

<https://doi.org/10.58419/gbs.v9i1.912304>

---

# CENTRAL BANK DIGITAL CURRENCY (CBDC) AND ITS POTENTIAL BENEFITS AND CHALLENGES

---

**Mr. Mallesha L**

*Doctoral Research Scholar, Department of Studies in Business Administration  
Vijayanagara Sri Krishnadevaraya University, Ballari,  
[malleshnaikmalla@gmail.com](mailto:malleshnaikmalla@gmail.com)*

**Prof Archana H N**

*Associate Professor, Department of Studies in Business Administration  
Vijayanagara Sri Krishnadevaraya University, Ballari,  
[archana@vskub.ac.in](mailto:archana@vskub.ac.in)*

## **ABSTRACT**

*In this study explores the potential impacts of introducing a Central Bank Digital Currency (CBDC) in the Indian economy, analysing its benefits and associated risks. CBDCs have garnered international attention as a solution to address limitations in privately-run electronic financial systems. Several countries have already launched or are planning to launch their CBDCs. Recently, the Reserve Bank of India has initiated pilot programs for CBDCs in the wholesale and retail sectors. Implementing CBDC could significantly improve financial stability, reinforce monetary policies, and foster financial inclusion in India. However, it is essential to establish a clear regulatory framework that can effectively accommodate both private virtual currencies and a sovereign digital currency, given the current uncertain regulatory landscape surrounding private virtual currencies in the country.*

**Keywords:** RBI, money creation, digital rupee, monetary policy, CBDC

**JEL classification:** E42, E43, E51, E52, G21

## **1. INTRODUCTION**

Central Bank Digital Currency (CBDC) has become a popular topic among central banks worldwide in recent times, with various countries already having launched or planning to launch their own CBDCs (Bijlsma et al., 2021). The emergence of stable coins and crypto currencies, as well as the entry of big tech companies into the payment industry, has increased the pressure on central banks to maintain their crucial role in the payment system (Allen et al., 2022). Furthermore, changing consumer preferences are leading to a shift away from cash towards digital payment methods (Burlon et al., 2022). Several countries have already launched or are planning to launch their CBDCs (Ding et al., 2022). Various countries have launched pilot projects to investigate the adoption of digital currencies. Some of these nations include the Bahamas, Nigeria, China, the United States, Jamaica, the United Arab Emirates (UAE), Ghana, Malaysia, Singapore, and Thailand, all of which are actively

engaged in this initiative. Recently, the Reserve Bank of India (RBI) released a concept note on Central Bank Digital Currency (CBDC) on October 7, 2022. It is available online at the RBI website. This note provides details on the CBDC pilot programmes that have been implemented in the wholesale and retail sectors. The e-W pilot, also known as Digital Rupee - Wholesale, was introduced on November 1, 2022, emphasising secondary market exchanges involving government assets. Meanwhile, the e₹-R pilot, also called Digital Rupee - Retail, was launched on December 1, 2022, and is only accessible to a closed user group consisting of participating customers and merchants. This article discusses the development of currency and digital currency, explicitly emphasising the potential effects of CBDC on the Indian economy. Additionally, the article analyses the recent launch of the CBDC pilot programs by the RBI and considers the advantages and disadvantages of adopting CBDC. The study has implication for investors, public, firms, customers and policymakers.

The remainder of the research paper comprises several vital sections. The second section delves into an in-depth literature review of Central Bank Digital Currency (CBDC). Following this, the third section presents the theoretical framework surrounding CBDC. The fourth section involves an extensive analysis and discussion of the subject matter. Finally, the fifth section concluding remarks.

## **2. LITERATURE REVIEW:**

Bjerg and Nielsen (2018) reviewed Danmarks National bank's analysis of implementing a Central Bank Digital Currency (CBDC) in Denmark. While agreeing with the conclusion that CBDC does not add efficiency or further functionality to existing payment solutions, they argued that the analysis overlooked potential benefits regarding increased financial stability due to CBDC's lack of credit risk. They also pointed out that CBDC could be valuable in future crises, despite fixed exchange rate regime constraints on interest rates. The authors suggested that National Banken's views might prioritize preserving the existing banking sector over the needs of the general public. Ward and Rochemont (2019) provided a comprehensive overview of CBDCs for Finance and Investment professionals, including a summary of Central Bank thinking and the possible implications of introducing a CBDC. They discussed the switch from public fiat to private electronic money, challenging the definition of money, access to legal tender, the role of Central Banks, the financial intermediation model, and the transmission of monetary policy. The paper highlighted Central Banks' exploratory projects to study the potential for issuing CBDCs and the array of

models under consideration. They also addressed technology innovation, including crypto currencies and Block chain, and their potential benefits and limitations. Bindseil (2020) reviewed the advantages and risks associated with CBDC. The paper addressed two main arguments against CBDC, related to risks of disintermediation of banks and systemic runs on banks during crises. The proposal of a two-tier remuneration of CBDC was put forward as a solution to these issues, and a comparison with alternative solutions was provided. Additionally, the paper compared the financial account implications of CBDC with those of crypto assets, stable coins, and narrow bank digital money domestically and internationally. The model implied annual implicit subsidies to U.S. banks of up to 0.8 per cent of GDP from 1999–2017. Bijlsma et al. (2021) examined the potential introduction of Central Bank Digital Currency (CBDC) and its impact on public preferences for payment and savings methods. Using data from a representative panel of Dutch consumers, they found that around half of the public would be willing to open CBDC current and savings accounts. This suggests a clear potential for CBDC adoption in the Netherlands, as consumers perceive it differently from traditional bank accounts. The study also highlighted the importance of knowledge and trust in banks and the central bank for intended adoption. Price incentives, such as interest rates, affect respondents' deposits in a CBDC savings account. Moreover, the study indicated that individuals valuing privacy and security and those with low trust in banks are likelier to use the CBDC current account. Nunez Alonso et al. (2021) analysed the current status of CBDCs. They explored their potential implementation in various countries and currency areas, drawing correlations between motives for implementing CBDCs and specific variables. The study suggested that the Baltic Sea area, Uruguay, Brazil, Malaysia, and South Africa were considered optimal areas for implementing CBDC based on correlation with pioneer countries in CBDC implementation. Allen et al. (2022) reviewed recent literature on fintech, crypto currencies, stable coins, and central bank digital currencies (CBDCs). The rise of fintech and the introduction of stable coins and CBDCs have significant implications. The paper provides an overview of China's experience in fintech, focusing on payments, digital banking, fintech lending, and its CBDC pilot's (e-CNY) progress. It also explores essential considerations in designing effective crypto currency regulations, which can foster innovations and increase public confidence in the market. Effective rules may lead to the e-CNY becoming a global mainstream currency, providing market participants with incentives and protection. Success for digital currencies largely depends on their widespread adoption, and if the Chinese e-CNY becomes mainstream, it could address existing issues in traditional

financial systems. Burlon et al. (2022) provided evidence on the estimated effects of digital euro news on bank valuations and lending, with the outcomes depending on deposit reliance and specific design features to regulate the quantity of CBDC. They developed a quantitative DSGE model to replicate the evidence and integrate critical mechanisms through which CBDC issuance could affect bank intermediation and the economy. The issuance of CBDC could have significant trade-offs and effects, impacting lending, real GDP, and welfare, with the potential to mitigate the risk of bank disintermediation. Ding et al. (2022) investigated the impact of the CBDC launch by the Bank of England on the manufacturing supply chain, specifically the production plan optimization based on a volatility clustering model to reduce CBDC value uncertainty. Their machine learning model outperformed the GARCH model, suggesting that lowering CBDC uncertainty could strengthen manufacturing companies' performance. (Chiu et al., 2023) Chiu et al. (2023) demonstrated that issuing a deposit-like

CBDC with an appropriate interest rate could encourage banks with market power in the deposit market to pay higher interest rates to retain customers. This would attract more deposits and increase loan offerings, indicating that CBDC issuance need not crowd out private banking. The CBDC would serve as an alternative option for households, limiting banks' market power and enhancing the efficiency of bank intermediation. Li (2023) predicted households' demand for CBDC with different design attributes using a structural demand model applied to a unique Canadian survey dataset. CBDC and its alternatives, cash and demand deposits, were product bundles with distinct attributes. The study estimated households' preferences for these attributes based on their allocation of liquid assets between cash and demand deposits, predicting that the aggregate CBDC holdings could range from 4% to 52% of households' liquid assets, depending on their perception of CBDC relative to cash or deposits. Mishra and Prasad (2023) developed a general equilibrium model highlighting trade-offs between physical and digital retail central bank money forms. They explored the differences between cash and CBDC, such as transaction efficiency, possibilities for tax evasion, and nominal rates of return. The paper also discussed how a CBDC could facilitate negative nominal interest rates and helicopter drops while preventing capital flight from other assets. Ozili (2023) reviewed recent advances in CBDC research, emphasizing the consensus that CBDC is a liability of the issuing central bank with cash-like attributes. The review presented the motivations and benefits of CBDC issuance, including improving monetary policy conduct, enhancing digital payment efficiency, and increasing financial

inclusion. However, the paper cautioned against over-optimism about CBDC benefits and identified areas for future research, such as finding the optimal CBDC design and understanding its effects on credit costs and financial stability.

After thoroughly reviewing the existing literature on Central Bank Digital Currency (CBDC), it was evident that only a few studies have been undertaken. In light of this, the research objectives were formulated with the aim of comprehending CBDC, exploring its potential advantages and challenges, as well as gaining insights into the recent CBDC pilot project implemented by the Reserve Bank of India (RBI).

### 3. **THEORETICAL FRAMEWORK:**

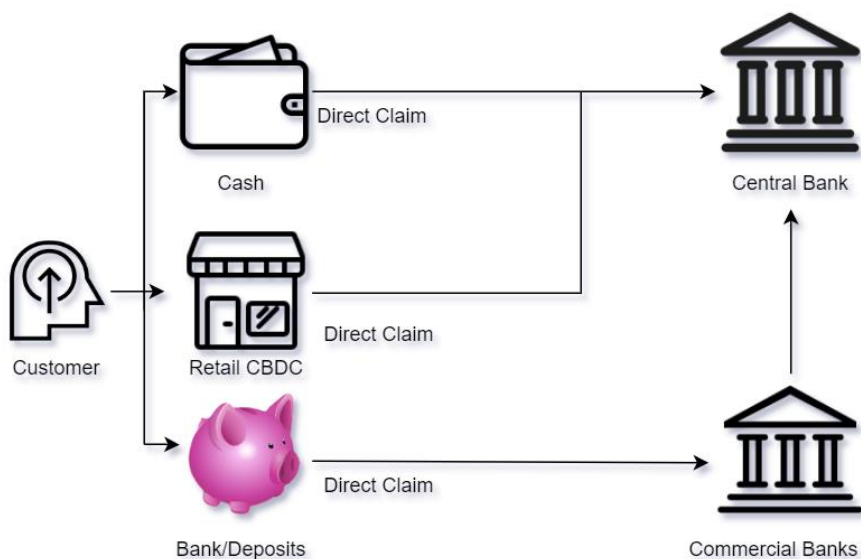
Throughout history, the concept of money has transformed significantly, transitioning from barter systems to modern-day digital currencies. Below is a concise overview of this evolution from barter systems to the emergence of Central Bank Digital Currency (CBDC):

- **Barter System:** In ancient times, people engaged in direct trade by exchanging goods and services without standardised currency. Unfortunately, this method often presented challenges, as finding mutually beneficial trading partners could take time and effort.
- **Commodity Money:** To overcome the limitations of bartering, societies started using commodities like gold or silver as a medium of exchange. These commodities possessed intrinsic value and were widely accepted as a standard trade unit.
- **Paper Money:** As trade expanded and transporting precious metals became impractical, paper money was adopted. These notes represented claims on specific amounts of commodity money held by a bank or government, offering a more convenient means of conducting transactions.
- **Fiat Money:** The introduction of fiat money marked a significant shift in monetary systems. Unlike commodity-backed money, fiat currency is not backed by any physical asset but derives its value from being declared legal tender by a government. The value of fiat money hinges on the trust and confidence people places in the issuing authority.
- **Digital Currency:** The rise of the internet paved the way for the advent of digital currencies like Bit coin. Operating decentralised, these currencies exist independently of government or financial institution control. Employing cryptographic techniques, digital currencies ensure secure transactions and govern the creation of new units.
- **Central Bank Digital Currency (CBDC):** A relatively recent development, CBDC represents the digital form of fiat money authorised and issued by central banks (Ozili,

2023). Backed by the full faith and credit of the government, CBDC combines the advantages of digital transactions with the stability and trust of traditional fiat currency. Its popularity has recently grown, showcasing the continuous evolution of money.

### **WHAT IS CENTRAL BANK DIGITAL CURRENCY (CBDC)**

The emergence of the internet and communication technology has resulted in the widespread adoption of electronic financial systems, where money is represented as digital numbers on computers rather than physical cash (Chu et al., 2022). Despite their popularity, the operation of these systems by private entities has led to several drawbacks, including high usage charges, security concerns, and exclusion. To tackle these challenges, many countries worldwide are considering the implementation of a central bank digital currency (CBDC). CBDCs are a novel concept in the banking and economics domains, as they are issued and supported by a central bank and represent a country's fiat currency in electronic form. These currencies are built on a distributed ledger technology (DLT) platform, ensuring secure, fast, and cost-effective transactions (Bjerg & Nielsen, 2018; Nández Alonso et al., 2021). CBDCs are recognized as legal tender and are equal in value to physical currency, offering a wide array of financial applications such as peer-to-peer payments, online purchases, and remittances (Bijlsma et al., 2021). In the context of India, Central Bank Digital Currencies (CBDCs) hold significant potential for transforming the financial sector. One key advantage is their ability to enhance financial inclusion, providing a low-cost and accessible payment system that benefits the unbanked and under banked populations. Additionally, CBDCs could bolster financial stability by mitigating risks associated with bank runs and private crypto currencies, which pose systemic risks. Furthermore, CBDCs can offer central banks a more efficient tool for implementing monetary policy, thereby improving their effectiveness in maintaining economic stability.



*Figure 1: Retail CBDC and Monetary System*

#### **4. ANALYSIS AND DISCUSSION:**

##### **Reserve Bank of India Launches Central Bank Digital Currency Pilot Programs:**

The Reserve Bank of India (RBI) has considered issuing a Central Bank Digital Currency for many years (CBDC). On October 7, 2022, the RBI issued a concept note on CBDC, which includes information on the pilot programmes that have begun in wholesale and retail sectors. The note can be accessed on the RBI’s website and provides a detailed outline of the framework of the CBDC and its features. The Digital Rupee - Wholesale (e-W) wholesale segment pilot programme launched on November 1, 2022. It attempts to assess the CBDC’s performance in public securities secondary market exchanges. The initiative includes financial institutions such as banks, non-banking financial organisations, and other payment intermediaries. A trial initiative for the retail sector called Digital Rupee-Retail (e-R) was introduced on December 1, 2022. In this pilot initiative, CBDC, a digital token representing legal cash, is produced in the same denominations as coins and paper money. Users can transact using a digital wallet offered by participating banks, which is disseminated through financial intermediaries like banks. It is possible to conduct both person-to-person (P2P) and person-to-merchant (P2M) transactions. The CBDC provides physical cash features like trust, safety, and settlement finality. It has no interest and can be converted into other currencies, including bank savings. The RBI has chosen eight banks to participate in the retail pilot programme. The State Bank of India, ICICI Bank, Yes Bank, and IDFC First Bank are all part of the first phase. In the subsequent stages, an additional four banks will be participating: Bank of Baroda, Union Bank of India, HDFC Bank, and Kotak Mahindra Bank. Based on

input from the pilots, the RBI intends to broaden the pilots' scope to operationalize CBDC gradually and thoroughly.

### ***Potential Benefits of Central Base Digital Currency (CBDC)***

CBDCs have been gaining significant attention worldwide as they offer a range of potential benefits. Here are some general key benefits of CBDC:

- **Improved Efficiency:** CBDC can improve the effectiveness of the payment system by reducing the time and costs associated with traditional payment methods. It can reduce the need for intermediaries, such as banks and clearinghouses, which can help to reduce transaction fees and increase the speed of settlement.
- **Financial Inclusion:** CBDCs advance financial inclusion by providing unbanked or under banked individuals access to digital payment systems. They can also lower the cost of financial services, making them more affordable for low-income individuals and small enterprises.
- **Security and Transparency:** Compared to traditional payment systems, CBDCs can provide improved security and transparency. Transactions can be recorded on a secure, distributed ledger, which makes them less vulnerable to hacking or manipulation. Furthermore, CBDCs can increase accountability and decrease fraud by providing high transparency, as all transactions are recorded on the block chain.
- **Control and Flexibility:** CBDCs help central banks gain more control over the money supply during economic uncertainty. Additionally, they can offer more flexibility in monetary policy, as central banks can adjust interest rates and other policy levers more quickly and easily.
- **Reduced Cost of Cash Management:** CBDCs can lower the cost of cash management for both central and commercial banks by eliminating the need for physical currency storage and transportation. This can lead to significant cost savings for these institutions.
- **Enhanced Data Collection:** CBDCs can provide more detailed data on transactions, which can be useful in monitoring economic activity and identifying potential risks to financial stability.

### **POTENTIAL CHALLENGES OF CENTRAL BASE DIGITAL CURRENCY (CBDC)**

CBDCs are gaining popularity globally, with many countries exploring the potential benefits of launching their own CBDCs. However, several challenges need to be addressed. Here are some of the significant challenges:



- **Technical Infrastructure:** The technical infrastructure required to support CBDCs is complex and costly. Central banks must develop robust systems to ensure the security, privacy, and integrity of CBDC transactions (Náñez Alonso et al., 2021). This will require significant investments in hardware, software, and cyber security.
- **Interoperability:** To ensure seamless use across different platforms and by different parties, CBDCs need to be interoperable with existing payment systems. Achieving interoperability will require collaboration and standardization across different jurisdictions and payment systems.
- **Legal and Regulatory Frameworks:** CBDCs will need to be governed by robust legal and regulatory frameworks to ensure they are used safely and responsibly (Priyadarshini & Kar, 2021). New laws and regulations will need to be enacted to address CBDC transactions and ensure compliance with know-your-customer (KYC) and anti-money laundering (AML) rules.
- **Privacy and Data Protection:** CBDCs have the potential to provide greater privacy and anonymity for users. However, this can also create risks for money laundering, terrorist financing, and other illicit activities (Carapella & Flemming, 2020). Central banks will need to balance the need for privacy with the need to prevent illicit activities while ensuring compliance with data protection regulations.
- **Financial Stability:** CBDCs have the potential to disrupt existing payment systems and financial intermediaries, which could affect financial stability, particularly if CBDCs are widely adopted and replace cash and bank deposits. Therefore, central banks must carefully consider CBDCs' potential impact on financial stability and take the necessary precautions to mitigate risks.

## 5. CONCLUSION.

Central Bank Digital Currency (CBDC) has garnered widespread attention from central banks worldwide due to the rise of stable coins, crypto currencies, and large technology companies in the payment sector. CBDCs are built on distributed ledger technology, enabling secure, swift, and cost-effective transactions. They are digital representations of a country's fiat currency, issued and backed by the central bank. The adoption of CBDC can significantly transform the financial system by enhancing monetary policies, fostering economic stability, and promoting financial inclusion (Ward & Rochemont, 2019). Recently, the Reserve Bank of

India (RBI) released a concept note on CBDC, initiating pilot programs in both wholesale and retail sectors. These initiatives could substantially impact the Indian economy and banking industry by establishing a more efficient and affordable currency management system, strengthening the development of monetary policies, enabling real-time situational monitoring, and enhancing central bank oversight. Additionally, implementing a robust regulatory framework for private virtual currencies could be a favourable step forward for the Indian economy, facilitating the coexistence of these currencies alongside a sovereign digital currency.

## **REFERENCES**

1. Allen, F., Gu, X., & Jagtiani, J. (2022). *Fintech, Cryptocurrencies, and CBDC: Financial Structural Transformation in China* (Working Paper (Federal Reserve Bank of Philadelphia) 22–12; Working Paper (Federal Reserve Bank of Philadelphia), pp. 22–12). Federal Reserve Bank of Philadelphia. <https://doi.org/10.21799/frbp.wp.2022.12>
2. Bijlsma, M., van der Crujisen, C., Jonker, N., & Reijerink, J. (2021). What triggers consumer adoption of CBDC? *SSRN Electronic Journal*. <https://doi.org/10.2139/ssrn.3836440>
3. Bindseil, U. (2020). Tiered CBDC and the Financial System. *SSRN Electronic Journal*. <https://doi.org/10.2139/ssrn.3513422>
4. Bjerg, O., & Nielsen, R. H. (2018). Who Should Make Kroner? - A Review of Danmarks Nationalbank's Analysis of CBDC. *SSRN Electronic Journal*. <https://doi.org/10.2139/ssrn.3124816>
5. Burlon, L., Montes-Galdon, C., Muñoz, M., & Smets, F. (2022). *The optimal quantity of CBDC in a bank-based economy*.
6. Carapella, F., & Flemming, J. (2020). *Central bank digital currency: A literature review*.
7. Chiu, J., Davoodalhosseini, S. M., Jiang, J., & Zhu, Y. (2023). Bank market power and central bank digital currency: Theory and quantitative assessment. *Journal of Political Economy*, 131(5), 1213–1248.
8. Chu, Y., Lee, J., Kim, S., Kim, H., Yoon, Y., & Chung, H. (2022). Review of Offline Payment Function of CBDC Considering Security Requirements. *Applied Sciences*, 12(9), 4488. <https://doi.org/10.3390/app12094488>

9. Ding, S., Cui, T., Wu, X., & Du, M. (2022). Supply chain management based on volatility clustering: The effect of CBDC volatility. *Research in International Business and Finance*, 62, 101690. <https://doi.org/10.1016/j.ribaf.2022.101690>
10. Li, J. (2023). Predicting the demand for central bank digital currency: A structural analysis with survey data. *Journal of Monetary Economics*, 134, 73–85.
11. Mishra, B., & Prasad, E. S. (2023). *A simple model of a central bank digital currency*. National Bureau of Economic Research.
12. Nández Alonso, S. L., Jorge-Vazquez, J., & Reier Forradellas, R. F. (2021). Central Banks Digital Currency: Detection of Optimal Countries for the Implementation of a CBDC and the Implication for Payment Industry Open Innovation. *Journal of Open Innovation: Technology, Market, and Complexity*, 7(1), 72. <https://doi.org/10.3390/joitmc7010072>
13. Ozili, P. K. (2023). Central bank digital currency research around the World: A review of literature. *Journal of Money Laundering Control*, 26(2), 215–226.
14. Priyadarshini, D., & Kar, S. (2021). Central Bank Digital Currency (CBDC): Critical Issues and the Indian Perspective. *Institute of Economic Growth*.
15. Ward, O., & Rochemont, S. (2019). Understanding central bank digital currencies (CBDC). *Institute and Faculty of Actuaries*, 1–52.