

# Developing a Conceptual Framework for DCEP Adoption Using Systematic Literature Review

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**Abstract:** *China's Digital Currency Electronic Payment (DCEP) is a financial innovation led by the central bank that aims to improve payment efficiency, enhance monetary sovereignty, and ensure the regulability of transactions. However, despite the rollout of DCEP in several pilot cities, its adoption among the bank user community still faces some resistance. Based on the Technology Acceptance Model (TAM) and Diffusion of Innovations (DoI) theory, this study constructs a conceptual framework for DCEP adoption, and explores the effects of Perceived Usefulness (PU), Perceived Ease of Use (PEU), Perceived Risk (PR), Financial Literacy (FL), and Adopter Category (AC) on user adoption intentions. It is found that PU is the main factor driving users' adoption of DCEP, while PR significantly and negatively affects adoption intention, especially among the group with lower financial literacy. In addition, FL and AC moderated the DCEP adoption process, with early adopters more likely to accept the technological advantages of DCEP, while late adopters were more influenced by the social environment and policy incentives. Based on the findings, this study makes recommendations to optimise user experience, enhance security, increase policy incentives and strengthen financial education to promote wider adoption of DCEP. The findings not only deepen the understanding of digital currency adoption mechanisms, but also provide practical references for the promotion of DCEP and future central bank digital currencies (CBDC).*

**Keywords:** Central Bank Digital Currency (CBDC), Technology Acceptance Model (TAM), Financial Literacy, Digital Currency Electronic Payment (DCEP), Innovation Diffusion Theory (DoI)

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## 1. Introduction

### 1.1 Overview of DCEP and Its Significance

China's payment methods have changed fundamentally in the last ten years. From cash transactions to smartphone payments, third-party payment systems like Alipay and WeChat Pay have almost entered every sphere of life. This private sector-dominated payment system has brought further questions about government control over money circulation, financial data security concerns, and financial regulatory challenges (Kang, 2018). To maximize the payment system, the Chinese government started the Digital Currency Electronic Payment (DCEP), to enhance financial sovereignty, payment efficiency, regulatory capacity, adaptation to global financial digitization, and Chinese currency- Renminbi (RMB) internationalization, and guarantees of China's proactive posture in the future competitive environment (Wang, 2023).

Unlike distributed blockchain technologies like Bitcoin, DCEP employs a completely centralized management model that lets the state monitor fund flow in real-time, guarantee transaction compliance, and enhance monetary policy implementation using blockchain, distributed ledger technologies (DLT), and cryptographic algorithms. Its two-tier functioning system consists of the People's Bank of China (PBoC) printing money for approved companies or commercial banks, which thereafter are distributed to end users (Kshetri, 2023). This method offers less money printing and quick, consistent transactions. Tracking events offline and in a network-less environment, DCEP employs DLT and centralized databases (Sethaput & Innet, 2023). By use of managed anonymity, DCEP safeguards user privacy while satisfying banking regulatory and anti-money laundering criteria. DCEP depends on the national financial system to enhance payment efficiency, monetary control, safety and regulation instead of Bitcoin, which depends on a dispersed consensus process (Xu et al., 2023).

Hainan has been a main DCEP pilot city since 2019 (Li et al., 2022). China's first Free Trade Port (FTP), Hainan is essential for both financial innovation and global trade. DCEP is a global economic centre, hence its use is rather important. Early adopters have benefited from government incentives and infrastructure support; most bank customers have found it difficult to adjust, hence adoption is less simple than expected. These pragmatic problems beg the DCEP acceptability question. Only by determining the primary factors encouraging and restricting its acceptance and proposing future digital currency rollouts will we be able to make DCEP successful both in China and beyond.

## **1.2 Need for Understanding DCEP Adoption in Hainan**

Hainan is crucial to China's financial and economic transformation due to its location. As China's first FTP and a major Special Economic Zone (SEZ), Hainan has pioneered policy experimentation in cross-border transactions, trade liberalization, and financial innovation. The Chinese government has made Hainan a significant international trade and banking centre, making it a test location for new financial infrastructure like DCEP (Ma & Wu, 2025).

Bank clients, who are major participants in the DCEP system, affect the integration of digital currencies into the financial system. Thus, investigating the primary variables affecting and delaying bank customers' DCEP acceptance in Hainan will optimize DCEP rollout techniques in Hainan and lead DCEP adoption nationwide. This will shape DCEP's global financial system position.

While DCEP trials have included Beijing, Shanghai, Shenzhen, Suzhou, and other cities, Hainan is an ideal region to examine DCEP adoption and bank customer behaviour due to various advantages: The other trial cities concentrate on local payment scenarios, while Hainan's pilots have introduced international commerce and financial cooperation. Hainan is a good site to research DCEP in cross-border payments, foreign currency settlements, and trade finance to minimize China's dependency on the US dollar and the Society for Worldwide Interbank Financial Telecommunication (SWIFT) system (Qi et al., 2021). Second, as an FTP, Hainan has more policy authority than previous SEZs, enabling regulators to pilot international remittances, foreign currency management, and financial compliance. Hainan is a good place for DCEP to test international payment regulatory regimes and applications due to its regulated financial innovation model. Third, Hainan's large number of visitors, duty-free shopping, and high-frequency transactions make it a great place to observe DCEP's application in retail, hospitality, and cross-border payments (Hu & Zhang, 2025). Hainan may reveal local customers, visitors, and merchants' adoption of DCEP and inform worldwide DCEP marketing efforts.

The reality is not as clear-cut as one would want, despite all these benefits and government initiatives to encourage DCEP in Hainan. The biggest obstacles to Hainan's DCEP promotion's advancement are found in the following spheres: First of all, public awareness of financial literacy issues has to be raised. Many people are not sure about DCEP's operation, how it varies from Alipay and WeChat Pay, and the pragmatic advantages of switching to it. Second, issues about data security and privacy. Although DCEP is supported by the government and offers stronger security than cryptocurrencies (Xia et al., 2023), some users are concerned that the traceability of transactions will result in privacy problems and they are not ready to make every transaction "transparent and visible". Third, the challenge of adjusting to technologies and routines. Many consumers have become used to their current mobile payment options: DCEP provides no clear benefits for them, hence there is no motivation to change; Alipay and WeChat are practical enough.

Previous studies on digital payments have been concentrated on commercial payment systems, such as Alipay and WeChat Pay (Xu et al., 2024), with somewhat little study on government-led national digital currency (CBDC). Unlike current payment systems, the encouragement of DCEP, user acceptability, and even regulatory consequences differ. Therefore, a thorough debate of the marketing challenge of DCEP in Hainan will not only assist enhance customer acceptability but also provide a reference for the promotion of DCEP in other places.

### 1.3 Purpose and Research Questions

The objective of this study is to construct a conceptual framework to analyze the acceptance of DCEP and the factors that influence it. Specifically, this study will focus on:

- 1) Identify the key factors influencing users' adoption of DCEP;
- 2) Evaluating the applicability of existing technology adoption theories (e.g., TAM, TRA, TPB, UTAUT, SCT, and DoI) to DCEP;
- 3) Add influences that have received less attention in previous research, such as the role of financial literacy, perceived risk, and adopter category on CBDC adoption.

To this end, this study will be organized around the following core questions:

- 1) What factors most influence the adoption of DCEP by bank users in Hainan?
- 2) How do existing technology adoption models explain the acceptance of DCEP?
- 3) What theoretical gaps exist in current research on digital currency adoption?

Through these studies, this research aims to not only promote the development of fintech adoption research, but also provide practical strategies and suggestions for financial institutions, policymakers, and technology developers to enhance the promotion of DCEP in Hainan and the whole country so that digital currency can truly integrate into people's daily lives.

## 2. Methodology

Systematic Literature Review (SLR) is a rigorous, structured methodology for identifying, screening, analyzing, and synthesizing existing literature to answer specific research questions and is widely used in information systems, financial technology, and innovative technology research (Pati & Lorusso, 2018). Unlike traditional Narrative Literature Review (NLR), SLR uses a systematic, transparent, and repeatable process to ensure that the research is comprehensive and scientifically sound (Van Dinter et al., 2021). This study adopts the SLR methodology to systematically analyze the adoption factors of DCEP by bank users in Hainan, China by introducing SLR's literature screening criteria, search strategy, screening process, and

data extraction and synthesis methods, and ultimately provide theoretical support for the conceptual framework of DCEP adoption.

## 2.1 Inclusion & Exclusion Criteria

In order to ensure that the literature is screened for high relevance to the research topic, academic value, and meets the requirements of transparency and reproducibility, a set of rigorous inclusion and exclusion criteria is developed in this study to ensure that the screened literature can fully support the conceptual framework constructs adopted by bank users in Hainan, China for the DCEP.

**Table 1: Inclusion and Exclusion Criteria for Literature Selection**

Category of Criteria	Inclusion Criteria	Exclusion Criteria
Timeframe	Studies from 2015 to present	Studies from 2014 and before
Research Objective	Study of factors influencing user adoption of DCEP	Research on how governments and corporations promote DCEP, but not on user adoption behavior
Research Methodology	<ul style="list-style-type: none"> <li>- Use of quantitative research (e.g. SEM, regression analysis)</li> <li>- Use qualitative research (e.g. case studies, interviews)</li> <li>- Conduct systematic reviews (SLR, Meta-Analysis)</li> </ul>	<ul style="list-style-type: none"> <li>- Policy commentary, news reports only, no empirical data</li> <li>- Involves only technical architecture analysis, no discussion of user adoption</li> </ul>
Research	<ul style="list-style-type: none"> <li>- Focuses on user adoption behavior of DCEP, CBDC</li> <li>- Research on mobile payments, e-money, fintech adoption that can be used in DCEP framework building</li> </ul>	<ul style="list-style-type: none"> <li>- Research on Bitcoin, cryptocurrencies only, not related to DCEP</li> <li>- Discusses purely technical implementations, but no user behavior analysis</li> </ul>
Data sources	<ul style="list-style-type: none"> <li>- Peer-reviewed journals (Scopus, Web of Science, IEEE Xplore)</li> <li>- International conference papers (e.g. ICIS, PACIS)</li> <li>- Official white papers (BOJ, IMF, BIS)</li> </ul>	<ul style="list-style-type: none"> <li>- Blogs, news articles, preprints</li> <li>- Student papers, unpublished academic reports</li> </ul>
Languages	English, Chinese	Other languages unless English translation is provided.

## 2.2 Search Strategy

In order to ensure the comprehensiveness, authority and reproducibility of the study, the following databases were selected for literature search:

**Table 2: Selected Databases and Their Coverage**

Databases	Areas Covered	Reasons to Choose
Scopus	Social Sciences, Economics, Technology	<ul style="list-style-type: none"> <li>- Covers research related to finance, blockchain, payment systems</li> <li>- Provides advanced Boolean search function to improve accuracy</li> </ul>
Web of Science	High-quality academic journals	<ul style="list-style-type: none"> <li>- Only high-quality peer-reviewed journals are included to ensure the authority of the literature.</li> <li>- Tracks citation frequency and identifies important studies</li> </ul>

IEEE Xplore	Computer Science, Fintech, Blockchain	- Includes research on DCEP-related technologies such as CBDC (Central Bank Digital Currency), blockchain payment technology, etc.
Science Direct	Economics, social sciences, technology	- For research related to financial technology, payment behavior
Springer link	FinTech, Digital Payments, E-commerce, Innovation Diffusion, Business Management	- Strong in FinTech research, high-impact business/technology journals, TAM & DoI studies, interdisciplinary approach
Wiley Online	Financial Services, Consumer Psychology, Risk Perception, Tech Adoption, Policy Studies	- Leading in business & finance, behavioral research on trust and adoption, policy & regulatory focus, data-driven insights

In order to ensure the accuracy and coverage of the search, this study used Boolean Search Expressions for keyword combinations to cover studies related to DCEP adoption.

**Table 3: Search strategy and keywords**

Term1	Operator	Term2	Operator	Term3
“DCEP” OR “Digital Currency Electronic Payment” OR “E-CNY” OR “CBDC” OR “Central Bank Digital Currency”	AND	“Adoption” OR “Acceptance” OR “Technology acceptance” OR “Intention to use” OR “User behavior”	OR AND	“TAM” OR “Technology Acceptance Model” OR “UTAUT” OR “Unified Theory of Acceptance and Use of Technology” OR “TRA” OR “Theory of Reasoned Action” OR “TPB” OR “Theory of Planned Behavior” OR “DoI” OR “Diffusion of Innovation Theory” OR “Rogers’ Innovation Diffusion Theory” OR “SCT” OR “Social Cognitive Theory”

### 2.3 Screening Process

The Preferred Reporting Items for Systematic Reviews and Meta-Analyses framework was used in this study to ensure that the literature screening process was systematic, transparent and reproducible (Selçuk, 2019). The whole screening process is divided into the following four stages:

#### 1) Identification

Perform keyword searches in databases such as Scopus, Web of Science, IEEE Xplore, Google Scholar, ScienceDirect, etc., to initially obtain relevant literature. Use literature management tools (EndNote, Zotero, etc.) to remove duplicates and ensure data uniqueness.

#### 2) Screening

The titles and abstracts were manually screened according to the Inclusion & Exclusion Criteria to exclude irrelevant studies.

#### 3) Eligibility

Literature that passed the initial screening was read in its entirety to further screen for studies that fit the topic of the study, and to exclude literature that only dealt with technology implementation and policy discussion but no user adoption analysis.

#### 4) Inclusion

The final screened literature will be included in the systematic review studies and used to construct the conceptual framework for DCEP adoption.

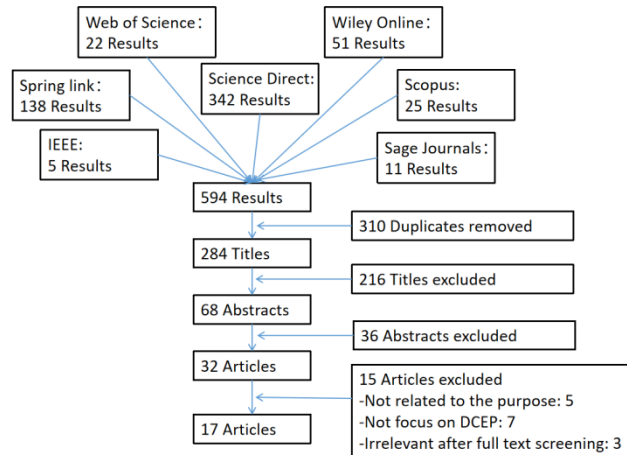


Figure 1: Flow diagram of the article selection process

## 2.4 Data Extraction & Synthesis

This study adopts thematic analysis to extract and synthesize data from the screened literature to summarize the key theories, influencing factors systematically, and user behaviors adopted by DCEP, and thus construct a conceptual framework for DCEP adoption.

### 2.4.1 Data Extraction

In the final screening of the literature, the following key information was extracted to ensure that the analysis was systematic and reproducible:

Table 4: Data Extraction Framework

Extracted content	Example
Basic research information	Title of paper, author, year of publication, journal/conference name
Research Methods	Quantitative (questionnaire survey, structural equation modelling SEM), qualitative (interviews, case studies), mixed methods
Subjects of the study	Whether the study is targeted at bank users, business users, policy makers
Theoretical framework	Theoretical models used (e.g. TAM, UTAUT, TRA, TPB, SCT, DoI)
Key variables	Perceived usefulness (PU), Perceived ease of use (PEU), Perceived risk (PR), Financial literacy (FL), etc.
Key Findings	How the study explains the influences and mechanisms of DCEP adoption
Research Limitations	Whether the study has sample limitations, methodological limitations, etc.

Data was extracted using Excel structured tables to record all key information and ATLAS.ti software for text analysis to ensure standardized and efficient data processing.

### 2.4.2 Data Synthesis

To ensure the systematic nature of the data analysis, this study adopts the Thematic Categorization to categorize the relevant studies adopted by DCEP into three major categories: technology acceptance theories, adoption factors, and user behaviors.

### 1) Technology Acceptance Theories

This section focuses on the theoretical models of DCEP adoption and analyzes the driving and hindering factors for users to adopt DCEP.

**Table 5: Comparison of Technology Adoption Theories in DCEP Research**

Theoretical Modeling	Core Variables	Application in DCEP Research
Technology Acceptance Model (TAM)	Perceived Usefulness, Perceived Ease of Use	Study of bank users' acceptance of DCEP
Unified Theory of Acceptance and Use of Technology (UTAUT)	Performance Expectancy, Effort Expectancy, Social Influence, Facilitating Conditions	Analyze the willingness of different groups to adopt DCEP
Theory of Reasonable Action (TRA)	Attitude, Subjective Norms	Examine how users' attitudes toward DCEP affect adoption intentions.
Theory of Planned Behavior (TPB)	Attitude, Subjective Norms, Perceived Behavioral Control	Evaluate users' likelihood of DCEP adoption in different contexts
Social Cognitive Theory (SCT)	Reciprocal determinism (personal, environmental, behavioral factors)	Analyze how users influence DCEP adoption through their social environment and personal capabilities.
Diffusion of Innovations Theory (DoI)	Innovation characteristics, communication channels, social systems, adopter categories	Examining models of diffusion of DCEP adoption

### 2) Adoption Factors

Examine the drivers and impediments to DCEP adoption and further generalize the key variables that influence user adoption.

**Table 6: Key Factors Influencing DCEP Adoption**

Category	Factors	Direction of influence
Technical factors	DCEP security, privacy protection	Influence user trust, determine adoption rate
Economic factors	Transaction costs, government incentives	Lower adoption thresholds, increase frequency of use
Social factors	Social acceptance, regulatory policy	Influence user acceptance of DCEP
User Characteristics	Digital financial literacy, age, risk appetite	Influence speed and breadth of adoption

### 3) User Behavior

This part of the study examines how bank users use DCEP and the factors that influence adoption intentions and long-term use intentions.

**Table 7: User Behavior and Adoption Intentions**

Research Direction	Key Variables	Core Findings
Intention to Use	Perceived Convenience, Trust, and Government Promotion	High Trust and Convenience Promote Adoption Intention
Continued Use	User experience, system stability, user satisfaction	User experience positively influences continued willingness to use
Substitution Effect	WeChat Pay, Alipay	Will DCEP adoption replace existing mobile payments

### 3. Theoretical Background

The theoretical framework of this study is based on a variety of classical theories of technology acceptance and use in order to explore the key factors influencing the adoption of DCEP by bank users in Hainan. The main theories examined include the TAM, DoI, UTAUT, TRA, TPB, and SCT. These theories provide important references for analyzing user behavior, adoption patterns, and influencing factors. However, existing models are still deficient in explaining DCEP adoption, such as less consideration of risk perception, financial literacy, and behavioral differences among different user groups. Therefore, this study combines multiple theoretical models in order to construct a theoretical framework that is more in line with the characteristics of DCEP adoption.

**Table 8: Comparative analysis of major technology adoption theories in DCEP research**

Theory	Core Concepts	Applications in DCEP Adoption	Limitations	Directions for improvement
TAM (Davis, 1989)	<ol style="list-style-type: none"> <li>Perceived usefulness (PU)</li> <li>Perceived ease of use (PEU)</li> <li>Attitude Toward Use (ATT)</li> <li>Behavioral Intent (BI)</li> </ol>	<ol style="list-style-type: none"> <li>Willingness to adopt increases if users perceive that DCEP can improve payment efficiency.</li> <li>DCEP's user-friendly and easy-to-use interface may increase adoption.</li> </ol>	<ol style="list-style-type: none"> <li>Lack of social influences (e.g., government promotion).</li> <li>Failure to consider risk perceptions (user concerns about the security and privacy of DCEP).</li> <li>Financial literacy (users' ability to understand DCEP) is not addressed.</li> </ol>	<ol style="list-style-type: none"> <li>Introduce Perceived Risk (PR), Financial Literacy (FL), Adopter Category (AC) in the TAM framework.</li> <li>Consider adoption patterns of different user groups in conjunction with DoI.</li> </ol>
DoI (Rogers et al., 2005)	<ol style="list-style-type: none"> <li>Adopter categories (AC) (innovators, early adopters, late mass, laggards).</li> <li>Relative advantage (RA), compatibility (C), complexity (CX), observability (OB).</li> </ol>	<ol style="list-style-type: none"> <li>Early adopters (young people, fintech companies) may be more willing to try DCEP.</li> <li>Comparative advantages (more convenient, lower cost) increase willingness to adopt.</li> <li>Compatibility (match with existing payment methods) promotes adoption.</li> </ol>	<ol style="list-style-type: none"> <li>Failure to consider government policy, whereas DCEP adoption is largely policy-driven.</li> <li>Ignores user risk perception and fails to explain security-sensitive user behavior.</li> </ol>	<ol style="list-style-type: none"> <li>Incorporate variables such as PU and PEU into TAM.</li> <li>Introduce government policy and regulatory factors to improve explanatory power.</li> </ol>
UTAUT (Venkatesh et al., 2003)	<ol style="list-style-type: none"> <li>Performance Expectation (PE)</li> <li>Effort Expectation (EE)</li> <li>social impact (SI)</li> <li>facilitating conditions (FC)</li> <li>user characteristics (age, gender, experience)</li> </ol>	<ol style="list-style-type: none"> <li>Social impacts (government advocacy, bank promotion) are evident for DCEP adoption.</li> <li>Facilitating conditions (e.g., DCEP wallet support, merchant acceptance) determine users' willingness to use it.</li> </ol>	<ol style="list-style-type: none"> <li>Lack of consideration of risk perception does not explain users' concerns about DCEP security.</li> <li>Failure to incorporate financial literacy, while users' understanding of digital currencies may influence their willingness to adopt.</li> </ol>	Refer to TAM & DoI as complementary theories to improve the explanatory power of DCEP adoption.

TRA (Fishbein, 1975)	<ol style="list-style-type: none"> <li>1. Behavioral intention (BI) determines behavior.</li> <li>2. Attitude (ATT) influence behavioral intentions.</li> <li>3. Subjective norms (SN) influence behavioral intentions.</li> </ol>	<ol style="list-style-type: none"> <li>1. Attitude (ATT): users' positive/negative evaluation of DCEP affects adoption intentions.</li> <li>2. subjective norms (SN): government promotion, bank publicity influence users' adoption decisions.</li> </ol>	<ol style="list-style-type: none"> <li>1. Ignoring behavioral control factors, assuming that users are fully autonomous in their decision-making, while in reality, factors such as policy and technical support affect DCEP adoption.</li> <li>2. Failure to consider risk factors, and users' security concerns may inhibit DCEP adoption.</li> </ol>	Consider the impact of Perceived Behavioral Control (PBC) on adoption intentions in conjunction with TPB.
TPB (Ajzen, 1991)	Added to TRA: Perceived behavioral control (PBC).	PBC plays a significant role in DCEP adoption, e.g., user's technical familiarity with DCEP, and ability to operate affects adoption behavior.	<ol style="list-style-type: none"> <li>1. Ignoring technical characteristics, DCEP adoption is influenced by payment convenience, security, etc.</li> <li>2. Not considering the category of adopters, unable to explain the adoption pattern of different user groups.</li> </ol>	Analyze the behavioral patterns of different adopter groups by combining the DoI.
SCT (Bandura, 1986)	<ol style="list-style-type: none"> <li>1. Self-Efficacy</li> <li>2. Observational Learning</li> <li>3. Outcome Expectations</li> </ol>	<ol style="list-style-type: none"> <li>1. Self-efficacy: Users are more likely to adopt the DCEP wallet if they believe they can easily operate it.</li> <li>2. Observational Learning: Seeing friends and merchants commonly using DCEP may increase willingness to adopt.</li> </ol>	<ol style="list-style-type: none"> <li>1. Failure to consider technical factors; DCEP adoption is heavily influenced by payment convenience and system security.</li> <li>2. It is difficult to quantify the adoption behavior of users, and it is harder to be used for large-scale prediction.</li> </ol>	Combine TAM and DoI to improve the explanatory power of DCEP adoption.

This study finally chooses TAM and DoI as the core theories to explain the DCEP adoption process. Among them, TAM is used to analyze the influence of users' perceived usefulness and perceived ease of use on adoption intention, while DoI is used to classify the adoption patterns of different user groups. Through the above integration, this study constructs a theoretical framework that is more in line with the characteristics of DCEP adoption, and provides policy recommendations for the government, banks, and other financial institutions to promote the widespread adoption of DCEP.

#### 4. Conceptual Framework Development

This study constructs a conceptual framework for DCEP adoption based on the TAM and DoI theory. The framework integrates a number of key variables affecting user adoption of DCEP and combines mediating and moderating variables in order to comprehensively analyze the adoption behavior of bank users in Hainan.

#### **4.1 Theoretical foundation of the conceptual framework**

This study adopts TAM and DoI as the core theoretical models and combines variables such as Perceived Risk (PR), Financial Literacy (FL), and Adopter Categories (AC) in order to construct a more explanatory DCEP adoption framework.

TAM explains how users form a willingness to accept technology through PU and PEU and ultimately decide whether to use the technology.

DoI focuses on how new technologies diffuse in society and categorizes users into innovators, early adopters, early masses, late masses, and laggards to predict the adoption patterns of different groups.

By combining TAM and DoI, this study is able to explain both individual cognitive factors (TAM) and social diffusion patterns (DoI) on DCEP adoption.

#### **4.2 Definition and Classification of Variables**

##### **4.2.1 Independent Variables**

This study identifies the following three key independent variables that directly influence users' willingness to adopt DCEP:

- Perceived Usefulness (PU): Whether users perceive DCEP to be able to improve payment efficiency or bring convenience.
- Perceived Ease of Use (PEU): Whether users believe DCEP is easy to learn and use.
- Perceived Risk (PR): Users' concerns about the security, privacy protection, etc. of DCEP.

##### **4.2.2 Mediating Variable**

PU is set as a mediating variable to analyze how PEU indirectly affects DCEP adoption intention (IU) by influencing PU.

##### **4.2.3 Moderating Variables**

Financial Literacy (FL): The degree of users' understanding of digital money and financial technology may affect the impact of PU, PEU, and PR on DCEP adoption intention.

Adopter Categories (AC): According to DoI theory, different types of users (e.g., early adopters and late adopters) may have different sensitivities to PU, PEU, and PR.

##### **4.2.4 Dependent Variable**

Intention to Use (IU): Whether the user is ultimately willing to use the DCEP.

#### **4.3 Hypotheses Development**

Based on the above conceptual framework, the following hypotheses are proposed in this study:

##### **4.3.1 Direct Effect of Independent Variables on Dependent Variables**

H1: Perceived usefulness (PU) positively influences DCEP adoption intentions (IU).

H2: Perceived Ease of Use (PEU) positively influences DCEP adoption intentions (IU).

H3: Perceived Risk (PR) negatively influences DCEP adoption intention (IU).

##### **4.3.2 Relationship between independent variables**

H4: Perceived ease of use (PEU) positively affects perceived usefulness (PU).

##### **4.3.3 Moderating effects**

H5a: Financial Literacy (FL) moderates the relationship between PU and IU.

- H5b: Financial literacy (FL) moderates the relationship between PEU and IU.
- H5c: Financial literacy (FL) moderates the relationship between PR and IU.
- H6a: Adopter category (AC) moderates the relationship between PU and IU.
- H6b: Adopter category (AC) moderates the relationship between PEU and IU.
- H6c: Adopter category (AC) regulates the relationship between PR and IU.

#### 4.3.4 Mediating effects

H7: Perceived usefulness (PU) partially mediates the relationship between perceived ease of use (PEU) and DCEP adoption intention (IU).

#### 4.4 Conceptual framework model

Based on the above variables and hypotheses, this study proposes a conceptual framework model for DCEP adoption:

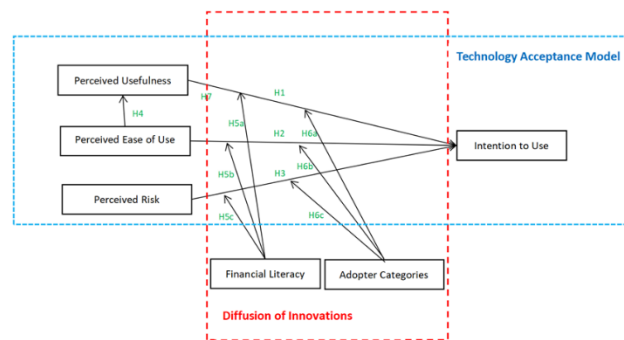


Figure2: Conceptual Framework for DCEP Adoption

The framework combines TAM and DoI and is able to comprehensively analyze the individual cognitive factors (PU, PEU) and social diffusion factors (AC) that influence DCEP adoption, and considers the moderating role of risk perception (PR) and financial literacy (FL).

### 5. Discussion and Implications

#### 5.1 Theoretical Contribution to Digital Currency Adoption Research

This study integrates the TAM and DoI theory to construct a more complete framework for DCEP adoption. The main theoretical contributions of this study are as follows.

##### 5.1.1 Extending TAM to introduce PR and FL

While the traditional TAM emphasizes the impact of PU and PEU on users' adoption behaviors, in the digital currency domain, users' security concerns (PR) and Financial Literacy (FL) also play a key role. This study extends the TAM by introducing PR and FL as additional variables and finds that PR significantly reduces DCEP adoption intention, suggesting that security and privacy concerns are important factors influencing users' decisions, and FL moderates the effects of PU and PEU on DCEP adoption intention, suggesting that users with higher financial literacy are better able to correctly assess the advantages and risks of DCEP.

This expansion improves the applicability of TAM in government-backed digital currency adoption studies.

##### 5.1.2 Combining TAM and DoI to construct a more complete adoption model

The TAM explains the technology acceptance behavior of individuals, but fails to account for how digital currencies diffuse to different social groups.

DoI provides categories of innovators, early adopters, early majority, late majority, and laggards to reveal the acceptance patterns of DCEP among different user groups. The findings suggest that the adopter category (AC) moderates the impact of PU, PEU, and PR on DCEP adoption. Early adopters are more concerned with technological advantages and innovativeness, while late adopters rely more on social influence and policy incentives. By combining TAM and DoI, this study provides a dual perspective of individual cognition and social diffusion to more accurately predict the DCEP adoption process.

### **5.1.3 Providing a Specific Adoption Model for Government Digital Currencies**

DCEP is different from decentralized cryptocurrencies such as Bitcoin in that its adoption is influenced by government regulation, policy push, and market incentives (Wu et al., 2022). This research finds that government policy and regulatory clarity reduce PR, increase PU, and enhance user trust in DCEP. DCEP's diffusion model differs from market-driven fintech innovations and relies more on policy orientation.

These findings fill a gap in existing research in the area of government-led digital currency adoption and inform research on central bank digital currencies (CBDC) in other countries.

## **5.2 Practical Implications for Policymakers and Financial Institutions in China**

### **5.2.1 Policy Recommendations for the Chinese Government**

First, enhance user trust through security and privacy protection. Since PR significantly reduces users' willingness to adopt DCEP, the government should take measures to enhance DCEP security and privacy protection, for example, establishing strict data protection regulations to eliminate users' concerns about privacy breaches; adopting encryption technology and anonymous payment options to ensure the privacy of small transactions; transparent DCEP transaction mechanisms to strengthen the regulation of fraud.

Second, driving DCEP adoption through financial incentives. This study finds that external incentives (e.g., rewards or subsidies) can increase users' PU and enhance willingness to adopt. Therefore, the government can implement DCEP consumption discounts or transaction fee reductions to encourage user adoption, tax incentives or equipment subsidies for merchants to increase DCEP acceptance in the market, and promote the disbursement of funds such as wages, social security, and government subsidies through DCEP to accelerate its popularization.

Third, expand the application scenarios of DCEP and increase PU. This study shows that the practical use of DCEP is the key to influencing the willingness to adopt, so its application scope should be expanded, such as public service payments (utility bills, taxes, traffic fines, etc.), cross-border payments, and smart contracts.

### **5.2.2 Strategic Recommendations for Chinese Financial Institutions**

First, improve the user experience of DCEP. As PEU affects DCEP adoption, financial institutions should optimize the user interface and functions of DCEP, for instance, simplifying the DCEP wallet registration process and reducing the account opening threshold; optimizing the payment interface and transaction feedback mechanism to improve the smoothness of use; and provide multi-language support and intelligent customer service to improve the convenience of use for different groups of people.

Second, formulate promotion strategies for different user groups. The study finds that different adopter categories (AC) have different concerns about DCEP, so differentiated marketing

strategies should be developed. For the early adopters (tech enthusiasts, corporate users), financial institutions should emphasize technological advantages, such as smart contracts, and cashless payments. On the other hand, for the late adopters (elderly, rural users), financial institutions should strengthen financial literacy, offline promotion and human customer service support.

Third, promote merchant acceptance and build a DCEP ecosystem. This research shows that DCEP adoption is limited by merchant acceptance, therefore, financial institutions should provide low-cost payment solutions to reduce the cost of DCEP usage for small merchants, cooperate with e-commerce platforms to improve the feasibility of DCEP online payment, and set up exclusive DCEP promotions to attract both merchants and consumers.

## **6. Conclusion**

### **6.1 Summary of Key Findings**

#### **6.1.1 PU is a core driver of DCEP adoption**

PU has the strongest positive influence on IU, indicating that users are more concerned about whether DCEP can bring convenience, reduce transaction costs, and improve payment efficiency.

PEU indirectly influences DCEP adoption intentions through PU, indicating that if users perceive DCEP as easy to use, they are more likely to perceive DCEP as useful and increase adoption intentions.

#### **6.1.2 PR as a significant deterrent to DCEP adoption**

The study finds that PR has a significant negative effect on DCEP adoption intention, indicating that users are mainly concerned about privacy protection, data security, and the technical stability of DCEP.

Users with high FL are less sensitive to PR, suggesting that users with higher levels of knowledge are better able to assess the security of DCEP and reduce concerns about risk.

#### **6.1.3 FL and AC have significant moderating effects on DCEP adoption**

FL influences the role of PU, PEU, and PR on DCEP adoption, for instance, high financial literacy users are more concerned about PU, while low financial literacy users are more likely to be influenced by PR.

AC influences the diffusion pattern of DCEP. Innovators and early adopters are more concerned about the technical advantages of DCEP and government rollout strategies.

While the late majority and laggards are more reliant on social influence (friend recommendation, merchant support, etc.) and policy incentives (subsidies, discounts, etc.).

#### **6.1.4 Policy and Regulation playing a key role in DCEP's adoption**

DCEP's adoption patterns differ from general FinTech innovation, government regulatory policies, financial incentives, and marketing of DCEP play a decisive role in the diffusion of DCEP. Policy-led technology adoption is more coercive than market-led innovation diffusion, so the adoption paths of different user groups may be strongly influenced by policies and regulations.

### **6.1.5 Key Strategies for DCEP Diffusion**

Based on the findings, this study recommends:

- 1) Enhance PU: Expand the application of DCEP in public services, cross-border payments, corporate settlements, etc. to increase its practical value.
- 2) Optimize PEU: Simplify the DCEP wallet registration process, improve user experience, and lower the technical threshold.
- 3) Reduce PR: Strengthen DCEP's security and privacy protection policies to enhance user trust.
- 4) Layered promotion: provide more advanced features (smart contracts, digital asset management, etc.) for high financial literacy users, strengthen financial education to increase low financial literacy users' acceptance of DCEP
- 5) Implement market incentives: provide discounts, point rewards, tax incentives and other measures to improve DCEP's market competitiveness.

### **6.2 Limitations and Suggestions for Future Research**

Although this study provided important insights into DCEP adoption, the following limitations remain, which could be further explored by future research.

#### **6.2.1 Limitations of the study scope**

The data in this study mainly comes from bank users in Hainan, and although Hainan is one of the DCEP pilot regions, the findings may not be fully applicable to other regions, especially those with different levels of economic development and fintech foundations.

Future research can be extended to the national level, or even cross-country comparative research to analyze the digital currency adoption patterns in different countries or regions.

#### **6.2.2 Limitations of variable selection**

This study focuses on factors such as TAM (PU, PEU), DoI (AC), PR, and FL, however, factors such as social trust, government trust, market competition, and network effects may equally affect DCEP adoption.

Future research may introduce variables such as social trust and government regulatory trust to explain DCEP adoption more comprehensively.

#### **6.2.3 Dynamics of adoption behavior not fully considered**

This study is based on cross-sectional data, which is unable to capture the changes in DCEP adoption behavior over time.

Future research could use longitudinal study to track changes in users' perceptions and behaviors toward DCEP to observe long-term adoption trends.

#### **6.2.4 The impact of technological development on DCEP adoption has not been explored in depth**

With the development of technologies such as blockchain, smart contracts, and artificial intelligence, the functions of DCEP may be further optimized, and future studies may explore how technological innovations affect DCEP adoption.

### 6.2.5 Impact of consumer psychological and behavioral preferences

This study mainly adopts the rational behavior model (TAM, DoI), but users may be influenced by behavioral economics factors, such as loss aversion and mental accounts, in their actual payment behavior.

Future research can combine the theory of behavioral economics to explore how users' irrational decisions affect DCEP adoption.

In conclusion, this study explored the willingness of bank users in Hainan to adopt DCEP from the dual perspectives of individual perception (TAM) and social diffusion (DoI), and proposed theoretical contributions, practical strategies, and policy recommendations, laying a foundation for the widespread application and optimization of DCEP.

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