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The Study on the Impact of the Development and Trends of DCEP

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Abstract

Central Bank Digital Currency (CBDC) is the abbreviated term for the Central Bank's Digital form of Currency, as described by the Bank of England in their research. It enables individuals and organizations to engage in transactions and store value electronically. Digital Currency Electronic Payment (DCEP) is the digital version of the Chinese Renminbi issued by the People's Bank of China. It is authorized for transactions and can be openly exchanged. The comprehensive account system supports flexible associations with bank accounts. Digital Renminbi possesses value characteristics and legal compensation, providing a controlled and anonymous payment method equivalent to paper currency and coins.

The aims are to study the perceived application scenarios for consumers in the current environment, and what impact do these scenarios have on the development of Digital Currency Electronic Payment (DCEP) and on society, financial institutions, and consumers.

The research findings were:

1. The hypotheses with significant positive impacts, users' perceptions mainly stem from their understanding of digital currencies in the international community and China. People haven't had much practical experience with the application scenarios of DCEP yet. However, they can imagine or perceive these scenarios. Therefore, it is understandable that users have a strong perception of the impact of H2 on society, financial structure, and users, starting from the mediating variables and making subsequent judgments based on possible usage scenarios.

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2. The hypotheses with weaker influences, respondents also provided their insights. It means that individuals haven't had firsthand experience with the interrelationships among different variables. Currently, all understanding of DCEP comes from limited advertisements and a small number of personal uses. The correlations between the options for selection are not significant, resulting in some weakly correlated hypotheses in the quantitative analysis. In the survey, the impact relationships of H1 and H3 are relatively weak. Both relationships originate from social backgrounds and environments. The underlying reason is that people are not familiar with the development of CBDC/DCEP domestically and internationally. Their knowledge is mostly limited to simple usage or exposure to advertisements. Hence, it is understandable that the relationships in these two layers, starting from independent variables, are not strong.

Keywords: Central Bank Digital Currency, Digital Currency Electronic Payment, Application Scenario, Foreign Trade

Introduction

The Digital Currency Electronic Payment (DCEP), also known as China's Central Bank Digital Currency, has its roots in the establishment of a research team by the People's Bank of China (PBOC) in 2014. In 2016, the PBOC initiated trials of the DCEP in specific regions, and by 2017, the project was officially included in the government's 13th Five-Year Plan. Since then, there has been significant progress in the development of the digital yuan, with the PBOC conducting a series of pilot projects in different parts of China. The primary purpose of the digital yuan is to serve as a digital representation of China's physical currency, the yuan, and is intended for both domestic and international transactions. It is built on a blockchain-based platform and is backed by the PBOC, ensuring its stability and legitimacy.

The DCEP is an important aspect of China's efforts to modernize its financial system and reduce its reliance on traditional payment methods. Despite the popularity of digital payment methods like Alipay and WeChat Pay, which are widely used in China, they still heavily rely on traditional bank accounts and payment networks. The potential impact of the digital yuan on both domestic and international trade is a

subject of extensive discussion and speculation. Some experts believe that the digital yuan could reduce transaction costs, promote financial inclusion, and improve the efficiency of cross-border transactions. However, others have expressed concerns about potential risks associated with the digital yuan, such as increased surveillance and control by the Chinese government.

Based on existing business rollouts and development patterns, the paper gives predictions regarding DCEP's possible uses. Based on current developments and expected application scenarios, survey respondents and interviews give a complete analysis and judgment on the possible influence of DCEP on society, financial institutions, and individual consumer behavior. This study makes hypotheses regarding these correlations and draws findings by verifying these hypotheses using quantitative and qualitative analytical methodologies

Research Objectives

According to the several research questions in this paper, the research objectives are mainly elaborated as follows:

1.By analyzing the feedback from the survey questionnaire and using quantitative analysis methods, the statistical analysis of the survey questionnaire is completed. The quantitative analysis is employed to validate our hypotheses.

2.Through interviews, we transcribed all the interview results and conducted comprehensive analysis by employing qualitative analysis methods, comparing and analyzing the interview results.

3.Through the integrated evaluation of quantitative and qualitative analysis, a summary analysis of our hypothesized propositions is conducted, identifying both acceptable and unacceptable hypotheses.

Hypotheses

H1: The Impact of Central Bank Digital Currency Market Status on User Perception

H1a: The Impact of CBDC Status on User Perception

H1b: The Impact of DCEP Status on User Perception

H2: The Impact of User Perception on the Market, Commercial Institutions, and Consumers

H2a: The Impact of User Perception on the Market(CHINA)

H2b: The Impact of User Perception on Commercial Institutions

H2c: The Impact of User Perception on Consumer Behavior

H2d: The Impact of User Perception on the Market(Oversea)

H3: The Impact of Central Bank Digital Currency Market Status on the Market, Commercial Institutions, and Consumers

H3a: The Impact of International Central Bank Digital Currency Market Status on the Market

H3b: The Impact of International Central Bank Digital Currency Market Status on Commercial Institutions

H3c: The Impact of Chinese Central Bank Digital Currency Market Status on the Market

H3d: The Impact of Chinese Central Bank Digital Currency Market Status on Commercial Institutions

H3e: The Impact of Chinese Central Bank Digital Currency Market Status on Consumers

H3f: The Impact of Chinese Central Bank Digital Currency Market Status on the Market (Oversea)

H3g: The Impact of International Central Bank Digital Currency Market Status on the Market (Oversea)

Conceptual framework

The Research used theories and academic literature to set all assumptions. The conceptual framework includes 7 latent variables and 39 observed variables, as shown in the Figure 1 below.

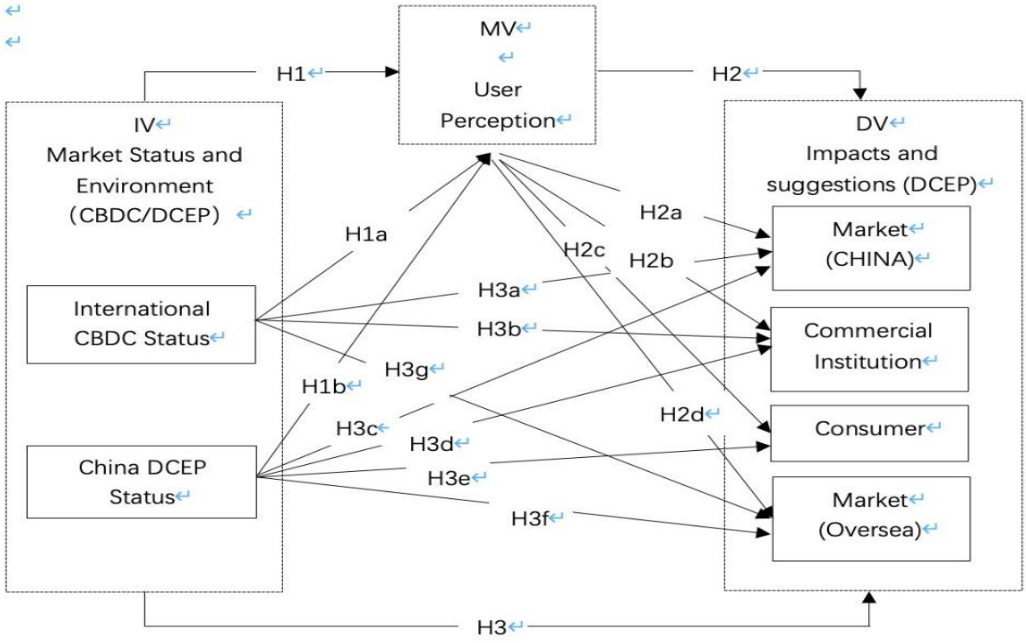

Figure 1 Conceptual Framework

Literature review

Research on CBDCs initiated in 2014 and has since broadened to encompass fields such as politics, technology, economics, and finance. In "Casting Light on Central Bank Digital Currency", Mancini-Griffoli, T., Martinez Peria, M.S., Agur, I., Ari, A., Kiff, J., Popescu, A., & Rochon, C. (2018) present an overview of the progression of CBDC research and its diversification into various disciplines. The discussion note elaborates on the potential impacts of CBDCs on the financial system and economy, alongside considerations of regulation and technology.

Policy studies primarily concentrate on the legislative framework, regulatory policies, CBDC issuance, and circulation mechanisms. For example, the International Monetary Fund (IMF) has released a paper on CBDC policy, legal, and regulatory challenges. Studies in economics mainly focus on the economic consequences of CBDCs, including aspects like monetary policy, financial stability, and payment and settlement systems. In "Central Bank Digital Currency and the Future of Monetary Policy", Bordo, M. D., & Levin, A. T. (2017) provide a detailed examination of the economic ramifications of CBDCs. They discuss possible effects on monetary policy, financial stability, and the systems of payments and settlements. Research in finance

predominantly centers on the impact of CBDCs on financial institutions and markets, covering areas such as payment systems, banking functions, and capital markets. In "The Rise of Digital Money", Adrian, T., & Mancini-Griffoli, T. (2019) delve into the influence of digital money, including CBDCs, on financial institutions and markets. They specifically elaborate on potential effects on payment systems, the operations of banks, and capital markets. Past studies indicate that the advancement of DCEP, specifically the DCEP, could have substantial consequences for both domestic and international trade.

In 2020, the China International Capital Corporation (CICC) conducted a study on the potential impact of DCEP on the Chinese economy. According to the study, DCEP has the potential to enhance the efficiency and inclusiveness of China's financial system. It can also contribute to the internationalization of the renminbi and improve China's competitiveness in cross-border payments and trade

Methodology

In this paper, an explanatory sequential mixed-method approach was utilized. Firstly, an analysis and research on the development status of CBDC and DCEP were conducted, supplemented by reference literature. A survey was designed and administered, with over 300 responses collected for quantitative analysis. The samples of this paper were randomly sampled by the statistical software SPSS 26.

Secondly, The researchers conducted interviews with a total of nine professionals from three industries. The interview results were recorded and transcribed into text. Using a comparative analysis method, qualitative analysis was performed. Finally, the conclusions drawn from both quantitative and qualitative analyses are integrated for a comprehensive analysis and to derive our findings.

Results

According to the analysis of reliability and validity, The researchers have removed variables IM11 and IM17. Here is the summary table of the SEM (Structural Equation Modeling) test results for the framework:

Table 1 Summary Table of Model Regression Coefficients

X	→	Y	Unstandardized Regression Coefficients	*SE*	*z* (CR value)	*p*	Standardized Regression Coefficients
International Status of CBDC	→	User Perception	0.029	0.059	0.491	0.623	0.039
International Status of CBDC	→	Impact on the Market (China)	0.03	0.095	0.319	0.75	0.024
International Status of CBDC	→	Impact on the Market (Oversea)	0.025	0.109	0.23	0.818	0.017
International Status of CBDC	→	Impact on the Commercial Institution	0.028	0.083	0.336	0.737	0.027
China Status of DCEP	→	User Perception	0.014	0.032	-0.439	0.661	0.026
China Status of DCEP	→	Impact on the Market (China)	0.036	0.051	-0.707	0.48	0.041
China Status of DCEP	→	Impact on the Market (Oversea)	0.067	0.059	1.125	0.261	0.065
China Status of DCEP	→	Impact on the Commercial Institution	0.052	0.045	1.147	0.251	0.071
China Status of DCEP	→	Impact on the Consumer	0.058	0.064	0.906	0.365	0.052
User Perception	→	Impact on the Market (China)	0.376	0.094	3.987	0	0.226
User Perception	→	Impact on the Market (Oversea)	0.336	0.109	3.07	0.002	0.176
User Perception	→	Impact on the Commercial Institution	0.243	0.084	2.893	0.004	0.178
User Perception	→	Impact on the Consumer	0.334	0.12	2.792	0.005	0.16
International Status of CBDC	→	IS4	0.946	0.217	4.358	0	0.492
International Status of CBDC	→	IS3	0.46	0.119	3.875	0	0.369
International Status of CBDC	→	IS2	0.852	0.197	4.335	0	0.478
International Status of CBDC	→	IS1	1	-	-	-	0.565

Table 1 Summary Table of Model Regression Coefficients (Cons.)

X	→	Y	Unstandardized Regression Coefficients	*SE*	*z* (CR value)	*p*	Standardized Regression Coefficients
China Status of DCEP	→	CS4	1.014	0.03	33.497	0	0.973
China Status of DCEP	→	CS3	0.558	0.037	15.206	0	0.683
China Status of DCEP	→	CS2	0.695	0.036	19.555	0	0.783
China Status of DCEP	→	CS1	1	-	-	-	0.935
User Perception	→	UP6	0.589	0.042	13.913	0	0.639
User Perception	→	UP5	0.686	0.046	14.852	0	0.666
User Perception	→	UP4	0.966	0.024	39.654	0	0.967
User Perception	→	UP3	0.664	0.033	20.177	0	0.782
User Perception	→	UP2	0.632	0.033	19.217	0	0.765
User Perception	→	UP1	1	-	-	-	0.956
Impact on the Market (China)	→	IM8	0.196	0.035	5.661	0	0.308
Impact on the Market (China)	→	IM7	0.237	0.035	6.834	0	0.365
Impact on the Market (China)	→	IM6	0.26	0.041	6.343	0	0.341
Impact on the Market (China)	→	IM5	1.091	0.03	36.398	0	0.923
Impact on the Market (China)	→	IM4	0.327	0.049	6.605	0	0.354
Impact on the Market (China)	→	IM3	0.682	0.041	16.5	0	0.695
Impact on the Market (China)	→	IM2	1.099	0.018	62.499	0	0.994
Impact on the Market (China)	→	IM1	1	-	-	-	0.972
Impact on the Market (Oversea)	→	IM18	0.919	0.036	25.45	0	0.948
Impact on the Market (Oversea)	→	IM16	0.932	0.033	27.93	0	0.985
Impact on the Market (Oversea)	→	IM15	0.935	0.033	28.49	0	0.992

Table 1 Summary Table of Model Regression Coefficients (Cons.)

X	⟶	Y	Unstandardized Regression Coefficients	*SE*	*z* (CR value)	*p*	Standardized Regression Coefficients
Impact on the Market (Oversea)	⟶	IM14	0.876	0.034	25.78	0	0.954
Impact on the Market (Oversea)	⟶	IM13	0.903	0.036	24.782	0	0.938
Impact on the Market (Oversea)	⟶	IM12	0.989	0.047	20.856	0	0.863
Impact on the Market (Oversea)	⟶	IM10	0.962	0.05	19.094	0	0.822
Impact on the Market (Oversea)	⟶	IM9	1	-	-	-	0.857
Impact on the Commercial Institution	⟶	ICI2	0.487	0.054	9.08	0	0.552
Impact on the Commercial Institution	⟶	ICI1	1	-	-	-	0.715
Impact on the Commercial Institution	⟶	ICI4	1.101	0.081	13.657	0	0.856
Impact on the Commercial Institution	⟶	ICI3	0.797	0.058	13.764	0	0.873
Impact on the Consumer	⟶	IC7	0.531	0.026	20.245	0	0.769
Impact on the Consumer	⟶	IC6	0.478	0.026	18.493	0	0.737
Impact on the Consumer	⟶	IC5	0.278	0.023	12.128	0	0.574
Impact on the Consumer	⟶	IC4	0.317	0.019	16.995	0	0.706
Impact on the Consumer	⟶	IC3	0.914	0.016	55.689	0	0.981
Impact on the Consumer	⟶	IC2	0.939	0.015	64.275	0	0.993
Impact on the Consumer	⟶	IC1	1	-	-	-	0.972

Note: The arrow (⟶) represents the regression influence relationship or the measurement relationship.

The researcher simultaneously examines several modules of both the independent variable (IV) and the moderator variable (MV) in relation to the

dependent variable (DV). Please refer to the table below for more details. The analysis of path coefficient as shown in table 2 below:

Table 2 Summary of testing hypotheses

NO.	Hypothesis	Content	Result
1	H1	The Impact of CBDC Market Status on User Perception	Partly Accepted
2	H1a	The Impact of CBDC Status on User Perception	Partly Accepted
3	H1b	The Impact of DCEP Status on User Perception	Partly Accepted
4	H2	The Impact of User Perception on the Market, Commercial Institutions, and Consumers	Accepted
5	H2a	The Impact of User Perception on the Market (CHINA)	Accepted
6	H2b	The Impact of User Perception on Commercial Institutions	Accepted
7	H2c	The Impact of User Perception on Consumer Behavior	Accepted
8	H2d	The Impact of User Perception on the Market (Oversea)	Accepted
9	H3	The Impact of Central Bank Digital Currency Market Status on the Market, Commercial Institutions, and Consumers	Partly Accepted
10	H3a	The Impact of International Central Bank Digital Currency Market Status on the Market	Partly Accepted
11	H3b	The Impact of International Central Bank Digital Currency Market Status on Commercial Institutions	Partly Accepted
12	H3c	The Impact of Chinese Central Bank Digital Currency Market Status on the Market	Partly Accepted
13	H3d	The Impact of Chinese Central Bank Digital Currency Market Status on Commercial Institutions	Partly Accepted

Table 2 Summary of testing hypotheses (Cons.)

NO.	Hypothesis	Content	Result
14	H3e	The Impact of Chinese Central Bank Digital Currency Market Status on Consumers	Partly Accepted
15	H3f	The Impact of CHINA DCEP Market Status on the Market (Oversea)	Partly Accepted
16	H3g	The Impact of International CBDC Market Status on the Market (Oversea)	Partly Accepted

Based on the results of SEM (Structural Equation Modeling), The researchers have organized the hypothesis relationships to create the relationship diagram above.

According to the relationship results depicted in the diagram, we can observe that both international CBDC and China's domestic DCEP are currently in the research and development or promotion stages. Although China has officially launched DCEP, its usage rate is still relatively low. Therefore, when it comes to assessing the current development status of CBDC and DCEP (IV), survey respondents are relatively conservative in their choices. However, in terms of scenario applications (MV), people have a better understanding. They have opinions regarding the potential impact and development recommendations (DV) that may arise from the implementation of scenario applications. As a result, the scores for H2 and H3 are generally higher than the score for H1.

Based on the survey results obtained through user interviews, The researchers conducted statistical analysis and quantitative analysis. The results were as follows:

Table 3 Results with those of the quantitative analysis

X	→	Y	Agree (Avg)
H1a International Status of CBDC	→	User Perception	4.67
H3a International Status of CBDC	→	Impact on the Market (China)	2.11
H3g International Status of CBDC	→	Impact on the Market (Oversea)	2.11
H3b International Status of CBDC	→	Impact on the Commercial Institution	2
H1b China Status of DCEP	→	User Perception	3.89
H3c China Status of DCEP	→	Impact on the Market (China)	2.78
H3f China Status of DCEP	→	Impact on the Market (Oversea)	2.67
H3d China Status of DCEP	→	Impact on the Commercial Institution	2.67
H3e China Status of DCEP	→	Impact on the Consumer	3.89
H2a User Perception	→	Impact on the Market (China)	4.67
H2d User Perception	→	Impact on the Market (Oversea)	4.67
H2b User Perception	→	Impact on the Commercial Institution	4.67
H2c User Perception	→	Impact on the Consumer	4.67

Firstly, for the hypotheses with significant positive impacts, users' perceptions mainly stem from their understanding of digital currencies in the international community and China. People haven't had much practical experience with the application scenarios of DCEP yet. However, they can imagine or perceive these scenarios. Therefore, it is understandable that users have a strong perception of the impact of H2 on society, financial structure, and users, starting from the mediating variables and making subsequent judgments based on possible usage scenarios.

Secondly, for hypotheses with weaker influences, respondents also provided their insights. It means that individuals haven't had firsthand experience with the interrelationships among different variables. Currently, all understanding of DCEP comes from limited advertisements and a small number of personal uses. The correlations between the options for selection are not significant, resulting in some weakly correlated hypotheses in the quantitative analysis. In the survey, the impact relationships of H1 and H3 are relatively weak. Both relationships originate from social backgrounds and environments. The underlying reason is that people are not familiar with the development of CBDC/DCEP domestically and internationally. Their knowledge is mostly limited to simple usage or exposure to advertisements. Hence, it is understandable that the relationships in these two layers, starting from independent variables, are not strong.

Finally, regarding the key variables and hypothetical conditions mentioned in the hypothesis propositions, I also focused on consulting during the interview process. After in-depth interviews, more professional opinions and insights were obtained from experts on the development of CBDC and DCEP. Below are the records of conversations with interviewees, analyzing the scoring of the relationships between our independent variables, mediating variables, and dependent variables. See the following sections for details.

Conclusions and Discussion

This study is of significant importance in the development of DCEP, particularly in providing different recommendations for society, commercial banks, and consumers during the development process of DCEP. The researchers combined the existing development background and environment of CBDCs and used quantitative research to validate the model, employing an explanatory analysis as the research method.

In the quantitative research phase, the study selected students, teachers, civil servants, and retirees as survey participants because these groups represent more common consumers, and the survey results can be considered applicable across a broader population. Bank executives, university teachers, and high-end consumers were chosen as key information providers, as they have higher levels of awareness and expectations regarding DCEP compared to others.

The study found that the current development background has a positive impact on users' personal perceptions. The launch and application of expected use cases by professionals and consumers, as well as the actual implementation of these use cases, also influence the assessment of professionals and consumers regarding the future development trends of DCEP, including trends in the domestic and international environments.

The researchers discussed the contributions of existing literature to this study, which focused on discussions of the development environment and background of DCEP, predictions regarding future development trends, and provided positive assistance to this research.

Recommendation

1. Recommendations for implementing

This paper has opened up new data support and market research support for the development of CBDC by collecting a large amount of data from general consumers (310 valid questionnaires/372) and conducting interview surveys with key industry users, improved the research framework, expanded the CBDC research field, and laid a foundation for future research on CBDC and DCEP with data and public opinion surveys.

2. Future research directions

2.1 In terms of data collection, because the development of central bank digital currencies is primarily promoted in China, survey subjects are primarily Chinese consumers, and there are certain regional limitations in investigating the international market that can only be obtained through official media releases. As a result, in future research, we should broaden the reach of the survey participants to make the study more general.

2.2 In terms of the degree of effect of variables, the author of this study can only acquire use data from Chinese consumers in practical applications, therefore variable setting and scope are confined to the Chinese market environment. Furthermore, in terms of the degree of impact, this study merely covers the reciprocal

influence of variables without delving into the degree of influence in detail. As a result, in future study, we should expand on factors to make the research more general.

2.3 In terms of variable selection and configuration, the author of this study can only get use data from Chinese consumers in practical applications, therefore variable setting and scope are confined to the Chinese market environment. Furthermore, we may investigate the link between the dimensions of different aspects in greater depth, although for a variety of reasons, it is not feasible to address all variables in depth. We should continue to investigate key factors in future related study.

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