



A Study on the Development Path and Promotion Measures of E-CNY

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Abstract. With the development of information science and technology, the digital economy has given the era a new direction. In 2014, the People's Bank of China issued the first legal digital currency, the e-CNY. With the cumulative number of e-CNY transactions of about 264 million and the number of merchant stores supporting e-CNY payment reaching 4.567 million, the e-CNY is still not enough to reach the level of well-known. The article establishes a mathematical model such as principal component analysis based on the current development of e-CNY and key issues, so as to discuss the development path and promotion measures suitable for e-CNY.

Keywords: e-CNY · e-CNY app · principal component analysis

1 Introduction

The emergence of e-commerce has created new financial needs that in many cases cannot be effectively fulfilled by traditional payment systems [1]. Then, the integration of wireless communication, smartphones, and banking systems has created a digital payment ecosystem that is gradually replacing traditional cash payments [2]. As information technology changes, a digital economy with better security, convenience and financial stability has emerged, giving a clear direction to economic development in the new era. Data shows that even with the impact of the epidemic, China's digital economy maintained a high growth rate of 9.7% in 2020 [3], which shows that it holds great promise for growth.

Currently, the cumulative number of transactions is approximately 264 million, with a value of approximately RMB 83 billion, and the number of merchant shops supporting e-CNY payments has reached 4,567,000. In order to give full play to the special functions such as e-CNY smart contracts, the research and development of e-CNY should be based on serving the real economy and people's lives, so that more companies and individuals can feel the value of e-CNY [4]. Starting from the basic situation of e-CNY, the article aims to study the existing key issues of e-CNY, and then find the appropriate development path and promotion measures for e-CNY.

During the "618" period in 2022, several pilot cities will use digital RMB red envelopes to boost consumption. It is understood that during the "618" period, Jingdong users spent a total of 400 million yuan in digital renminbi, and the digital renminbi

red envelopes issued in 23 pilot cities exceeded 10 million yuan. And under the joint issuance of 30 million yuan of “Tesco Shenzhen” digital RMB red envelopes by 8 banks in Shenzhen through the Meituan platform, the transaction volume of Longhua business district, Science and Technology Park business district, Xili business district, Shajing business district and Minzhi business district increased year-on-year. The growth rates are 23.24%, 15.37%, 24.21%, 23.89% and 21.56% respectively [5].

2 Difficulties in Promoting the e-CNY

2.1 Traditional Media Is Currently the Main Route for the Public to Learn About e-CNY

Through a survey on the public’s understanding of electronic renminbi, it is found that most respondents can understand and accept that electronic renminbi is related to age, but the overall level of understanding is still low. Traditional media is currently the main way for the public to understand the e-RMB. However, the utilization rate of online platforms such as new media and communication channels such as social media is high, and the public promotion of information such as e-renminbi is more effective. Reflecting the need to promote e-renminbi channels to keep pace with the times and continuously improve the efficiency of publicity.

2.2 E-CNY App is Less Frequently Used

According to the data results of literature search and research, the public has a low frequency of using e-CNY APP. Most users use it for basic consumption such as transportation, public utilities payment, internal payment, etc., and the application scope of e-CNY APP is relatively narrow. Moreover, there was no legislation or international standard for central bank digital currencies (CBDC) [6] at the time. At the same time, the general use of e-CNY APP is narrow, and the main problem is the lack of public awareness. This is followed by the public’s perception of security risks in the payment process and the unfriendly design of the E-CNY App interface as well as the instability of the system.

2.3 Limited Support for New Features in Technology Applications

The introduction of a widely available CBDC has the potential to create new processes for end-to-end payments transactions, founded on newer technologies [7]. However, judging from the pilot situation of the “dual offline” payment function introduced in the e-CNY pilot process in different pilot cities and the Beijing Winter Olympics scene, this function still needs more technical application support to further enhance the inclusiveness and convenience of e-CNY. On the one hand, the use of e-CNY APP requires the installation of software with offline payment function on the specified model of mobile phone terminals. Currently, only some models of Xiaomi and vivo mobile phones are supported [8], which to a certain extent restricts the public’s acceptance and popularization of e-CNY.

2.4 The Current Low Level of Use of the e-CNY for International Circulation Promotion

SWIFT dominates cross-border fund settlement and is now used by more than 11,000 financial institutions around the world [9]. The e-CNY can cross the SWIFT system in international settlements, reduce banks' dependence on the SWIFT system, improve the convenience of capital transfers, and expand China's financial opening to the outside world, enhancing the international competitiveness of the renminbi. However, in the pilot cities, it can be found that e-CNY is less used for cross-border trade settlement. At present, the United States once again uses the SWIFT system to impose financial sanctions on the target country. Therefore, the plan to build a cross-border payment system based on e-CNY to avoid risks needs to be put on the agenda as soon as possible [10].

3 E-CNY Model Analysis

The further expansion of the scope of the digital renminbi pilot will help to extend the reach of digital renminbi services and improve financial inclusion [11]. In order to study the suggestions for promoting the promotion of digital RMB and further propose improvement measures, the frequency of measures and suggestions for improving digital RMB was selected as the original data, and the KMO and Bartlett tests were carried out by principal component analysis to obtain Table 1. The KMO value calculation formula is:

$$KMO = \frac{\sum \sum_{i \neq j} r_{ij}^2}{\sum \sum_{i \neq j} r_{ij}^2 + \sum \sum_{i \neq j} \alpha_{ij}^2}$$

For the KMO value greater than 0.8, it is suitable for principal component analysis. For Bartlett's test, if the significance is less than 0.05 or 0.01, it means that principal component analysis can be performed. The data analysis result is 0.00089, indicating that the model is more suitable.

The factor loading diagram was obtained from the analysis, and the spatial distribution of the principal components was presented through a quadrant diagram by reducing the dimensionality of multiple factors into two or three principal components. In the Fig. 1. Two-dimensional factor loading diagram, this paper finds that the options of increasing the promotion and publicity of e-CNY and optimising the related system,

Table 1. KMO test and Bartlett's test

KMO values		0.84900
Bartlett's test of sphericity	Approximate cardinality	151.503
	df	15.0000
	p	0.00089

webpage and e-CNY app are in the first quadrant, indicating that the above two measures are more important under these two dimensions.

Also in the Fig. 2. Three-dimensional factor loading diagram, we can see that increasing the promotion and publicity of e-CNY and optimising the design of related systems, web pages and e-CNY APP are in the higher spatial dimension and of higher importance, and the relevant government or financial institutions should focus on these two issues when promoting and publishing e-CNY.

The principal component analysis was then carried out to produce the Table 2. Principal component weighting analysis coefficients based on information such as the loading coefficients, which were calculated as: variance explained / cumulative variance explained after rotation.

The team found that in the option of increasing the promotion of e-CNY, its principal component variance interpretation rate and cumulative variance interpretation rate are relatively high, with a weight of 85.107%, indicating that it is important to increase the promotion of e-CNY in the use of renminbi. Relevant government departments should pay attention to this measure. At the same time, optimizing the design of relevant systems and e-CNY APP, and strengthening relevant laws, regulations and policy formulation are also two important dimensions for improving the promotion of e-CNY. The weights of the two are 8.194% and 3.724% respectively.

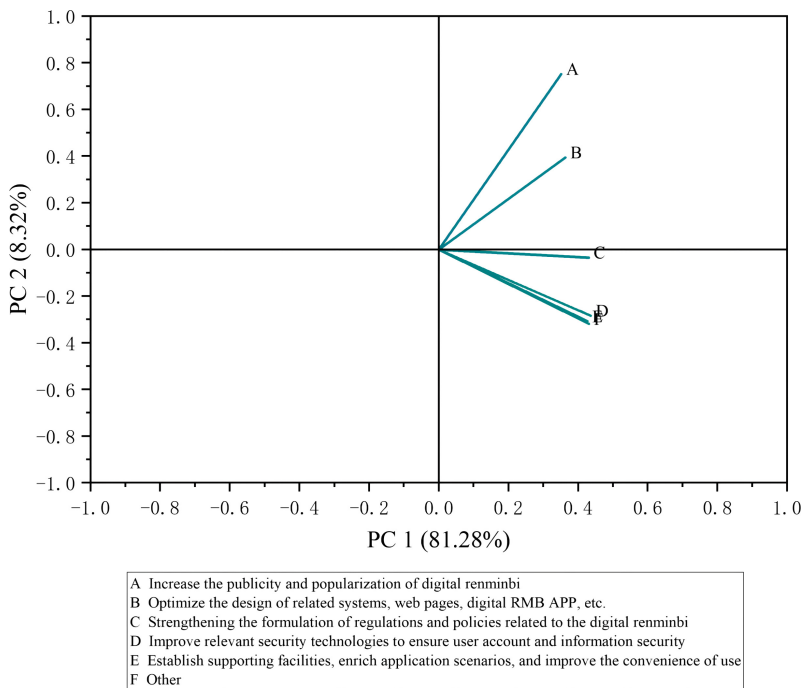


Fig. 1. Two-dimensional factor loading diagram

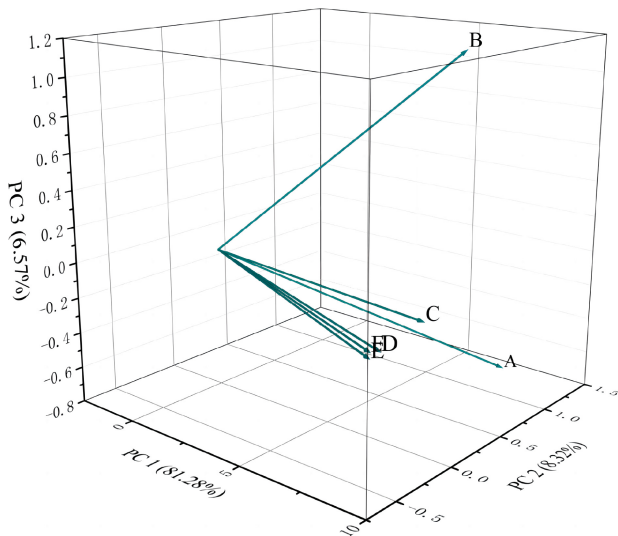


Fig. 2. Three-dimensional factor loading diagram

Table 2. Principal component weighting analysis coefficients

Options	Explanation of variance	Cumulative variance explained	Weighting
Increasing the promotion and popularity of e-CNY	0.851	0.851	85.107%
Optimise the design of related systems, web pages, e-CNY app, etc.	0.082	0.933	8.194%
Strengthening regulations and policy development related to e-CNY	0.037	0.97	3.726%
Improve relevant security technology to safeguard user accounts and information	0.014	0.984	1.382%
Establish supporting facilities to enrich application scenarios and improve ease of use	0.012	0.996	1.15%
Others	0.004	1	0.442%

4 Conclusions

4.1 The State Should Innovate the Means of Promoting e-CNY

The state should increase publicity on e-CNY, enhance the popularity of e-CNY at several online levels, promote e-CNY payment activities by financial institutions, facilitate the real economy and daily life, improve the efficiency of financial services, enhance the convenience, security and anti-counterfeiting of retail payments, reduce transaction costs and promote financial inclusion [12].

4.2 Identify the Potential Stocks of e-CNY to Enhance Promotion Efficiency

In view of the fact that most of the respondents are relatively young and have great consumption potential, commercial activities are used to awaken consumption desires and increase the frequency of e-CNY use in daily life. At the same time, cultivate people's consumption habits and make e-CNY settlement an important means of payment. E-CNY promoters can create a complete business ecological chain.

4.3 Enriching e-CNY APP Ecological Functions and Providing Visualization Degree

The research and development of APP can improve the degree of integration of people's livelihood and RMB by developing the APP "dual offline" payment mode, adding payment and query interfaces for medical insurance and social insurance, and automatic exchange rate conversion functions. At the same time, use the national information to monitor the user's payment amount to push reminders on the tax payment platform, increase tax services, and improve the convenience of people's lives.

Commercial banks can obtain more, more accurate, and more detailed information on the assets of digital RMB customers, simplify loan approval procedures, improve the credit report of the credit reference center, provide credit analysis basis for commercial banks to issue loans, and reduce unit loan costs and non-performing loans. loan rate [13].

4.4 E-CNY Enters Cross-Border Payment System to Enhance International Influence

The research and development of APP can improve the degree of integration of people's livelihood and RMB by developing the APP "dual offline" payment mode, adding payment and query interfaces for medical insurance and social insurance, and automatic exchange rate conversion functions. At the same time, in the transaction of e-CNY, the national information supervision user's payment amount is used to push the reminder of the tax payment platform, increase tax services, and improve the convenience of people's lives. Break the financial monopoly of the West and the US dollar hegemony, and realize healthy competition in international settlement through traditional settlement systems and digital e-CNY [14].

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