

Title: “Understanding Central Bank Digital Currencies: A Global Perspective and Exploring the Factors that Influence their Adoption in India”

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Abstract

This paper provides an overview of the global introduction of Central Bank Digital Currencies (CBDCs) with a particular focus on India. Given the limited research on consumer behavior towards CBDC adoption, especially in the Indian context where pilot projects are underway, this study addresses a critical gap in understanding the factors influencing consumer intentions of using CBDCs. The study has two main objectives: first, to analyze the global landscape of CBDCs and the pilot projects initiated by the Reserve Bank of India (RBI), including the role of Unified Payments Interface (UPI) interoperability in promoting CBDC adoption; second, to identify the factors influencing consumer behavioral intention to adopt retail CBDCs in India, based on an empirical investigation. Using the UTAUT 2 model, the study finds that Perceived Risk, Hedonic Motivation, and Social Influence are significant predictors of Behavioral Intention, while Perceived Trust did not have a significant impact. This paper contributes to the very limited existing literature by analyzing current advancements and challenges in CBDC adoption, offering insights into the future of digital currency within India financial ecosystem. This study supports the effective implementation of CBDCs and highlights their potential to modernize financial systems and drive innovation in digital finance.

Keywords: Central Bank Digital Currencies (CBDCs), UPI Interoperability, e-Rupee.

1.Introduction

As the demand for digital payment methods in retail has increased and the use of cash has decreased (Auer et al., 2020) , central banks globally are actively exploring the issuance of CBDCs. This shift is driven by the need to enhance the efficiency and security of payment systems while providing a more inclusive and resilient financial infrastructure. Additionally, the rise of digital currencies reflects the broader trend of digital transformation in financial services, aiming to meet the evolving needs of consumers and businesses in an increasingly interconnected world.

CBDCs are digital forms of legal tender issued by central banks, offering stability and government backing unlike private cryptocurrencies such as Bitcoin and Ethereum. These digital currencies are pegged to national currencies, ensuring acceptance as legal tender. CBDCs operate on private blockchain networks managed by central and select commercial banks, enhancing security and exclusivity. They are digital tokens issued by central banks without the need for cash reserves. In 2024, many countries are adopting and exploring CBDCs to modernize financial systems and improve monetary transaction efficiency.

There are a range of motivations for issuing retail CBDCs including maintaining monetary sovereignty, strengthening monetary policy pass-through, combating the illicit use of money, strengthening competition for e-money payment providers, and improving payments efficiency and safety which feature prominently in reports published by central banks in advanced economies. Distinct from advanced economies, boosting financial inclusion stands out as one of the main objectives for retail CBDCs among emerging market and low-income economies (Kosse & Mattei, 2023)

According to the Bank for International Settlements, "CBDCs have the potential to enhance the safety and resilience of payment systems" (BIS, 2022). The International Monetary Fund emphasizes that "CBDCs could provide a robust platform for financial innovation, driving efficiency and inclusiveness in the financial sector"(Adrian, 2019). Furthermore, a report by the European Central Bank (ECB) highlights that "the issuance of a digital euro would ensure the continued access of citizens to central bank money in an increasingly digital world". These insights underscore the growing recognition of CBDCs as a crucial component in the future of global financial systems.

India digital payment ecosystem continues to witness impressive growth, with transaction volumes increasing by 42% year-on-year in Financial Year 2023–24, and projections indicate a potential threefold growth by Financial Year 2028–29. Several factors drive this surge, including advancements in technology, innovative business models, increased customer awareness, and proactive measures by both government and regulators to promote digital financial inclusion (PwC, 2024). With this rapid rise in digital transactions, the introduction of CBDC will offer a more secure and regulated framework to complement these systems, ensuring that monetary policy remains effective in an increasingly digital economy. CBDCs can enhance financial inclusion by reaching unbanked populations through digital means, reduce reliance on physical cash, and offer a government-backed alternative to private digital payment systems.

In October 2020, the Reserve Bank of India (RBI) established an Internal Working Group to study the design and implementation of CBDCs in India. Since 2022, the RBI has launched

two pilot projects for CBDCs. The RBI is working on an initiative to ensure interoperability between the CBDC and the Unified Payment Interface (UPI). This initiative aims to facilitate the widespread adoption of CBDCs by leveraging the existing robust UPI infrastructure, thereby enhancing the convenience and accessibility of digital transactions for consumers. The interoperability of UPI with CBDC is a significant step towards adoption by the RBI, further propelling India digital economy (Yadav & Bhargava, 2024).

The objective of this paper is twofold. First, it aims to provide a comprehensive overview of the global landscape of CBDCs, with a specific focus on India current state and the pilot projects initiated by the RBI. Second, it seeks to identify the factors that influence consumer behavioral intention to adopt CBDCs in India, which is crucial for understanding future trends in retail CBDC usage. Research on consumer behavior related to CBDC adoption is scarce, particularly in the context of India. With pilot projects now underway, understanding consumer behavior intention and the factors driving adoption is critical. This study aims to provide insights that will support the effective implementation of CBDC on a national scale.

2. Global overview of CBDCs

2.1. Defining CBDCs

According to the IMF, a CBDC is a public digital form of money issued by a central bank, typically denominated in the national currency and generally convertible to other types of central bank money. Depending on its objectives, a CBDC can be available to all domestic users as a cash substitute (retail CBDC) or restricted to certain financial institutions to improve financial market efficiency (wholesale CBDC). CBDC is a form of electronic fiat currency issued by a central bank, intended for use as a medium of payment and a store of value. Saito & Iwamura, (2018) define CBDC as an electronic fiat currency issued by a central bank, usable for payments and as a store of value. Lagarde, (2019) described CBDC as digital cash that represents the physical cash currently in use. Davoodalhosseini, (2018) defined CBDC as money issued by the central bank in electronic form, universally accessible for settling transactions involving goods and services.

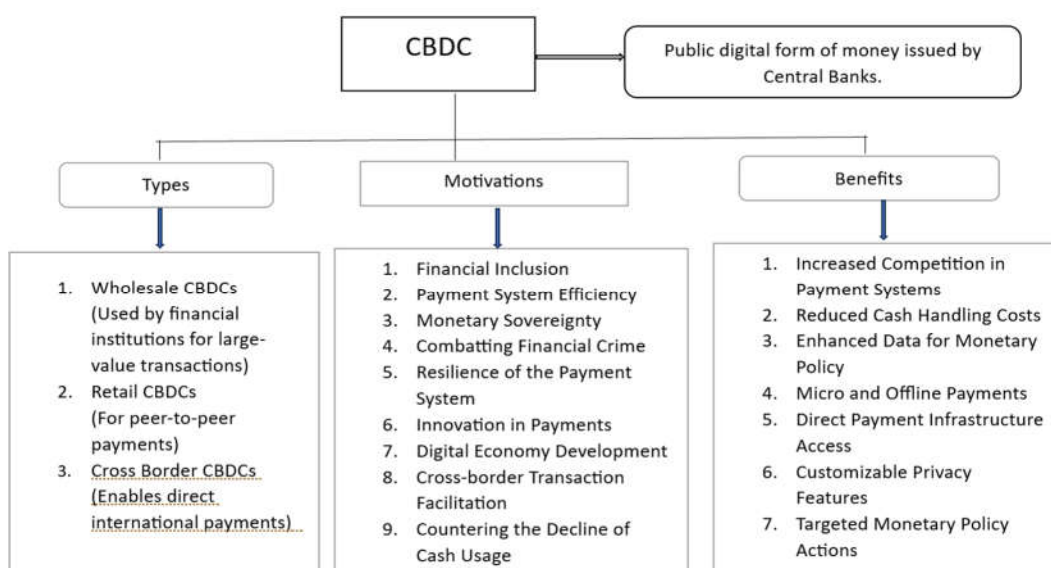


Figure 1. CBDC Overview: Key Types, Motivations, and Benefits (source: Author's Own work)

2.2 Types of CBDCs

CBDCs can be designed in various models depending on their intended use. The primary types include wholesale CBDCs, retail CBDCs (also known as general-purpose CBDCs), and cross-border CBDCs. Each model offers unique advantages that could drive innovation and enhance financial ecosystems.

- Wholesale CBDCs facilitate access for multiple financial institutions to high-value payment systems and support settlements within digital financial market infrastructures. The potential benefits include broader access to risk-free central bank money for large-value transactions, supporting delivery-versus-payment and payment-versus-payment transactions, and promoting the digitalization of financial markets.
- Retail CBDCs enable real-time, peer-to-peer transactions both online and offline, with immediate settlement. This capability can advance financial inclusion, foster a competitive and innovative payments environment, and provide a future-proof digital payments channel.
- Cross-border CBDCs could enable direct monetary transactions between different CBDC networks under central bank supervision. These CBDCs aim to reduce risks and delays associated with cross-border payments, eliminate the need for correspondent banking models, lower costs, and improve integration within financial markets.

2.3 Motivations for issuing CBDCs

Central banks are driven by a broad array of motivations to explore CBDCs, with marked differences between emerging markets and advanced economies. Additionally, the specific reasons for interest can vary greatly depending on the unique circumstances of each jurisdiction (Boar et al., 2020).

According to major research conducted by (Mancini-Griffoli et al.,(2018).), (Barontini & Holden, 2019), (Maniff, 2020), and the Concept Note on Central Bank Digital Currency by the FinTech Department of the RBI, these are the primary motivations driving central banks worldwide to promote the issuance of CBDCs. CBDCs have the potential to enhance competition, efficiency, and resilience in payment systems, countering the dominance of large corporations. They can facilitate financial digitalization, reduce cash handling costs, and boost financial inclusion, particularly in less advanced financial systems. Additionally, CBDCs could improve monetary policy effectiveness through better data on payment flows and help limit the impact of privately issued currencies that may threaten monetary sovereignty and financial stability. CBDCs can support efforts to reduce reliance on foreign currencies and provide more cost-effective cross-border payment services (CPMI, 2018). By streamlining these transactions, CBDCs have the potential to enhance financial stability, reduce transaction costs, and foster greater integration within the global financial system (Boar et al., 2020). Furthermore, CBDCs enhance transaction security through advanced cryptographic and blockchain technologies, ensuring robust protection against fraud and maintaining transaction integrity.

2.4 CBDCs around the world

According to the Atlantic Council, the exploration and development of CBDCs are gaining global traction. As of now, 134 countries and currency unions, accounting for 98% of the global GDP, are exploring CBDCs there is a remarkable increase from just 35 in May 2020. Out of

these, 68 countries are in advanced stages, encompassing development, pilot programs, or official launches. Within the Group of 20 (G20), 19 countries are advancing their CBDC initiatives, with eleven already in the pilot stage, including major economies like Brazil, Japan, India, Australia, South Korea, South Africa, Russia, and Turkey. Notably, the Bahamas, Jamaica, and Nigeria have successfully launched their CBDCs. Meanwhile, the Eastern Caribbean Currency Union, comprising eight countries, is redeveloping its D-Cash pilot project for CBDC following technical setbacks.

Europe is also making strides, with the ECB actively preparing for the digital euro, currently undergoing practical tests in a controlled environment and slated to complete its preparation phase by 2025. In contrast, progress in the United States has stalled, partly due to increasing political opposition, making CBDC a contentious topic in the presidential campaign. Across all advanced retail CBDC projects globally, distribution is managed through banks, financial institutions, and payment service providers, ensuring a structured approach. China offers a unique model with an option for direct CBDC access via a central bank application, showcasing the diverse methods countries are adopting in their digital currency initiatives.

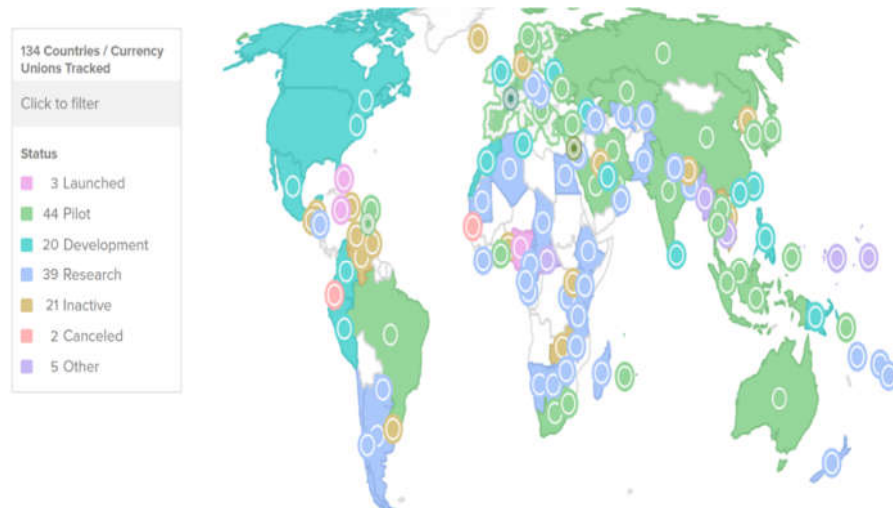


Figure 2: Global Progress of CBDC Initiatives: Status Across 134 Countries and Currency Unions

(Source: <https://www.atlanticcouncil.org/cbdctracker/>)

2.5 CBDC in India

As defined by the RBI, CBDC is legal tender issued in digital form by the central bank and holds equivalent value to physical currency, recorded as a liability on the central bank's balance sheet. The RBI has introduced the Digital Rupee, also known as 'e-Rupee' or (e₹), which constitutes a digital version of the Indian Rupee. Each e-Rupee mirrors the value and denominations of traditional notes and coins but exists in a digital format, with each unit assigned a unique serial number, just like physical currency. Stored in a digital wallet on the user's smartphone, e-Rupee can be exchanged just like cash through a dedicated application provided by banks.

2.5.1 Pilot Projects of CBDCs in India

In line with global developments, the RBI launched pilot programs for CBDCs within India. The wholesale CBDC pilot began in November 2022, involving collaboration among nine major banks: State Bank of India, Bank of Baroda, Union Bank of India, HDFC Bank, ICICI Bank, Kotak Mahindra Bank, Yes Bank, IDFC First Bank, and HSBC. At the same time, a retail CBDC pilot was introduced in December 2022, initially featuring State Bank of India, ICICI Bank, YES Bank, and IDFC First Bank across four cities, as per RBI specifications. The program later expanded to include Bank of Baroda, Union Bank of India, HDFC Bank, and Kotak Mahindra Bank, broadening user engagement. In June 2023, the retail pilot achieved one million users and involving 262,000 merchants.

In the fiscal year 2022-23, the RBI reported that the total circulation of e-rupee amounted to ₹16.39 crore. Of this, ₹5.70 crore was used for retail transactions, while wholesale transactions accounted for ₹10.69 crore. This reflects the increasing integration and utilization of digital currency within India financial system, highlighting a significant shift towards digital transactions in both retail and wholesale sectors.

In the end of December 2023, the CBDC ecosystem achieved a major milestone with 4 million customers onboarded and ten lakh transactions completed. The e-rupee has been effective in promoting digital transactions, even in areas with limited internet connectivity. Its transformative potential is expected to set a global benchmark and play a key role in facilitating seamless cross-border payments, establishing itself as an innovation symbol internationally.

During a Monetary Policy Committee meeting on February 8, 2024, the RBI Governor announced plans to improve retail CBDC pilot by introducing programmability and offline functionality. These enhancements will allow tailored payments for specific uses, like welfare benefits, and enable transactions in areas with poor internet access. The goal is to increase flexibility, control, and accessibility in digital payments to better serve diverse user needs across India.

2.5.2 The Fusion of CBDC and UPI

UPI, launched in 2016 by the National Payments Corporation of India (NPCI), has become a transformative force in India digital payment landscape, driving the shift towards a cashless economy with its user-friendly features and strong government support. Its remarkable success is further reinforced by a robust technological infrastructure, positioning UPI as one of the most secure and efficient payment methods globally. UPI remains at the forefront of this transformation, with a YoY transaction volume growth of 57%, recording over 131 billion transactions in FY 2023–24. Projections estimate that UPI will handle 439 billion transactions by FY 2028–29, further solidifying its dominance in retail digital payments, where it already accounts for over 80% of the market, a figure expected to reach 91% by 2028–29 (PwC, 2024). UPI has expanded beyond India, with recent partnerships including France and ongoing collaborations with countries such as Singapore, the United States, Australia, Canada, Hong Kong, Oman, Qatar, Saudi Arabia, the United Arab Emirates, the United Kingdom, and Sri Lanka.

In July 2023, daily transactions for retail CBDCs averaged around 18,000, a figure that initially fell short of the RBI target of 1 million daily transactions. To address this, the RBI introduced an interoperability program, allowing seamless transactions using a unified QR code,

integrating UPI and the digital rupee. Interoperability refers to the ability of the CBDC to be seamlessly integrated into the existing UPI system, allowing users to make transactions between CBDC wallets and traditional UPI-linked bank accounts or apps. In the end of December 2023, the CBDC ecosystem onboarded 4 million customers, with ten lakh transactions, and is poised to set global trends in digital payments. This integration simplifies transactions for users and merchants, accelerating CBDC adoption. With the interoperability initiative and UPI popularity, the target of 1 million daily transactions was met. Currently supported by 13 banks with plans to expand to 20-25, this interoperability enables users to make everyday payments effortlessly, enhancing the utility and acceptance of both UPI and CBDCs.

The transformative potential of CBDCs, combined with UPI strong framework, is set to revolutionize India financial ecosystem by lowering transaction costs and improving transparency. As CBDCs continue to gain popularity, their integration with UPI is expected to further enhance financial inclusion and boost economic growth. Looking ahead, the future of digital currency in India looks bright, with upcoming innovations and supportive regulations creating a stronger and more dynamic financial system.

3. Literature Review and Hypotheses Development

Central banks are fundamental to the financial infrastructure of each country, delivering dependable, efficient, and timely economic solutions. Digital currencies are increasingly favoured as a payment method, providing an alternative to traditional forms of payment like cash, checks, and credit cards (Chaum et al., 2021; Zaidi & Rupeika-Apoga, 2021). These digital currencies bring numerous advantages, including facilitating online transactions, enabling money transfers, offering a store of value, and presenting investment opportunities. The shift towards digital payments is also driven by the high costs and time involved in printing physical money, with people gravitating towards the convenience and ease of digital payment options (Ligon et al., 2019). Several central banks worldwide, including those in the United States, China, Russia, and the Bahamas, are actively developing or researching CBDC projects (Alonso et al., 2021). The introduction of new financial technologies and services, alongside the disruptions caused by the COVID-19 pandemic, has further spurred interest in CBDCs (Adrian, 2019). The Reserve Bank of India launched CBDC pilots in both wholesale and retail segments in the end of 2022. Successful implementation of these pilots could ensure that the public continues to use and access the most secure form of money central bank-issued currency even as economies become more digitalized (Babin et al., 2022). CBDCs have the potential to expand payment options, reduce cross-border payment costs and time, widen access to financial services, and facilitate fiscal transfers during economic crises (varma et al., 2022)

CBDC development represents a recent phenomenon that may trigger a fundamental shift in economic culture. Therefore, there is a pressing need to investigate the level of acceptance of CBDC as a payment system. This research aims to examine CBDC usage by utilizing a conceptualized model that takes some variables from The Unified Theory of Acceptance and Use of Technology (UTAUT) model, the technology acceptance model (TAM), and the UTAUT 2 model. In this study, the model has been conceptualized by including performance expectancy and social influence from UTAUT, hedonic motivation from UTAUT 2, and perceived risk from TAM and additionally perceived Trust. This approach aims to identify the factors influencing behavioural intention towards CBDC adoption.

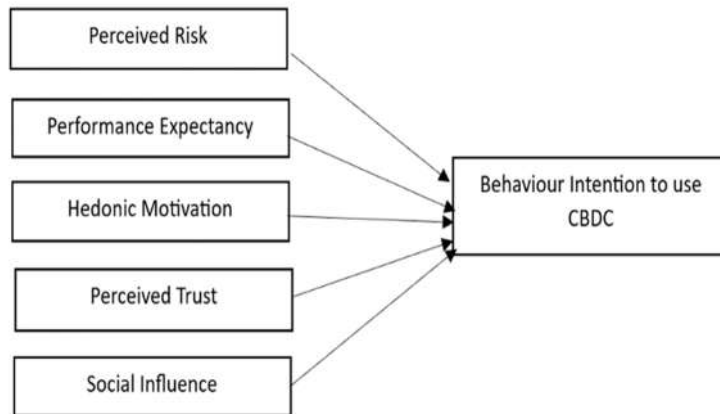


Figure 3: Conceptual Framework of the study

3.1 Hypothesis Development

3.1.1 Perceived Risk

Users perception of risk can significantly affect their acceptance, perceived usefulness, and satisfaction with digital currency technology (Featherman & Pavlou, 2003) . Even minor perceived risks can notably impact user behavior and adoption of the technology. Studies employing the TAM have demonstrated that perceived risk holds substantial explanatory power in the adoption and use of digital banking in rural areas (Abdul-Hamid et al., 2019). Additionally, perceived risk has been shown to indirectly influence intentions to use online applications under security threats (Lu et al., 2005).

H1: Perceived Risk (PR) has a negative impact on Behavior Intention (BI).

3.1.2 Performance Expectancy

Performance expectancy, the belief that using a system will improve job performance, is crucial for post-adoption technology use and a strong predictor of behavioral intention (Nikolopoulou et al., 2021; Venkatesh et al., 2003) Studies show that if individuals believe technology will enhance their performance and help achieve their goals, they are more likely to adopt it; otherwise, they are less inclined to do so (Sharma et al., 2022).

H2: Performance Expectancy (PE) has a positive impact on Behavior Intention (BI).

3.1.3 Hedonic motivation

Perceived enjoyment, which focuses on the pleasure or enjoyment derived from using digital currency, significantly impacts behavioral intention (Sarosa, 2019; Wang & Wang, 2010). Hedonic motivation encompasses emotional experiences such as joy and happiness (Berridge & Kringelbach, 2011) and influences customers willingness to use online banking services (Curran & Meuter, 2007) . When users find central bank digital currencies (CBDCs) enjoyable, they are more likely to adopt and promote their use.

H3: Hedonic Motivation (HM) has a positive impact on Behavior Intention (BI).

3.1.4 Perceived trust

(Gefen et al., 2003) define trust as the affection that manifests in the confidence and sense of security towards another party. They note that consumers often refrain from purchasing products online due to concerns about safety. Some researchers argue that trust may influence people's attitudes towards using technology more significantly than ease of use. Thus, perceived security is a factor influencing perceived trust, which in turn is a crucial element affecting consumers' intentions to use mobile payment systems.

H4: Perceived Trust (PT) has a positive impact on Behavior Intention (BI).

3.1.5 Social Influence

Social influence significantly shapes behavior as individuals are often swayed by the opinions, attitudes, and behaviors of those around them (Howard, 2012). People tend to conform to their peers and social groups' views, especially when they see them as credible sources of information (Bakshy et al., 2013). If a product or behavior is perceived as widely accepted or used by others, individuals are more likely to adopt it.

H5: Social Influence (SI) has a positive impact on Behavior Intention (BI).

3.1.5 Behavior Intention

An individual's attitude towards behavior (Vagnani & Volpe, 2017), perceived risk (Amirtha et al., 2021), performance expectancy (Catherine et al., 2017), and hedonic motivation (Santo & Marques, 2021) all influence their intention to adopt technology-based innovations. Understanding and anticipating what motivates users to adopt these innovations is crucial for the growth of digital currency (Sobti, 2019).

4. Research Methodology

This is an empirical study where the author attempted to explore the factors that influence the CBDC adoption in India by conducting pilot study on a small sample. To test the model questionnaire reliability and validity we conducted a pilot study to measure the construct anticipated to forecast the intention to use CBDC. The study results are based on pilot testing of the questionnaire.

4.1. Sampling and Data Collection

Data was collected using a questionnaire by a pilot study conducted in NCR. The collected data were analyzed using IBM SPSS Statistics version 29.0.2.0, which involves outlining the relationships between latent variables and observed indicators in a theoretical model. The model parameters were estimated using the statistical software SPSS. In the SPSS analysis process, the measurement model was evaluated first, including assessments of the reliability and validity of the measures used in the study.

The questionnaire consisted of three sections: the first section introduced the study area and the objectives of the study. It was important to give an overview of the study to the participants. The second section gathered demographic information, such as gender, age group, and annual income, while the third section evaluated the constructs under investigation. Data were collected using convenience sampling. Participants were informed of the study objectives and assured of confidentiality and anonymity. The survey was conducted through online google form, and the google form link was shared to participants on emails and social networking apps.

4.2. Measures and Study Design

A five-point Likert scale was used to evaluate participants responses to each question, ranging from 1 (strongly disagree) to 5 (strongly agree). Data were gathered using a self-administered questionnaire. At the beginning of the survey, the purpose of the study, which focused on the use of in digital payments, was clearly communicated to the respondents.

5. Data Analysis

5.1 Reliability Analysis

The reliability of the constructs in the measurement model was assessed using Cronbach's Alpha. The results revealed a high Cronbach's Alpha value of 0.922 for the 19-item scale, which is well above the recommended threshold of 0.70. This suggests that the items used to measure the latent constructs in this study are highly consistent, indicating a robust internal reliability. Additionally, the item-total statistics show that removing any item from the scale would not significantly improve the Cronbach's Alpha, further confirming the reliability of the scale.

5.2 Descriptive Statistics

The pilot study on CBDC behavioral intention comprised 92 respondents, predominantly young adults aged 25-34 (30.8%), with a balanced gender representation (54.9% male, 44% female). Participants were well-educated, with 67.1% holding at least a bachelor's degree, and primarily employed full-time (62.6%). The sample was predominantly urban (70.3%), reflecting a tech-savvy population, with 65.9% preferring mobile/digital wallets for regular transactions.

Additionally, 28.3% of respondents reported having prior experience with CBDC, primarily using it for retail purchases (29.3%) and peer-to-peer transfers (26.1%). This initial adoption, coupled with 44.6% of users indicating merchant awareness of CBDC transactions, suggests an emerging acceptance of this new digital currency in everyday financial interactions.

The mean scores for individual items ranged from 3.13 to 3.89, indicating a generally favorable attitude toward CBDC. Skewness and kurtosis values were within acceptable ranges, ensuring that the data distribution is appropriate for subsequent analysis. The slight negative skewness in the data suggests that respondents leaned more toward agreement with positive statements regarding CBDC, reflecting overall optimism about its adoption and potential benefits.

5.3 Factor Analysis

To ensure the validity of the constructs, an exploratory factor analysis was conducted. The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was 0.892, and Bartlett's test of sphericity was significant ($p < 0.001$), indicating that the data is suitable for factor analysis. A principal axis factoring extraction method with Varimax rotation was used, resulting in three factors with eigenvalues greater than one. The rotated factor matrix showed strong loadings on the expected dimensions, aligning well with the constructs from the UTAUT2 model, such as performance expectancy, social influence, and hedonic motivation. These factors cumulatively explained 55.87% of the variance, providing strong support for the construct validity of the measurement model.

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.892
Bartlett's Test of Sphericity	Approx. Chi-Square	997.268
	df	171
	Sig.	<.001

Figure 4: KMO and Bartlett's Test Results

5.4 Regression Analysis

A multiple linear regression analysis was performed to examine the impact of key constructs on behavioral intention to adopt CBDC. The regression model was significant ($F = 22.727$, $p < 0.001$), with an R^2 value of 0.569, indicating that 56.9% of the variance in behavioral intention can be explained by the independent variables included in the model. This suggests a substantial influence of the selected predictors on behavioral intention.

Among the predictors, social influence ($\beta = 0.285$, $p = 0.009$) and hedonic motivation ($\beta = 0.223$, $p = 0.070$) were found to have a statistically significant positive impact on behavioral intention, indicating that individuals are more likely to adopt CBDC when influenced by their social environment and when they find the technology enjoyable to use. Perceived trust ($\beta = 0.259$, $p = 0.030$) also emerged as a significant predictor, underscoring the role of trust in the adoption process. However, performance expectancy ($\beta = 0.070$, $p = 0.553$), while positive, was not statistically significant in predicting behavioral intention, suggesting that while individuals believe CBDC could enhance their financial management, this belief does not significantly influence their adoption intentions. Similarly, perceived risk ($\beta = 0.055$, $p = 0.503$) did not significantly impact behavioral intention, reflecting that concerns about risks may not play a major role in the decision to adopt CBDC.

Table 1: Regression Coefficients

Variables	Unstandardized Coefficients (B)	Standardized Coefficients Beta	t-value	p-value (Sig.)
Perceived Risk	0.043	0.055	0.673	0.503
Performance Expectancy	0.081	0.07	0.553	0.582
Hedonic Motivation	0.241	0.223	1.836	0.07
Perceived Trust	0.286	0.259	2.202	0.03
Social Influence	0.309	0.285	2.659	0.009

5.5 Model Fit

The model demonstrated a good fit, as indicated by various fit indices. The χ^2/df ratio was within the acceptable range of 1 to 3, while the Comparative Fit Index (CFI) and Tucker-Lewis Index (TLI) both exceeded 0.90, suggesting an adequate fit of the model to the data. The

RMSEA value was 0.045, which is well below the 0.08 threshold, further supporting the model goodness of fit. These results suggest that the model is a good representation of the data and that the hypothesized relationships are valid.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	Change Statistics			
						F Change	df1	df2	Sig. F Change
1	.754 ^a	.569	.544	.51565	.569	22.727	5	86	<.001

a. Predictors: (Constant), Social Influence, Perceived Risk, Hedonic Motivation, Perceived Trust, Performance Expectancy
b. Dependent Variable: behavioural intention

Figure 5: Model Fit Summary for Regression Analysis

6. Discussion

The hypothesis testing revealed that social influence, hedonic motivation, and perceived trust are significant predictors of behavioral intention to adopt CBDC. These findings suggest that individuals are more likely to adopt CBDC if they perceive it as socially endorsed, enjoyable, and trustworthy. Interestingly, while performance expectancy did not emerge as a significant predictor, its positive coefficient indicates that it may still play a role in shaping users' perceptions, but not strongly enough to influence behavioral intention in this study. The non-significant impact of perceived risk suggests that users may not view the risks associated with CBDC adoption as a critical barrier. The results provide valuable insights for policymakers and financial institutions seeking to promote CBDC adoption. Emphasizing the social and enjoyable aspects of CBDC, along with enhancing trust, could play a crucial role in encouraging its widespread use. Further research could explore other factors that may influence the actual use of CBDC, given the limitations of this study in fully explaining the variance in behavioral intention.

7. Implications for Policymakers and Technological Advancement

The findings of this study carry important implications for policymakers, financial institutions, and technology developers. Given the significant impact of social influence, hedonic motivation, and perceived trust on the behavioural intention to adopt CBDCs, it becomes crucial for stakeholders to focus not only on the functional benefits of digital currencies but also on fostering social acceptance and user enjoyment. Public campaigns that emphasize the societal benefits and trustworthiness of CBDCs, while providing a positive and enjoyable user experience, are likely to accelerate adoption.

Additionally, the lack of significance for performance expectancy and perceived risk challenges conventional assumptions, indicating that users may be less concerned with technical efficiency or risks when it comes to CBDC adoption. Instead, the social and psychological dimensions of technology adoption play a more pivotal role. For regulators and policymakers, this suggests a shift towards creating a narrative of social endorsement and trust to enhance CBDC adoption.

Furthermore, regulatory frameworks need to be adaptable to support the transparent and trusted operation of CBDCs, ensuring that trust-building remains a key focus in both design and communication strategies. This is critical in shaping how CBDCs are integrated into the broader digital financial ecosystem, ensuring that they can drive financial inclusion and contribute to the digital transformation of economies like India.

While our study faced limitations due to a small sample size, we plan to conduct future research with a larger sample to strengthen the robustness of the findings. This will ensure that the results are more comprehensive and provide greater value for practical implications.

8. Challenges and Risks in Implementing CBDCs

The Central Bank of Saudi Arabia highlights several challenges and potential benefits of issuing CBDCs. Key concerns include legal and regulatory constraints, as existing laws may not support CBDC features like programmability, necessitating legislative changes. There is a risk of bank disintermediation, which could destabilize traditional banking systems. Technical challenges include infrastructure issues, rural internet connectivity, interoperability with existing systems, and cybersecurity threats. Financial literacy is also critical, as increased digitalization does not guarantee improved financial knowledge, potentially leading to greater exclusion for less tech-savvy individuals. Public trust and acceptance are essential for successful CBDC implementation, with privacy concerns possibly hindering adoption. Additionally, central banks must address the environmental impact of CBDC infrastructure and ensure sustainable solutions. Finally, international coordination and standardization are necessary for facilitating cross-border transactions and preventing regulatory arbitrage in the global financial system.

According to Yadav & Bhargava, (2024) CBDCs are expected to reshape financial operations by enhancing efficiency, security, and global accessibility, but their widespread adoption hinges on further research and practical exploration.

9. Conclusion

Central banks are increasingly focused on developing digital currencies to enhance payment efficiency, security, and financial inclusion, driven by technological advancements such as UPI in India and the rise of private digital currencies. The study identified Perceived Risk, Hedonic Motivation, and Social Influence as significant predictors of Behavioral Intention toward CBDC adoption in India. However, Perceived Trust did not have a significant impact on adoption intentions, suggesting that while trust is important, other factors may be more critical in shaping consumer behavior.

The Digital Rupee pilot, with its integration into the UPI system, exemplifies a strategic approach that could facilitate widespread CBDC adoption. This initiative underscores the importance of addressing risk perceptions and leveraging social influence and motivational factors in promoting CBDC. As India continues to lead in this advancement careful planning and risk management will be essential to overcoming the technical, operational, and legislative challenges associated with CBDC implementation. The success of these efforts could set a global standard for financial innovation and stability, positioning India as a key player in the future of digital currencies.

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