

Central Bank Digital Currency (CBDC): Features, Benefits and Economic Implications

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Abstract:

The rapid advancement of digital payment systems has transformed the financial landscape of India, paving the way for the introduction of Central Bank Digital Currency (CBDC). The Reserve Bank of India (RBI) launched the Digital Rupee (₹) as a sovereign-backed digital form of the Indian currency to complement existing digital payment mechanisms such as the Unified Payments Interface (UPI). This study examines the concept of CBDC as a new form of digital currency, focusing on its features, benefits, need, and overall significance in the Indian financial system. The research highlights the key features of the Digital Rupee, including instant settlement, offline functionality, interoperability with existing QR infrastructure, programmability, anonymity for small transactions, and legal tender status. It distinguishes between Retail CBDC (₹-R), designed for the general public, and Wholesale CBDC (₹-W), intended for interbank and institutional settlements. The study further explores how CBDC differs from private digital payment platforms and cryptocurrencies by offering sovereign guarantee and regulatory oversight. The significance of the study lies in evaluating the role of CBDC in promoting financial inclusion, particularly in rural areas where banking penetration remains limited. By reducing dependency on physical cash and lowering currency printing and distribution costs, the Digital Rupee has the potential to enhance efficiency, transparency, and sustainability in the monetary system. Additionally, CBDC can help mitigate fraud, curb money laundering, and strengthen monetary policy transmission. Based on secondary data from RBI reports and related publications, the study concludes that the Digital Rupee represents a transformative step toward a more inclusive, secure, and technologically advanced financial ecosystem in India.

Keywords: CBDC, E-Rupee, e wallet, Digital rupee, DvP

Introduction

A CBDC is virtual money backed and issued by a central bank. The e-Rupee (₹), also known as the Digital Rupee, is India's Central Bank Digital Currency (CBDC) issued and regulated

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by the Reserve Bank of India. As of 2026, it serves as a secure, digital version of physical cash, maintaining a 1:1 exchange rate where one digital rupee is always worth one physical rupee. Unlike money in a bank account which is a bank's liability, the e-Rupee is a direct claim on the RBI, much like the physical currency notes in your wallet. As of mid-2024 to early 2025, the Digital Rupee is in a pilot stage, expanding its user base and integrating with banks to enable wider adoption, including programmability for specific use cases.

Digital Rupee or e₹, is India's Central Bank Digital Currency (CBDC). It is the digital form of India's physical currency, the Rupee (₹). e₹ is issued by the Reserve Bank of India (RBI) in digital form and e₹ is at par with the physical currency, offering features similar to physical cash like convenience of use, guarantee of RBI, finality of settlement, etc. e₹ is stored in the user's digital wallet and can be used to receive / send money, and / or make payment for transactions, just like any physical ₹ note.

e₹ wallet is a digital wallet that can be opened on one's mobile phone/device. e₹ wallet stores the Digital Rupee, like the physical wallet/purse that stores the physical currency. e₹ wallets are being currently provided by banks and non-banks, which are part of the retail CBDC pilot.



Cash, but Digital !

Objectives of the Study

1. To examine the concept and evolution of Central Bank Digital Currency in India.
2. To analyse the key features and operational mechanism of the Digital Rupee.
3. To study the benefits and challenges associated with CBDC implementation.
4. To evaluate the role of CBDC in promoting financial inclusion.
5. To assess its economic and environmental impact.

Research Methodology

The present study titled "Central Bank Digital Currency – A New Form of Digital Currency: Features and Benefits" is descriptive and analytical in nature. It aims to examine the evolution, operational framework, benefits, and implications of Central Bank Digital Currency (CBDC) in India, particularly the Digital Rupee introduced by the Reserve Bank of India.

1. Research Design

The study adopts a descriptive research design supported by analytical interpretation. Since the Digital Rupee is a recent monetary innovation, the research focuses on understanding its conceptual framework, structural features, policy objectives, and broader socio-economic implications.

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The design enables:

- Examination of the evolution and regulatory background of CBDC in India.
- Analytical assessment of its operational mechanism.
- Evaluation of its economic, financial inclusion, and environmental impact.

2. Nature and Source of Data

The study is entirely based on secondary data. No primary survey or field investigation has been conducted.

Sources of Secondary Data

Data has been collected from the following reliable and authenticated sources:

1. Official Publications of the Reserve Bank of India
2. Government Reports and Policy Documents
3. Research Articles and Academic Journals
4. Official Banking and Institutional Publications
5. Authentic Websites and Digital Payment Portals

Only credible and verified sources have been considered to ensure accuracy and reliability.

3. Period of Study

The study primarily covers developments related to CBDC in India from 2020 onwards, particularly after the official announcement and pilot launch of the Digital Rupee by the Reserve Bank of India.

4. Tools and Techniques of Analysis

Since the study is conceptual and policy-oriented, the following analytical tools have been used:

- Descriptive Analysis - To explain the concept, evolution, and framework of CBDC.
- Comparative Analysis - To compare Digital Rupee with physical currency and existing digital payment systems such as UPI.
- Content Analysis - To interpret policy documents, RBI reports, and official statements.
- Interpretative Analysis - To evaluate the potential economic, financial inclusion, and environmental impact.

Wherever necessary, statistical data (such as financial inclusion index and cost of printing currency) have been presented in a structured manner for better understanding.

Scope of the Study

The study focuses on:

- Concept and evolution of CBDC in India
- Features and operational mechanism of the Digital Rupee
- Benefits and challenges of implementation
- Role in financial inclusion
- Economic and environmental implications

The study is confined to the Indian context and does not provide an in-depth comparative analysis of CBDCs in other countries.

Limitations of the Study

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- The study is based solely on secondary data; therefore, it depends on the accuracy of published information.
- As the Digital Rupee is still in the pilot phase, comprehensive empirical data on long-term impact is limited.
- Rapid technological and regulatory changes may affect the relevance of certain findings over time.

Need and Significance of the Study

The massive popularity of UPI is a testament to India's shift towards digitalisation and a base for growth in the usage of the Digital Rupee. The mass appeal of UPI has also enabled dominating foreign players in the UPI space – such as Google Pay, Walmart-backed PhonePe and Amazon Pay – to enter the digital currency space. India is a developing nation with majority of the population residing in rural areas. It has been battling with the challenge of financial inclusion. This leads to much of the population having no bank accounts as they lack financial literacy as well as infrastructure. The lack of infrastructure, poor connectivity and socioeconomic barriers are the major contributors to the low financial inclusion of rural people. As per RBI reports, India's financial inclusion index is 56.4% as of March 2022. The Digital Rupee can be introduced in rural areas to bridge this gap as digital currency does not require fully functional bank accounts and it works offline, thereby boosting inclusion. Printing, distributing and securing cash involves a substantial cost for the government as well as financial institutions. The expenditure for printing currency notes between April 2021 and March 2022 was Rs. 4,984 crore (US\$ 596.67 million), as per RBI reports. COVID-19 offered a prime example of cash mismanagement as cash was held as a precaution for the ongoing challenges during that period. With the introduction of Digital Rupee, the costs involved reduce significantly and the need for holding physical cash diminishes. Additionally, it plays a big role in reducing the environmental issues that are caused in the process of printing and transporting cash. The scope for fraud and money laundering is reduced as each transaction can be tracked and recorded.

Key Features of e-Rupee Transactions

- **Instant Settlement:** Finality of settlement is assured instantly, unlike UPI which may involve bank, clearinghouse, and settlement delays.
- **Offline Functionality:** The system supports transactions without active internet connectivity.
- **Anonymity:** Designed to mirror the privacy of physical cash for day-to-day transactions.
- **Transaction Fees:** Generally free for individuals, with potential nominal charges for merchants, aiming to be as cost-effective as physical cash.
- **Exchange Rate:** 1 Digital Rupee (e₹) = 1 Indian Rupee (₹).
- **Transaction Limits (Retail):** While pilot-based, daily transaction limits are typically high (up to ₹2,00,000 in some cases), though some banks may apply specific caps.
- **Usage:** Used through a dedicated e₹ wallet, allowing QR code scanning for payments

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Key Types of e-Rupee

The RBI has implemented two distinct versions to serve different financial needs:

- **Retail (e₹-R):** Designed for the general public, including individuals and businesses, for everyday transactions like shopping or sending money to friends.
- **Wholesale (e₹-W):** Restricted to select financial institutions for high-value interbank settlements and government securities transactions.

Core Features & Benefits

- **Trust and Safety:** Issued by the RBI, it offers the same level of trust and finality of settlement as physical cash.
- **Digital Wallet:** Stored in a digital wallet provided by participating banks; it does not require a bank account for the transaction itself to occur.
- **Interoperability:** Users can scan existing **UPI QR codes** to make payments using their e-Rupee wallet.
- **Programmability:** The government is piloting "programmable" e-Rupee for specific purposes, such as food subsidies, where tokens can only be redeemed for their intended use.
- **No Interest:** Similar to physical cash, funds held in an e-Rupee wallet do **not earn interest**.
- **Participating Banks:** Major banks including SBI, ICICI Bank, Yes Bank, IDFC First Bank, Bank of Baroda, and Axis Bank are participating in the pilot.

Table 2.1: Comparison: e-Rupee vs. UPI vs. Cryptocurrency

| Feature | E-Rupee (CBDC) | UPI | Cryptocurrency (e.g., Bitcoin) |
|-------------------|-------------------------------|-------------------------------------|--------------------------------|
| Nature | Digital form of physical cash | A payment system for bank transfers | Decentralised private asset |
| Issuer | Reserve Bank of India (RBI) | Commercial Banks/NPCI | No central authority |
| Settlement | Instant between wallets | Bank-to-bank settlement | Blockchain-based verification |
| Value | Fixed (Stable 1:1 with INR) | Linked to bank balance | Highly volatile |

Source: www.rbi.org.in

How to Use e-Rupee

1. **Download App:** Install the official Digital Rupee app from a participating bank (e.g., SBI, ICICI, HDFC).
2. **Register:** Link your mobile number and set up a secure 6-digit Wallet PIN.
3. **Load Tokens:** Move funds from your linked bank account into your digital wallet. You will see digital tokens in denominations like ₹10, ₹50, and ₹500.

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4. **Transact:** Use "Scan & Pay" for merchants or enter a mobile number for person-to-person (P2P) transfers.

Table 2.2 CBDC Pilot Banks and name of the App

| Sl No | Pilot Banks | Name of the App |
|-------|---------------------|--------------------------------|
| 1 | SBI | eRupee by SBI |
| 2 | ICICI Bank | Digital Rupee By ICICI Bank |
| 3 | IDFC First Bank | IDFC First Bank Digital Rupee |
| 4 | YES BANK | Yes PAY Next |
| 5 | HDFC Bank | HDFC Bank Digital Rupee |
| 6 | Union Bank of India | Digital Rupee By UBI |
| 7 | Bank of Baroda | Bob World Digital Rupee |
| 8 | Kotak Mahindra Bank | Digital Rupee by Kotak Bank |
| 9 | Canara Bank | Canara Digital Rupee |
| 10 | Axis Bank | Axis Mobile Digital Rupee |
| 11 | IndusInd Bank | Digital Rupee by IndusInd Bank |
| 12 | PNB | PNB Digital Rupee |
| 13 | Federal Bank | Federal Bank Digital Rupee |
| 14 | Karnataka Bank | Karnataka Bank Digital Rupee |
| 15 | Indian Bank | Indian Bank Digital Rupee |
| 16 | IDBI Bank | IDBI eRupee |
| 17 | UCO Bank | UCO Digital Rupee |
| 18 | Bank of Maharashtra | eRupee by Bank of Maharashtra |
| 19 | Bank of India | Bank of India Digital Rupee |

Source: www.rbi.org.in

Benefits of CBDC

Promote a cashless economy

Precautionary cash holding during COVID-19 and the anonymous nature of cash transactions led to a rapid increase in cash usage during 2021–22. The introduction of CBDC with conditional anonymity will boost cashless transactions and thus be a step towards promoting a cashless economy.

Boost payment innovation

CBDC can serve as a platform for payment innovation and provide diverse options to consumers. It is also free from credit and liquidity risks and hence removes barriers for firms to innovate new capabilities.

Curb money laundering

There is often a concern about privately issued digital assets and a sizable share of the population transacting, holding and trading in such assets. Unlike cryptocurrencies, CBDC is less vulnerable to volatility and instability, thus safeguarding individual rights.

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Reduce operational costs and help achieve ESG goals

The cost of cash management in India has been immense. The expenditure incurred on printing between April 2021 to March 2022 was INR 4,984 crore – a figure that excludes the ESG impact. Apart from the high printing costs, it should be noted that the Government of India subsidises the usage of UPI. The introduction of CBDC will ease the pressure on the government in terms of printing, distribution, and storage of currency, and also contribute to India's ESG goals by helping reduce the carbon footprint.

Simplify securities settlement

Government securities can be settled using wholesale CBDC in India through a process known as delivery versus payment (DvP) settlement. DvP settlement is a mechanism used to ensure that the delivery and settlement of securities occur simultaneously. In India, the RBI has launched a pilot wholesale CBDC called the 'Negotiated Dealing System-Order Matching (NDS-OM) CBDC' which allows banks to buy or sell government securities.

Status of CBDC transactions in India

As of early 2026, India's Central Bank Digital Currency (CBDC) or "Digital Rupee" (₹) has expanded significantly, with the retail pilot covering over 82 lakh (8.2 million) users and 11 lakh (1.1 million) merchants. The system is now interoperable with the Unified Payments Interface (UPI), allowing users to scan any UPI QR code for transactions.

Key Status and Features (2025-2026):

- **Expansion:** The retail ₹-R pilot is active with 16-19 participating banks, including SBI, ICICI Bank, and HDFC.
- **Transaction Volume:** In 2025, the digital rupee in circulation rose significantly to ₹10.16 billion (\$122 million), making it the second-largest CBDC pilot.
- **Interoperability:** A major milestone includes the ability to use ₹ wallets to pay at UPI-enabled merchants.
- **Functionality:** The RBI is actively testing offline functionality to enable transactions in remote areas without internet access.
- **Wholesale (₹-W):** The wholesale pilot continues to facilitate interbank transfers and settlement of government securities.
- **Programmability:** The RBI is exploring programmability, such as for Direct Benefit Transfers (DBT) to ensure funds are used for specific purposes.

Conclusion

The Central Bank Digital Currency represents a significant milestone in India's digital financial transformation. With strong institutional backing from the Reserve Bank of India and integration with existing digital infrastructure such as UPI, the Digital Rupee has the potential to revolutionise India's payment ecosystem. It promotes financial inclusion, reduces operational costs, enhances transparency, and supports sustainable economic development.

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Thus, CBDC emerges as a modern, secure, and efficient alternative to physical currency, marking a new era in the evolution of money.

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