Total	0.756	10

C VALIDITY TEST AND EXPLORATORY FACTOR ANALYSIS

Table 8. Validity Analysis

KMO value		.726
Bartlett spherical test	Approximate chi-square	520.921
	Degree of freedom	45
	Significance	.000

Table 9. Total Variance Explanation

Composition	Initial eigenvalue			Extract the load square sum			Rotation load square sum		
	Total	Variance percentage	Cumulative percentage	Total	Variance percentage	Cumulative percentage	Total	Variance percentage	Cumulative percentage
1	3.562	35.624	35.624	3.562	35.624	35.624	2.258	22.580	22.580
2	1.611	16.110	51.734	1.611	16.110	51.734	1.967	19.669	42.249
3	1.376	13.761	65.495	1.376	13.761	65.495	1.777	17.770	60.019
4	1.025	10.249	75.744	1.025	10.249	75.744	1.573	15.725	75.744
5	.599	5.988	81.731						
6	.477	4.769	86.500						
7	.411	4.105	90.605						
8	.370	3.696	94.301						
9	.340	3.398	97.699						
10	.230	2.301	100.000						

Table 10. The Rotated Component Matrix

	Component			
	1	2	3	4
RP1	.861			
RP2	.874			
RP3	.730			
US1		.788		
US2		.822		
US3		.666		
DT1			.903	
DT2			.895	
UE1				.886
UE2				.865

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