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Research Article

Internet of Things Background: An Empirical Study on the Payment Intention of Central Bank Digital Currency Design

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This article proposes and verifies the consumer acceptance intention model under the background of central bank digital currency payment. It modifies the theory of technology acceptance (TAM), rational action theory (TRA), and extended valence framework (EVF) through the construction of perceived privacy, perceived security, perceived system quality, and perceived benefits. The data collected from 325 questionnaires on consumers' attitudes toward the central bank's digital currency were used to apply the structural equation model to evaluate the prediction model. The empirical results indicate that perceived privacy, perceived security, and perceived system quality are important predictors of perceived trust, and perceived trust is an important predictor of perceived interest and intention. Perceived privacy, perceived security, and perceived system quality are key factors influencing consumers' intentions.

1. Introduction

In modern history, governments have played a special role in the allocation and regulation of money. As payment methods have continued to evolve, cash has gradually been marginalized, and more have entered the "cashless" era. According to the report released by the Swedish Central Bank in 2019, the amount of cash payments by the Swedish public only accounted for about 1% of GDP, and only about 13% of Swedish citizens had used cash payments recently. In Norway, the United Kingdom, Canada, the United States, and other countries, cash payment accounts for less than 10% of GDP. The advent of the cashless era has laid the foundation for the issuance of central bank digital currency. Driven by international trade and the shift from nationalism to globalism, the concept of global currency has received considerable attention in the past decades [1]. This has been coupled with the global crisis brought on by COVID-19, which the International Monetary Fund (IMF) has defined as a "great lockdown." The economies of major countries around the world have been severely affected by the pandemic. We found that countries and regions with a relatively good digital economy have suffered relatively little impact on their economies during the pandemic and recovered quickly. Consumption and consumer behavior are key factors in society, especially during the ongoing COVID-19 pandemic. Digitalization has become a major factor in consumer behavior, which has led to new lifestyles [2]. This also reflects the necessity of digital economy research in the context of the pandemic.

Countries such as China that have made remarkable achievements in fighting the pandemic have maintained steady and rapid economic growth while actively fighting the pandemic. This is also related to China's economic strategies and policies. One such important initiative was the release of the digital RMB (Ren Min Bi/Chinese *yuan*) by China's central bank [3]. Central banks are charged with maintaining monetary and financial stability and improving the security and efficiency of payments. One of the central bank's core tools to achieve these public policy goals is to provide banks, enterprises, and the public with the safest form of money [4]. Digital currency is a cashless mode of currency transaction, and China has increasingly operated on a cashless basis. In 2020, cashless transactions in China

reached $49 trillion, accounting for four-fifths of payment transactions [3]. Therefore, the application of paperless digital currency has become a trend.

The IMF defines a central bank digital currency (CBDC) as "a widely available digital form of fiat currency [5]. This central bank digital currency will be a liability of the central bank and will form part of the base money supply." The main advantage of CBDC for retail payment is to provide users with high liquidity, low risk, easy to use, and universal payment. On the other hand, the advantage of using it for wholesale settlement is to provide faster, safer, and cheaper cross-border payment methods [6]. Moreover, nongovernment virtual currency is not the focus. Cryptocurrencies like Bitcoin and Ethereum that have infiltrated the mainstream financial markets have been heavily hyped and even stirred up some controversy recently. In view of these changes, central banks around the world have gradually begun to consider introducing "official" digital currencies, often referred to as CBDCs [7]. The European banking authority defines a virtual currency as a digital representation of value that is not issued by a central bank or authority and is not linked to fiat currency but is accepted by the public as a means of payment and can also be transferred, stored, or traded electronically.

Since 2017, the Bank for International Settlements (BIS) has conducted an annual survey of the willingness of major developed and developing countries to issue CBDCs. In the latest survey report, 80% of the surveyed countries indicated that they have been working on CBDCs for various reasons, and an increasing number of countries have moved from conceptualization to experimentation. Among them, Sweden, Britain, Canada, China, and other countries are at the forefront of the world's research on CBDC, and a small number of countries have carried out pilot work on CBDC.

In Japan, many central banks, including the Bank of Japan, have begun to study CBDC [8], and the Bank of Japan had planned to start the empirical experiment of digital currency in spring 2021. The idea was divided into three stages. Among them, the main work of the first stage was to establish basic functions. The second stage was functional testing under more complex conditions. The third stage was to find problems in the actual operation, makeup loopholes, and constantly improve. The digital currency proposed in the Japanese research report is an ordinary electronic currency that can be widely used by individuals and enterprises. It is issued by the central bank and popularized to consumers through private banks, which is an indirect issuance mode.

In South Africa, in June 2018, the Central Bank of South Africa released a trial report on the Khokha digital currency payment project based on distributed ledger technology.

In the European Union, the president of the European Central Bank said that he wants to make the digital euro a reality within 5 years. This statement is equivalent to the European Central Bank's "policy announcement," made when the launch of the digital euro was already on the line. This is interesting because, for years, Europe has been hesitant to use and promote electronic payments and is even more wary of digital currency.

In South Korea, substantial preparations for digital currency began in earnest in early 2020. Bank of Korea (BOK) President Lee Ju-yeol said in his 2021 New Year's speech that the central bank would build a testing system for digital currency in a virtual environment as planned and carry out relevant tests. Preparations for the launch of Korea's digital currency are in full swing, with all tests expected to be completed by the end of 2021.

In China, the People's Bank of China has been at the forefront of CBDC research and was also one of the first central banks to announce its intention to launch CBDC [5]. In 2014, the People's Bank of China set up a special research group to conduct in-depth discussion and research on the e-CNY issuance and business operation framework along with relevant technologies and legal issues. The Digital Currency Research Institute of the People's Bank of China started applying for digital currency patents in early 2016 and named the research and development and pilot project of the digital yuan DC/EP in 2018. By March 2021, the digital yuan had been publicly tested in several places, including Shenzhen and Suzhou. In December 2021, China's homegrown "Sinomic" digital currency wallet passed relevant tests. The product could be unlocked by fingerprint recognition, supporting digital currency payment, balance query, transaction information display, loading health code, and other functions. Now, the People's Bank of China has carried out digital RMB pilot programs in Shenzhen, Suzhou, Xiongan, Chengdu, Shanghai, Hainan, Changsha, Xi 'an, Qingdao, Dalian, and the 2022 Beijing Winter Olympics [9]. By the end of 2021, the number of digital RMB pilot scenarios had exceeded 8 million with a total of 261 million individual wallets opened and a transaction amount of 87.56 billion yuan [10]. This is also a sign that the digital yuan is increasingly permeating every aspect of people's lives. It can be used to pay for food, taxis, or movie tickets online, as well as more than 200 offline consumption scenarios, including catering, take-out, and fresh food retail. China's digital RMB has basically achieved full coverage of the digital RMB in people's daily life. The digital RMB has been combined with high-frequency consumption scenarios and can serve the real economy and people's lives on a larger scale, thus driving the improvement of the inclusiveness and availability of digital RMB. However, the application scope of the confirmation is still limited, the pilot is also in the early stage, which requires the support of various entities to promote the research of CBDC.

The research on central bank digital currency is inseparable from the research on traditional mobile payments because the application of mobile payments has been relatively popular and convenient. Mobile payment is a regulated digital transaction in the form of cashless, checkless, and physical credit card-free payments via mobile devices. Mobile payments can be credit card payments using a mobile wallet, where consumers can securely store bank details associated with a debit card or one or more credit cards. The main reason for mobile payment services is that citizens obtain digital authorization and reduce intermediaries, thus making society cashless, paperless, and faceless [11]. Mobile payment plays a crucial role in the

services of the 21st century. People can easily transfer money with a few taps on their mobile phones regardless of geographical distance and time [12]. Legal digital currency adopts the Xinde double offline technology, which can realize double offline payment. Compared with the current mobile payment system, Xinde has stronger practical significance [13].

Digital currency payment technology and mobile payment technology composition are similar and may use near field communication (NFC) payment, quick response (QR) code payment, and SMS-based payment. The first and second (NFC and QR) are proximity systems, and the third (SMS) represents a remote system [14]. NFC is an emerging short-range wireless communication technology [15] that meets the needs of providing secure, short-range, and implicit paired communication capabilities in smartphones. Both NFC and QR payments are made in person at a store or compatible terminal, simply by using a mobile device to approach the terminal. A QR code is a storage system that uses a dot matrix or two-dimensional bar code developed by DensoWave, which can be printed or displayed on a screen and scanned by a special reader. The digital RMB payment system in this study also includes the application of the above technologies.

When consumers choose payment methods, such as cash, check, credit card, debit card, or mobile payment, they often subconsciously go through an evaluation process [16]. When consumers have multiple payment options and the various back-end technologies that power payment systems, each of which has different security, privacy, risks, and other issues, it becomes critical to investigate the factors that influence consumer adoption of digital currency payment systems.

The purpose of this study was to evaluate the impact of perceived trust on consumers' willingness to adopt the CBDC mobile payment system. Investigating the digital currency and mobile payment literature review, Kim et al., in 2009, used the theory of rational behavior framework, extension, value, and expectation, and confirmed the theory under the background of a combination of electronic commerce consumer trust and satisfaction model [17]. The theory includes privacy, security, and familiarity as preconditions of trust and risk perception. Chin et al., in 2020, further validated and supplemented the Extended Valence Framework (EVF) system to assess intent based on perceived trust and three antecedents (i.e., privacy, security, and familiarity) and packaged it with an extended valence framework that takes into account the opposing concepts of perceived risk and perceived benefit [16]. In addition, this study elevated privacy and security to perceived privacy and perceived security. In 2015, Gao and Waechter combined ISS, TCE, and technology acceptance (TAM) models and took perceived information quality, perceived system quality, and perceived service quality as the prerequisite conditions for trust [18]. We unified these three factors into perceived system quality and supplemented Chin's model to further improve the pre-influencing factors for explaining trust and risk. After a pilot study with 324 participants, data were collected from respondents' surveys and analyzed. Finally, we present our findings and discuss their implications.

2. Related Work

A review of previous literature identified hundreds of publications related to the adoption of digital currencies for mobile payments. Most previous studies, however, have not examined the adoption of digital currency payment systems by central banks. Two empirical studies summarized 312 previous publications. The first study reviewed 204 mobile payment manuscripts from 2002 to 2022. In this review, the researchers focused mostly on mobile payment studies in multiple categories. The first category was technical applications, such as NFC and QR. Another was the application of theoretical models in consumer behavior, intention, and adoption. Representative theoretical models included the TAM, unified theory of technology acceptance and use (UTAUT), innovation diffusion (DOI) model, rational action theory (TRA), planned behavior theory (TPB), and EVF. Based on the first empirical study, the author found that there were only 26 manuscripts related to digital currency in mobile payment, most of which were studies on policies and impacts, and there were only a few empirical studies on digital currency [19]. Many scholars have conducted in-depth research on consumer behavior patterns and intention to use, but these results cannot well explain the special problems brought about by the central bank's digital currency technology itself. First of all, consumers have uncertain risk perceptions about the currency payment experience brought by the central bank's digital goods and the existing traditional payment experience; second, advanced and fresh technologies can meet the specific emotional needs of consumers. Finally, this study takes the digital currency of the people's Bank of China as the object, and the consumers are Chinese residents. Chinese residents have the important feature of "valuing emotion," which makes the interpersonal relationships in our society generally have the characteristics of people's identity. The recognition of relatives and friends to the new payment technology will form a social norm in a sense, thus promoting consumers' intention to use it. The author concluded that TAM, TRA, and other theories have been repeatedly used by researchers since 2002 to study mobile payment. It is not completely applicable to the research of central bank digital currency payment and it is suggested to introduce a classical research model or new theory for the study of CBDC payment.

The second study reviewed 108 digital currency-related manuscripts from 2013 to 2022. Through sorting, it was found that most manuscripts are about the prospect, development, and influence of digital currency and other financial research. Among them, only a few manuscripts researched consumers' adoption of CBDC [20], which also reflects the necessity of studying consumers' adoption of CBDC.

3. Theoretical Background

The continuous progress and popularization of information technology have injected new vitality into society, but in many cases, the introduction of new technology has not achieved the desired effect. How to popularize the new technology has attracted the attention of many scholars, and different solutions have been proposed.

From the perspective of consumers, technology acceptance theory studies how beliefs and attitudes determine consumers' intentions to use new technologies. TRA, TPB, and DOI are considered the first batch of theories to explain technology adoption and acceptance [21]. Ajzen and Fishbein proposed TRA, which regards attitude and subjective norms as determinants of behavior [22]. Based on TRA theory, Davis developed the TAM model to explain how and when consumers decide to accept and use a technology [23]. Ajzen added the knowledge of controlling factors and perceived promoting factors, namely perceived behavioral control factors, on the basis of planned behavior theory to form the planned behavior theory (TPB) [24]. In 2009, Kim et al. developed EVF theory based on TRA theory, and the value framework mainly comes from economics and psychology [17]. In this model, trust is believed to directly affect consumers' intentions and indirectly affect consumers' intentions through its two mediating factors, perceived risk and benefit.

Therefore, based on the previous theories, EVF theory has been widely and repeatedly applied to mobile payment research. It integrates TRA, TPB, TAM, DOI, and value framework theory. The purpose is to explain the intentions that influence consumers to use the new system. The model shows that the five core factors affecting consumers are perceived privacy, perceived security, perceived familiarity, perceived trust, and perceived benefit.

4. Research Methods and Hypotheses

This study modified the EVF model proposed by Kmin et al. and added a new influencing factor of perceived system quality. This model is shown in Figure 1, including perceived privacy, perceived security, familiarity, perceived system quality, perceived trust, perceived risk, perceived benefit, and intention. This study measured the acceptance of digital currency by selecting consumers in the pilot cities of the CBDC as the survey object. In 2022, Beijing, Shanghai, Shenzhen, Dalian, and other cities were selected by the central bank as pilot cities for the introduction of digital currency.

The survey design consisted of three phases. First, the study added the classification of consumers used and unused. The unused consumers registered for trial on-site and collected questionnaire data after observing their use status. Second, personal interviews were added, which were also divided into two categories of use and non-use to investigate what factors would affect their use. Finally, the expert group corrected the questions according to the results of the questionnaire predictive test. The test involved 21 cities with 325 valid questionnaires. The proportion of those who had used digital currency and those who had not was 31.08% and 68.91%, respectively. The respondents were almost evenly distributed in the pilot cities, ensuring the objectivity of the survey results. Nearly 83% of the interviewees were between 18 and 40 years old, and more than 65.54% had a bachelor's degree or above. It is understandable that many new technology consumers are young and educated [20].

4.1. Perceived Privacy. We define perceived privacy as the ability of individuals to control when, how, and to what extent their personal information is communicated to mobile applications [25]. It is also defined as the right to prevent unauthorized disclosure of personal information. Perceived privacy risk refers to an individual's concern about the potential harm to their personal information [26]. In the process of information collection, consumers can limit the use of information technology when they feel that their privacy is violated [27]. However, with the semi-complete reliance on electronic information, privacy surges become an important factor affecting consumers' intention to use digital RMB payment, and some consumers even believe that only cash can provide privacy [28]. The higher the privacy concern, the lower the trust of consumers, which in turn may lead to a decrease in consumers' intention to use CBCD [27]. In our study, we expected perceived trust to decrease and perceived risk to increase as privacy concerns increase. Therefore, we propose the following hypothesis:

> Hypothesis 1: Consumers' concerns about privacy have a negative impact on consumers' trust in mobile payment systems.
>
> Hypothesis 2: The privacy issues perceived by consumers positively affect the risks perceived by consumers in the mobile payment system.

4.2. Perceived Security. Perceived security is "the subjective probability that consumers believe that their personal information will not be viewed, stored, and manipulated by inappropriate parties in a way that meets their confident expectations during transmission and storage" [29]. More important than existing actual security measures is consumers' perception of realized security, which mainly affects trust and intent [30]. In this article, perceived security refers to the degree to which consumers believe that technical service providers can take appropriate actions to ensure that the use of digital RMB payment technology is risk-free. Privacy and security are not mutually exclusive but interact in the transaction process, as privacy cannot be compromised without compromising security [31]. Some researchers have found a significant positive correlation between perceived security and trust [32]. In other studies, it was found that security was positively correlated with trust and negatively correlated with risk [33, 34]. Therefore, we propose the following hypothesis:

> Hypothesis 3: Consumers' perceived security has a positive impact on consumers' perceived trust in the digital RMB payment system.

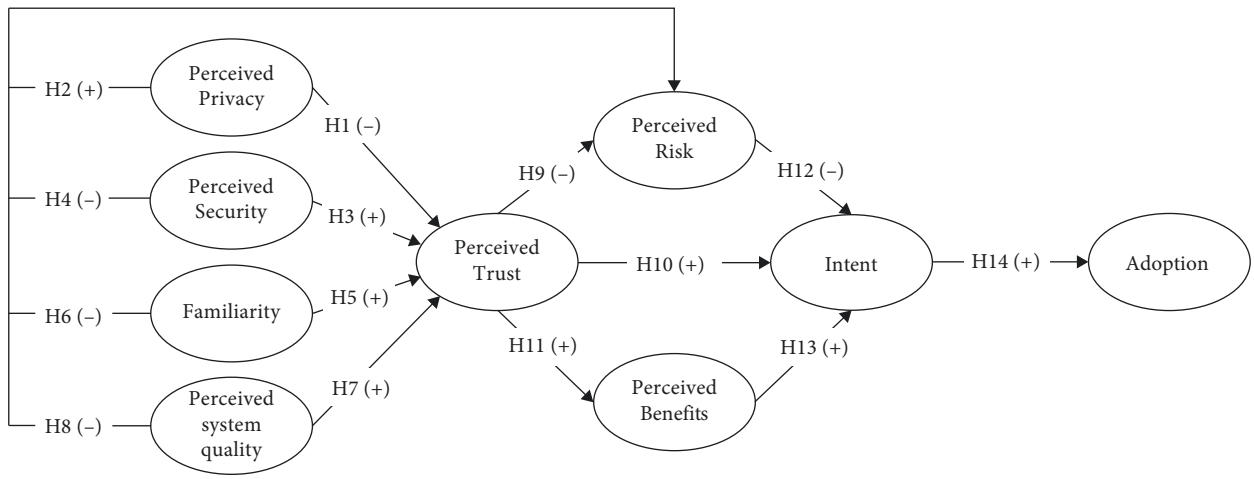

Figure 1: Hypothetical model.

Hypothesis 4: The perceived security of consumers has a negative impact on the perceived risk of the digital RMB payment system.

4.3. Familiarity. Familiarity is defined as "the number of product-related experiences accumulated by consumers" [16]. In this article, familiarity refers to consumers' satisfaction with transactions through the digital RMB payment system. The more familiar consumers are with the successful process, the more they expect the institution to continue to fulfill its obligations, and therefore, consumers may feel more comfortable with the whole process [33, 34]. In addition, Liu indicated that the higher the familiarity between the sender and the receiver, the greater the willingness of the receiver to purchase based on the suggestion of the sender [35]. Therefore, a similar situation occurs in the perceived trust and risk of familiarity toward the digital RMB payment system. Several previous studies have examined the impact of familiarity on consumer behavior and intention [36]. Previous studies have found that familiarity is positively correlated with perceived trust [37] and negatively correlated with perceived risk [33, 34, 38]. Therefore, we propose the following hypothesis:

Hypothesis 5: Consumers' perceived familiarity with the digital RMB payment system has a positive impact on consumers' perceived trust in the digital RMB payment system.

Hypothesis 6: Consumers' perceived familiarity has a negative impact on consumers' perceived risk of the digital RMB payment system.

4.4. Perceived System Quality. The perceived system quality in this study reflects consumers' perception of the access speed, ease of use, appearance, and compatibility of the digital RMB payment system. The concept of system quality is defined as the quality reflected in the overall performance of the system and measured by personal perception [39]. At the same time, we added the concept of compatibility to the original connotation of perceived system quality. Compatibility refers to the consistency between the exponential RMB payment and consumers' lifestyle and shopping mode [40]. Compatibility with existing values and practices indirectly affects the actual adoption of digital currency [19]. Sarkar found that system quality affects consumers' trust in mobile payment providers [41]. Lee points out that system quality affects consumers' trust in mobile banking [42]. They argue that when consumers find mobile banking systems difficult to use, they may feel that service providers are not putting effort and resources into providing them with systems that are easy to use. Therefore, we propose the following hypothesis:

Hypothesis 7: Perceived system quality has a positive impact on consumers' perception of trust in the digital RMB payment system.

Hypothesis 8: Perceived system quality has a negative impact on consumers' perceived risk of the digital RMB payment system.

4.5. Perceived Trust. Perceived trust can be defined as "the tendency of one party to be influenced by another party's behavior based on the expectation that the other party will perform a particular behavior that is important to him or her, regardless of the ability to monitor or control the other party"; that is, the tendency behavior pattern to adopt a particular behavior [43]. By increasing trust in the monetary system, the central bank makes it easier for households to realize the importance of CBDC [44]. Consumers must take into account the risk level of their personal funds when purchasing and transferring funds using the digital RMB payment system. To protect against risk, consumers can rely on the trust of merchants. For example, consumers may perceive less risk if they have more trust in merchants. Transactions are conducted through trusted providers. The more consumers trust their mobile payment platform, the less risk they perceive and the more willing they are to adopt the platform [45]. These relationships have been proved in a number of studies on mobile payment adoption. Research results indicate that trust has a positive impact on perceived benefits and perceived convenience, and these three factors

jointly affect adoption intention [18]. In addition, studies have also shown that there is a significant negative relationship between perceived trust and perceived risk [41]. In EVF [16], it is assumed that in addition to directly affecting online purchase intention, trust also indirectly affects intention through the two mediators of perceived risk and perceived benefit, and it is finally confirmed that perceived trust positively influences adoption intention and perceived benefit. Therefore, we propose the following hypothesis:

Hypothesis 9: Consumers' trust in the digital RMB payment system has a negative impact on perceived risk.

Hypothesis 10: Consumers' trust in the digital RMB payment system positively affects intentions.

Hypothesis 11: Consumers' trust in the digital RMB payment system positively affects perceived benefits.

4.6. Perceived Risk. Perceived risk refers to the consumer's uncertainty about the appropriate measures an institution takes to ensure that the technology is safe to use in the digital currency payment environment. Derbaix found in their study that for various reasons, consumers could not judge the quality of the products they purchased and the possible adverse effects after purchase, which resulted in a sense of uncertainty, namely perceived risk [46]. Perceived risk is one of the important components of various information system adoption models [47]. It reflects consumers' perception of the uncertainty and adverse consequences of the payment environment [48], thus reducing the use intention. Therefore, we propose the following hypothesis:

Hypothesis 12: Perceived risk has a negative impact on the intention to adopt a digital RMB payment system.

4.7. Perceived Benefits. Consumers make purchasing decisions to minimize disutility, maximize positive utility, and maximize overall net utility. In this article, we regard the positive utility consumers gain from adopting the digital RMB payment system as a perceived benefit [49]. Consumers can perceive the benefits of technology in the experience of purchasing and using products or services. Previous studies have shown that perceived benefits enhance adoption intention [50, 51]. Therefore, we propose the following hypothesis:

Hypothesis 13: Perceived benefits positively affect the intention to adopt a digital RMB payment system.

4.8. Intention. Intention refers to the possibility that a person uses a certain technology and is an important indicator to evaluate the application of technology [52]. This article specifically refers to the possibility of consumers using digital RMB payment systems. There are many factors influencing consumers' intention to use these systems. Based on the previous research summary, we put forward the influence of privacy, security, familiarity, system quality, trust, risk, and benefit on consumers' intention to use these systems. Capturing usage intentions helps to understand the reasons for actual use and continued use [53]. Consumers' intention to adopt mobile payment systems is regarded as a significant predictor of their actual adoption of such systems [16]. Therefore, we propose the following hypothesis:

Hypothesis 14: Consumers have a positive impact on the adoption of digital RMB payment systems intentions.

5. Analysis

First, the structural reliability of the measurement was evaluated by examining the aggregation validity of the measurement items in Table 1. As shown in Table 2, all project loads were greater than 0.676, indicating that there is sufficient shared variance between projects and their structures [54]. The reliability measures of potential variables in the model are shown in Table 3. All Cronbach's alpha values were greater than 0.70, ranging from 0.828 to 0.919. The comprehensive reliability was over 0.80 and ranged from 0.856 to 0.941. Similarly, the average variance extraction (AVE) for all measures was greater than 0.50, with a range of 0.639–0.842.

The differential reliability of these measures was assessed by checking that the index compared the load on the factor to which it was located with the load on other factors. It can be seen from Table 3 that the load of all indicators was higher than 0.6, and the loading of each indicator on its structure was much higher than that on other structures.

Comparing each dimension with its own AVE open root, the discriminant validity was tested. It was found that the correlation coefficients of each dimension were all less than their corresponding AVE square root values, indicating good discriminant validity. Among the exploratory factors, the variance explanation rate of the first factor accounted for less than 40% of the total measured variance.

The maximum likelihood method was adopted for structural equation model evaluation. Amos 24.0 software was used to adjust and evaluate the model repeatedly, and a model with a better fitting degree was obtained (Figure 2). According to the index modified by each fit degree, the model fit was better. Model fitting index is provided in Table 4.

In order to analyze the relationship between potential variables, the path coefficients corresponding to the structural equation model are listed in Table 5. According to Table 5, Hypothesis 1 was found to be true, as the relationship was consistent with the predicted direction and had statistical significance ($CR = 9.241$, $p = 0.002$). Hypothesis 2 was also found to be true, as the relationship was consistent with the predicted direction and was statistically significant ($CR = 6.918$, $p < 0.001$). Hypothesis 3 was found to be true, and the relationship was consistent with the predicted direction and was statistically significant ($CR = 7.332$, $p < 0.001$). Hypothesis 4 was found to be false. Although the relationship was consistent with the predicted direction, it was not statistically significant ($CR = -1.711$, $p > 0.05$). Hypothesis 5 was also found to be false. The path was inconsistent with the predicted direction, and it was not statistically

Table 1: Reliability and validity analysis.

Construct	Item	Standardized loading	Cronbach's alpha	Composite reliability	AVE
Perceived privacy	1.1	0.887	0.935	0.9411	0.8420
	1.2	0.931			
	1.3	0.934			
Perceived security	2.1	0.877	0.890	0.8563	0.6676
	2.2	0.868			
	2.3	0.693			
Familiarity	3.1	0.872	0.935	0.9071	0.7120
	3.2	0.904			
	3.3	0.902			
	3.4	0.676			
Perceived system quality	4.1	0.788	0.941	0.8761	0.6392
	4.2	0.857			
	4.3	0.788			
	4.4	0.762			
Perceived trust	5.1	0.838	0.928	0.9005	0.6444
	5.2	0.815			
	5.3	0.797			
	5.4	0.799			
	5.5	0.763			
Perceived risk	6.1	0.910	0.931	0.9294	0.8144
	6.2	0.914			
	6.3	0.883			
Perceived benefits	7.1	0.884	0.904	0.8927	0.7352
	7.2	0.868			
	7.3	0.819			
Intention	8.1	0.919	0.932	0.9082	0.8318
	8.2	0.905			

Table 2: Factor load.

Index	Perceived privacy	Perceived security	Familiarity	Perceived system quality	Perceived trust	Perceived risk	Perceived benefits	Use
1.1	−0.063	0.069	−0.028	0.229	**0.887**	0.03	0.006	−0.017
1.2	−0.058	0.025	−0.01	0.191	**0.931**	0.02	0.03	0.044
1.3	−0.075	−0.033	0.038	0.152	**0.934**	−0.05	0.036	0.032
2.1	0.249	0.103	0.135	0.009	0.07	0.121	**0.877**	0.079
2.2	0.252	0.139	0.168	−0.026	0.026	0.147	**0.868**	0.047
2.3	0.284	0.235	0.269	−0.094	−0.015	0.177	**0.693**	0.08
3.1	0.113	**0.872**	0.168	0.123	−0.031	0.086	0.146	0.128
3.2	0.083	**0.904**	0.203	0.13	0.007	0.067	0.114	0.087
3.3	0.144	**0.902**	0.2	0.118	0.052	0.119	0.091	0.061
3.4	0.234	**0.676**	0.417	0.117	0.081	0.158	0.125	0.013
4.1	0.261	0.331	**0.788**	0.065	0.011	0.135	0.146	0.109
4.2	0.263	0.218	**0.857**	−0.003	0.033	0.116	0.127	0.042
4.3	0.299	0.206	**0.788**	0.043	−0.03	0.205	0.189	0.117
4.4	0.33	0.239	**0.762**	0.026	−0.026	0.172	0.194	0.146
5.1	**0.838**	0.078	0.189	−0.094	−0.001	0.097	0.215	0.049
5.2	**0.815**	0.052	0.24	−0.117	−0.043	0.133	0.213	0.039
5.3	**0.797**	0.159	0.256	−0.1	−0.125	0.183	0.186	0.121
5.4	**0.799**	0.145	0.138	0.125	−0.065	0.126	0.117	0.152
5.5	**0.763**	0.165	0.304	−0.024	−0.064	0.202	0.147	0.139
6.1	−0.034	0.145	0.057	**0.910**	0.161	0.031	−0.008	−0.037
6.2	−0.06	0.165	0.012	**0.914**	0.195	0.015	−0.045	−0.034
6.3	−0.044	0.078	0.022	**0.883**	0.235	0.013	−0.027	−0.063
7.1	0.186	0.047	0.125	0.011	−0.005	**0.884**	0.185	0.107
7.2	0.188	0.112	0.211	0.047	−0.007	**0.868**	0.158	0.147
7.3	0.179	0.181	0.138	0.011	0.011	**0.819**	0.054	0.12
8.1	0.126	0.106	0.158	−0.051	0.04	0.179	0.076	**0.919**
8.2	0.218	0.133	0.1	−0.089	0.024	0.164	0.086	**0.905**

*Mark in bold when the factor load factor is greater than 0.5.

Table 3: Discriminative validity test.

Variable	Perceived privacy	Perceived security	Familiarity	Perceived system quality	Perceived trust	Perceived risk	Perceived benefits	Intention
Perceived privacy	**0.918**							
Perceived security	0.048	**0.817**						
Familiarity	0.065	0.367	**0.844**					
Perceived system quality	0.004	0.517	0.571	**0.799**				
Perceived trust	0.145	0.573	0.368	0.666	**0.802**			
Perceived risk	0.41	0.036	0.277	0.077	0.111	**0.902**		
Perceived benefits	0.002	0.426	0.317	0.486	0.476	0.049	**0.857**	
Intention	0.029	0.283	0.279	0.363	0.406	0.101	0.393	**0.912**

*Bold shows the diagonal of the correlation coefficient of each factor.

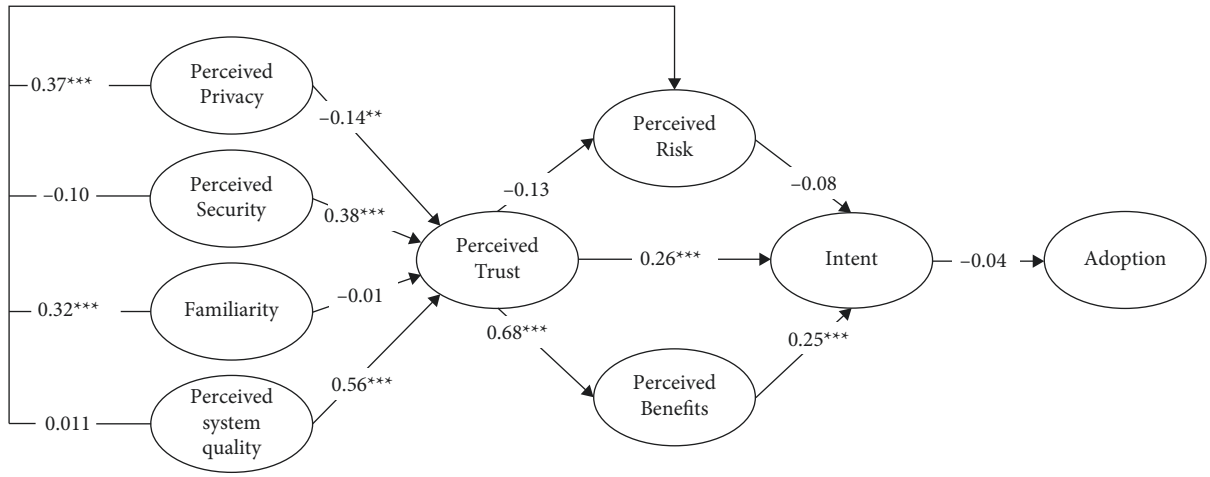

Figure 2: Structural equation model.

Table 4: Model fitting index.

Evaluation index	Reference standards	Results
X^2/df	<3	2.705
IFI	>0.90	0.931
TLI	>0.90	0.921
CFI	>0.90	0.930
RMSEA	<0.080	0.073

significant (CR = −0.255, $p > 0.05$). Hypothesis 6 was found to be true, and the path was consistent with the predicted direction and was statistically significant (CR = 4.81, $p < 0.001$). Hypothesis 7 was true, and the path was consistent with the predicted direction and was statistically significant (CR = 9.241, $p < 0.001$). Hypothesis 8 was not found valid, and the path was not consistent with the predicted direction and had no statistical significance (CR = 0.56, $p > 0.05$). Hypothesis 9 was false, and the path was consistent with the predicted direction, but not statistically significant (CR = −1.805, $p > 0.05$). Hypothesis 10 was true and the path was consistent with the predicted direction and was statistically significant (CR = 4.287, $p < 0.001$). Hypothesis 11 was true, and the path was consistent with the predicted direction and was statistically significant (CR = 7.501, $p < 0.001$). Hypothesis 12 was found to be false, and the path was consistent with the predicted direction, but not statistically significant (CR = −1.493, $p > 0.05$). Hypothesis 13 was found to be true, and the path was consistent with the predicted direction and was statistically significant (CR = 4.28, $p < 0.001$). Hypothesis 14 was false, and the path was inconsistent with the predicted direction and was not statistically significant (CR = −0.695, $p > 0.05$). Refer to Table 6 for details.

Table 5: Path coefficient estimation results of the model.

Path	Nonstandardized regression coefficient	Standard error	CR	p value	Standardized regression coefficient
Perceived trust←perceived system quality	0.435	0.047	9.241	≤0.001***	0.562
Perceived trust←familiarity	−0.012	0.047	−0.255	0.799	−0.013
Perceived trust←perceived security	0.344	0.047	7.332	≤0.001***	0.363
Perceived trust←perceived privacy	−0.097	0.031	−3.161	≤0.002**	−0.136
Perceived risk←perceived trust	−0.191	0.106	−1.805	0.071	−0.135
Perceived benefit←perceived trust	0.712	0.095	7.501	≤0.001***	0.681
Perceived risk←perceived privacy	0.374	0.054	6.918	≤0.001***	0.371
Perceived risk←perceived safety	−0.137	0.08	−1.711	0.087	−0.102
Perceived risk←familiarity	0.396	0.082	4.81	≤0.001***	0.316
Perceived risk←perceived system quality	0.048	0.086	0.56	0.575	0.044
Intention←perceived risk	−0.067	0.045	−1.493	0.135	−0.079
Intention←perceived interest	0.292	0.068	4.28	≤0.001***	0.255
Intention←perceived trust	0.311	0.073	4.287	≤0.001***	0.26
Use←intention	−0.012	0.017	−0.695	0.487	−0.039

*$p < 0.05$; **$p < 0.01$; ***$p < 0.001$.

Table 6: Hypothesis verification.

Hypothesis	Testing result
Hypothesis 1: consumers' privacy concerns have a negative impact on consumers' trust in mobile payment systems	True
Hypothesis 2: consumers' perceived privacy issues positively affect consumers' perceived risks of mobile payment systems	True
Hypothesis 3: consumers' perceived security has a positive impact on consumers' perceived trust in the digital RMB payment system	True
Hypothesis 4: consumers' perceived security has a negative impact on consumers' perceived risk of digital RMB payment system	Not true
Hypothesis 5: consumers' perceived familiarity with the digital RMB payment system has a positive impact on consumers' perceived trust in the digital RMB payment system	Not true
Hypothesis 6: perceived familiarity of consumers has a negative impact on perceived risk of the digital RMB payment system	True
Hypothesis 7: perceived system quality has a positive impact on consumers' perceived trust in the digital RMB payment system	True
Hypothesis 8: perceived system quality has a negative impact on consumers' perceived risk of the digital RMB payment system	Not true
Hypothesis 9: consumers' trust in the digital RMB payment system has a negative impact on perceived risk	Not true
Hypothesis 10: consumers' trust in the digital RMB payment system positively affects intentions	True
Hypothesis 11: consumers' trust in the digital RMB payment system positively affects perceived benefits	True
Hypothesis 12: perceived risk has a negative impact on intentions to adopt a digital RMB payment system	Not true
Hypothesis 13: perceived benefits positively affect the intention to adopt a digital RMB payment system	True
Hypothesis 14: consumers' intention to adopt a digital RMB payment system positively influences its adoption	Not true

6. Conclusion

Today, digital payments reduce the frequency of cash payments. Central banks in many countries such as China are issuing CBDC and conducting in-depth research in related areas. In this turbulent era featuring a pandemic, reducing contact and stabilizing national sovereign currency through the digital currency of central banks may be the inevitable trend of future social development. For this to happen, it is necessary for consumers to accept digital currency payments. Therefore, the results of this article can be used for CBDC to improve the acceptance of individuals.

6.1. Theoretical Significance. The main contribution of this study was to investigate the influencing factors of the adoption of the CBDC payment system using the EVF model. In order to better achieve this goal, the perceived system quality is also included in the EVF model to measure the quality of consumer perception reflected in the overall performance of the system. The model was debugged and evaluated by Amos, and the fitting degree of the model was better. The empirical results indicate that perceived privacy and perceived security perceived system quality are important predictors of perceived trust, and perceived trust is an important predictor of perceived interest and intention.

By pointing out that perceived system quality is an important extension of the EVF model, this article makes a theoretical contribution to the research of central bank digital currency. This indicates that perceived privacy, perceived security, and perceived system quality are key factors influencing consumers' intentions, which also means that these factors are crucial for the central bank's digital currency promotion breakthrough. Perceived system quality is an extremely important factor for the establishment of trust. As a pre-influencing factor of trust, it pays more attention to the comfort or service feeling brought by the system itself to consumers. The effect of perceived benefits on intention is significant, which may be because of the role played by the government in the promotion. As the issuer of

CBDC, the government will add some benefits, such as red envelopes, to the promotion. Consistent with previous studies, perceived privacy and perceived security were found to be significant factors for perceived risk. Familiarity had a negative significant correlation with perceived risk, which is inconsistent with previous studies. In addition, the present study also found that intention had no significant impact on adoption, which is inconsistent with previous studies. The reason may be that the study group had already widely used third-party payment methods such as Alipay and WeChat Pay, and consumers had already established convenient and fast payment methods. Overall, the results of the present study indicate the need to improve the quality of the system from a consumer perspective and increase consumer understanding of CBDC.

6.2. Actual Impact. The results of this study point to a number of factors influencing CBDC acceptance. First, this study's results suggest that researchers and stakeholders need to consider the collection of private information. As a payment behavior, the type of privacy information collected needs to be strictly controlled. Perceived privacy, perceived security, and perceived system quality need to be closely linked to building consumer trust. Understanding consumers' behavioral intentions is an effective means to analyze the adoption of new technologies. In practice, these findings can provide key influencing factors for banks, governments, and other institutions to affect the adoption of central bank digital currency services. It can help practitioners better manage the deployment and implementation process of applications and focus consumers' attention on the attitude formation and perceived behavior control factors, which will affect their intention to adopt the central bank's digital currency.

As the issuer of CBDC, the government can establish a good sense of credit, which will increase consumers' sense of integrity, which is also conducive to promotion. In addition, the government should set up related terminals in merchant ports to cooperate with the payment of digital currency and expand the scope of the CBDC payment. The government should introduce some explanations when formulating relevant policies, which will help people better understand the policies. In the long run, the issuance of digital currency by the central bank will further reduce the utilization rate of paper money and reduce the cost of currency circulation. In the overall process of consumption, this reduces the time of human exposure and also reduces the incidence of COVID-19.

6.3. Limitations and Future Research. The limitations of this study may provide opportunities for further research. First, owing to the limitation of data collection, this study was only conducted on the Chinese population. Therefore, it will be helpful to collect data from other countries in future studies, as well as to make cross-cultural comparisons. Second, as the number of digital currency consumers registered by the Central Bank reaches tens of millions, the number of 325 samples may be asymmetric with the proportion of the overall population, which may lead to limitations in the results. Future researchers can expand the research scope and increase the number of samples. At the same time, as the pandemic changes, consumers' adoption of the CBDC may change.

Data Availability

All data included in this study are available upon request by contact with the corresponding author.

Ethical Approval

All experiments comply with ethical requirements. The data of this study were collected through Wenjuanxing Institution, which is subject to the control of Chinese laws. We promise that this study will not violate ethical issues. The authorization number ID is 167437759. All studies involving human subjects comply with ethical norms.

Conflicts of Interest

The authors declare that there are no conflicts of interest.

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