# Challenges and Risks for Retail Central Bank Digital Currency (CBDC) in India

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**Abstract:**

The purpose of this study is to identify the obstacles and risks associated with the implementation of a retail CBDC in India. As the world moves towards digital payments, the adoption of retail CBDCs has received a lot of attention. However, the success of the Retail CBDC implementation in India requires a thorough analysis of the obstacles. The methodology of this study will be based on a mix of qualitative and quantitative methods.This review paper provides a comprehensive overview of recent advancements in Retail CBDC, challenges such as technological infrastructure needs, adoption and awareness of users, security and fraud detection, regulatory frameworks, financial system interoperability, privacy and data protection, etc. A thorough understanding of these issues will be essential in building a strong and effective Retail CBDC eco-system in India.

The paper begins by presenting a brief background on the current status of Retail CBDC in India, The objective of this review is to study How does the digital rupee work for the retail segment in india? And also, what are the Risks and Challenges Associated with E-Rupee specifically for the retail segment? This study also aims to prepare the ground for informed decisions, regulatory frameworks and technological innovations required to unlock the full potential of digital currencies in terms of financial inclusion, transaction facilitation and economic development in India. This review paper provides a comprehensive synthesis of recent advances in retail CBDC all over the world.

**Key words: CBDC, Digital Currency, Retail CBDC**

## Introduction

The Central Bank Digital Currency (CBDC) is a potential game-changer in the world of money transactions and management. CBDC can revolutionize financial systems, enhance economic performance, and drive innovation in the digital payments space, while simultaneously raising important questions about privacy, security and financial sovereignty.

Central banks throughout the world are investigating ways to create their own digital money, central bank digital currencies (CBDCs), its backed and issued by central banks. Many central banks feel that digital currencies have the potential to increase payment efficiency and security for both domestic and cross-border transactions, as well as financial stability. CBDC has risen in reaction to payments, finance, technological developments, and Covid-19 disruptions.

Currently, 19 countries from G20 are interested in CBDC, and 16 are either in the early stages of development or piloting. The leading players in the CBDC race will be China, Taiwan, and India, with Europe and South Korea following close behind.

Different countries have different reasons for setting up a CBDC, but some of the main ones are to improve financial inclusion, increase financial stability, improve payment systems, fight against illegal activities, and make sure that the currency has a certain amount of power in a digital economy.

The purpose of this study is to speculate on how Indian digital currency might develop in the future in regards to the underlying technology and ideas of current implementations by RBI. To understand the what limitations, exist for Implementation of Indian central Bank Digital

currency and look into possible mitigation measures based on a comprehensive review of recent research. By systematically reviewing existing empirical studies, this study puts forward the state-of-the-art classification of digital Currency and its challenges.

**A. Central Bank Digital Currency in India.**

Central Bank Digital Currency (CBDC) is a "paperless" fiat money in digital form, issued and controlled by the Reserve Bank of India. CBDC (Digital Rupee (e₹)) introduced as the legal tender issued by a central bank in a digital form. It's like paper money, but it's different. It can be exchanged at the same rate as the real thing, and it's accepted as a way to pay, legal tender, and a safe way to store value.

Central Bank Digital Currency (CBDC) classified into two broad types i.e. Retail (CBDC-R) and Wholesale (CBDC-W) Currency. Digital currencies that the RBI distributed to the general public is the retail CBDC (CBDC-R) which is based on the distributed ledger technology, or DLT, and has the traits of anonymity and traceability. One prominent category of CBDC is the "Retail CBDC," which would enable individuals and businesses to make everyday transactions using a digital representation of the Indian Rupee. This form of CBDC could provide benefits like instant payments, reduced reliance on intermediaries, increased financial inclusion for underserved populations, and enhanced security measures. Retail CBDCs could function through various channels such as mobile apps, digital wallets, or even feature phone-based systems, ensuring accessibility for all sections of society.

Retail CBDC can also accessible 24 hours a day, 365 days a year. The Wholesale CBDC (CBDC-W) refers to financial institutions that carry reserve deposits with a central bank which facilitates towards improving the payments and securities settlement efficiency, as well as lowering the counterparty credit and liquidity risks.

On 1st November 2022, CBDC trial programmes for wholesale and retail were launched. The main reasons for this were to reduce operational costs associated with physical cash management; to promote financial inclusion; to bring resilience, efficiency and innovation to the payments system; to improve efficiency in the settlement system; to boost innovation in the cross-border payments space; and to provide the public with the benefits that private virtual currencies offer, without the risks.

The Digital Rupee-Wholesale (e-W) trial in the wholesale market was introduced on November 1, 2022, with the settlement of secondary market transactions in government

securities as its sole use case. The interbank market is anticipated to become more effective with the use of (e-W).

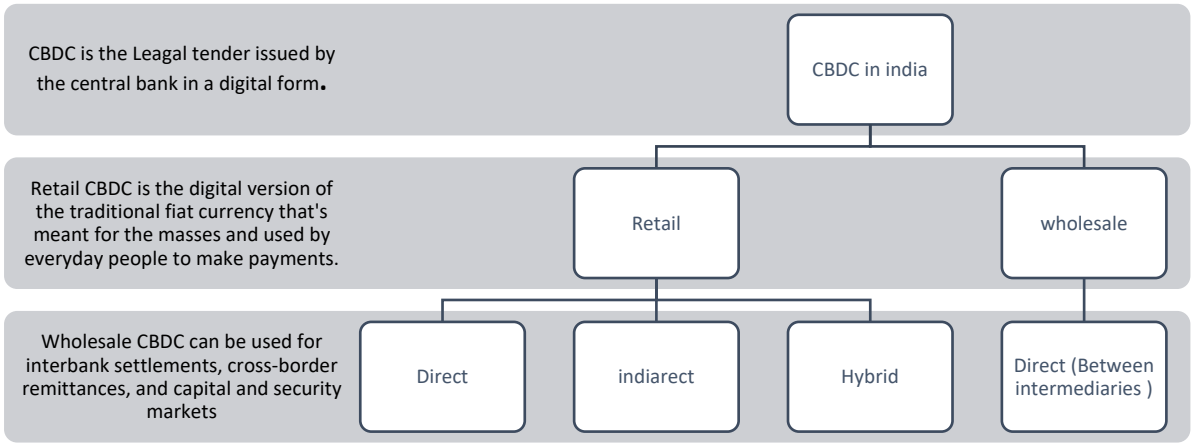
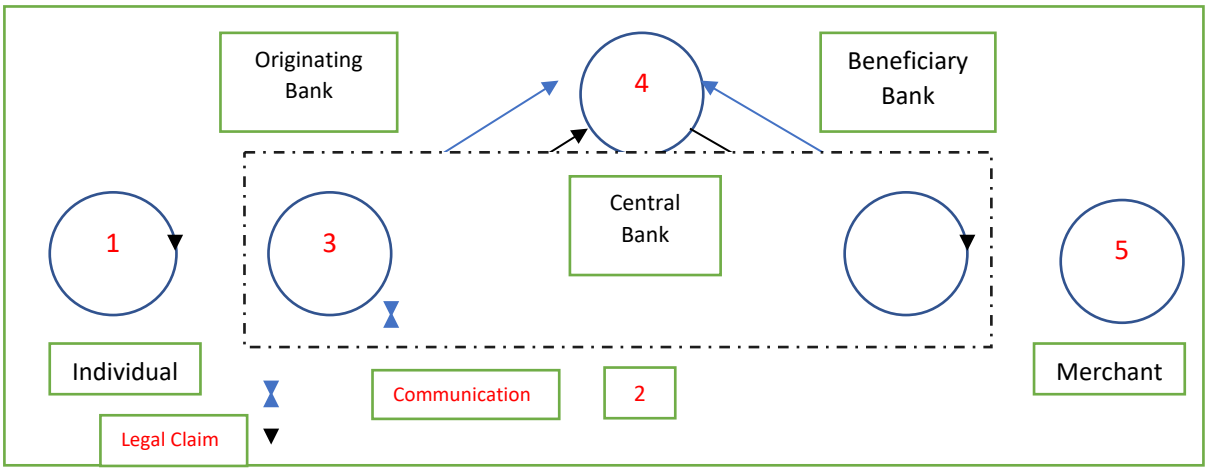



**Figure 1: Categories of CBDCs in India.**

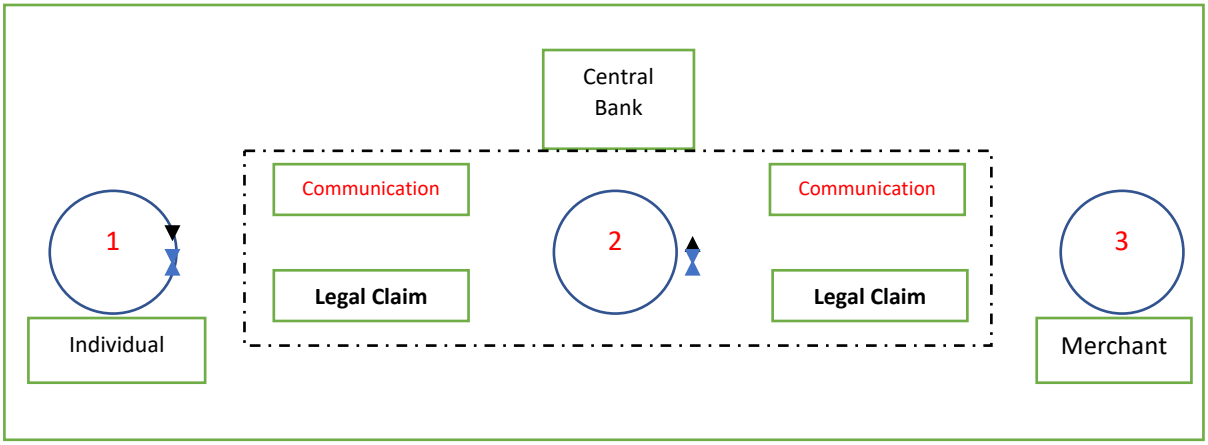



**(Source: Deloitte)**

**Figure 2: Indirect retail model**

The implementation process of the Indirect Retail CBDC model is contingent upon the design decisions, regulatory considerations, and technological capacities of each country adopting the model. The steps outlined below provide a general overview of the key elements and considerations associated with the implementation of an indirect Retail CBDC model.




**(Source: Deloitte)**

**Figure 3: Indirect retail model**

Direct retail CBDC model, which involves the issuance and distribution of digital currency directly from the central bank to end-users, bypassing intermediaries.

## Research Methodology

The research methodology for this review paper involves a systematic approach to gather, evaluate, and synthesize existing literature on a Central bank Digital currency in retail segment issued by reserve bank of India.

### Research Questions

a) How does the digital rupee work for the retail segment?

b) What are the Risks and Challenges Associated with E-Rupee specifically for the retail segment?

**Research Objectives**

The design considerations and technical requirements for implementing a CBDC in the retail sector are the primary focus of the research. Scalability, interoperability, security, privacy, user experience, and regulatory compliance are all components of this investigation. The goal of the research is to find out what a CBDC can do for the retail segment, and how it can improve transaction efficiency, lower costs, enhance financial inclusion, and offer features and functionalities not available with traditional methods of payment. The study also looks at the challenges and risks of implementing and adopting a CBDC in retail in India.

**Literature review**

In Ward, Rochemont's (2019) definition, a CBDC is a digital form of CBD that differs from the balances in a traditional reserve or settlement account. In Ozili's (2021) definition, it's a fiat digital money. In Kiffetal's (2020), it's a digital version of a government currency issued by and a liability of a jurisdiction's CBD or other monetary authority issued by the central bank. In Auer, Böhme's (2021), it's seen as a way to improve financial inclusion in emerging markets and developing economies by giving everyone access to digital payment methods. There are several reasons why you might want to issue a CBDC. As per study by Bordo,Levin, 2017 support unconventional monetary policy (Engert,Fung, 2017) the need to preserve financial stability. According to Ozili (2023) a review of CBDC literature, many central banks are exploring the possibility of issuing a CBDC because of its many advantages, but some studies have I warned against over-hyping the benefits of CBDC because CBDC design is inherently limited and unable to achieve multiple competing objectives. Khando(2023) The foundation for Financial Inclusion is The interplay between finance and technology with the use of the internet which triggered the emergence of digital payment technologies. Arghanshu Bose(2022) In India, the digital Rupee for wholesale segment was launched on November 1, 2022. This Rupee is mainly used by the banks to settle the transactions in the secondary market in government securities. The retail version of the Rupee can be used by the end user to transact on a daily basis. Peterson K. Ozili (2023) I explained that the consensus was that a CBDC was a liability for the central bank and had some cash-like attributes.

**Retail CBDC**

Vassilios G. Papavassiliou (2021) explained CBDCs will make it easier to make international payments than domestic ones. They'll have lower transaction and storage fees, as well as more transparent and reliable payment solutions. According to Neena Gupta(2023), Retail CBDCs will also cut down on the amount of time it takes to process payments and reduce the amount of time money is stuck in pre-paid nostro accounts. Matthieu Saint Olive (2020) a CBDC can only be a game-changer for the payment sector if the CBDC is constructed as an open, shared infrastructure that the private sector can easily build on. According to D. Prayadarshini (2021), the conceptual challenges can be divided into three categories: monetary sovereignty, national sovereignty and developmental challenges. Monetary sovereignty issues, issues from the point of view of national sovereignty, and developmental issues also analyse these issues from the perspective of the rapid digitalization taking place in India. Debesh Bhowmik(2022) discusses several analytical frameworks of CBDC monetary policy options developed by several economists involved in the study of CBDC issues, designs and applications, some of which positive effects are yet to be seen.

In India the RBI has proposed two structures for CBDC: token-based and account-based. Token System Preferred For Retail, Account System For Wholesale. RBI: Report on Currency and Finance (2020-21).

**Risks and challenges**

Implementing a Retail Central Bank Digital Currency (CBDC) in India would come with various risks and challenges. Some of the key considerations include:

a) **Accessibility and privacy:**

A digital currency, CBDC will leave a digital footprint and a transparent audit trail. The issue is that it might result in privacy invasion and abuse by government organisations. The RBI has tried to allay this worry by claiming that they are working on ways to make CBDC comparable to actual currency in terms of anonymity.

There are also additional risks for central banks, especially around payment failures due to technology failure or cyberattacks giving rise to country-wide systemic risk.

b) **Privacy and Consumer Protection:**

A CBDC, particularly if issued at the retail level. If a CBDC were to be implemented at retail level, it would represent a significant threat to consumer privacy and protection. What would

prevent a CBDC from being used as a weapon against citizens or to prevent the blocking of legitimate transactions by undesirable groups?

c) **Regulate the activity not the technology:**

Most regulators agree that the financial activity should be regulated, not the technology.There is need of making a policy for regulating the activities related to blockchain, artificial intelligence and quantum computing.

d) **Cyber-attacks:**

Cyber-attacks from various state and non-state players is the major risk in CBDC ecosystem the regulators need to make Strong cybersecurity practices and control protocols would need to be established to ensure that potential cyber-attacks can be prevented.

e) **Business Continuity and Resiliency:**

After a cyber-attack, the question is how resilient is the system to bounce back and get back up and running as soon as possible after the attack. Long hours of downtime will damage the public's trust and confidence in CBDCs.

f) **Eliminates the Goal of Decentralization:**

The primary purpose of blockchain is to create a decentralized system and allow free distribution without any monitoring or control by any regulator or governing body. However, this is not the case with CBDCs as they are issued, managed, and tracked by the RBI.

g) **Online Fraud and Data Breaches:**

The potential risk for online fraud and data breaches can be easily possible in CBDC ecosystem which can become a major hurdle for widespread adoption of Retail CBDC. This will help in building the confidence and trust of consumers to use CBDC. RBI needs to ensure a consumer protection is at the forefront of these DBDC ecosystem. This will help in building the confidence and trust of consumers to use retail CBDC.

Technological Infrastructure: Building a strong and secure technological infrastructure for a national CBDC system requires a robust and scalable platform that can handle high transaction volumes, fast and efficient processing, and a smooth user experience.

**h) Financial Inclusion**

The CBDC is all about financial inclusion, but making sure everyone has the same access to digital currency, even if they don't have a smartphone or internet, is a challenge. We need to take steps to close the digital divide and give people other ways to use and access the CBDC.

**i) Monetary Policy and Financial Stability:**

The introduction of a central bank digital currency (CBDC) could have a knock-on effect on monetary policy. Central banks must carefully assess the impact of a central debase on interest rates and money supply, as well as on the overall functioning of the economy. Monetary authorities and policy makers need to work closely together to mitigate potential risks and maintain financial stability.

The implementation of a retail-centric E-RUPEE system could present unique challenges that are specific to the retail industry. Below are some of the potential challenges that may arise with retail E-RUPEEs:

**a) Merchant Acceptance:**

Encouraging widespread acceptance of E-Rupee by retail merchants might be a challenge. Retail merchants will need to invest in setting up digital payment solutions, such as point-of-sale (POS) systems and mobile terminals. They will also need to deal with non-cash customers and ensure that they can make E-Rupee payments at various retail outlets.

**b) User Experience:**

An E-Rupee retail system would be successful if it provides a smooth and easy-to-use experience for the retail customers. Retail E-Rupee systems should be user-friendly, intuitive, and easy to navigate. The system should also provide fast and efficient payment processing. A cumbersome or complex user experience may discourage customers from using e-Rupees for their retail transactions.

**c) Interoperability with Retail Systems:**

Retailers will need to make sure that E-RUPE payment solutions are compatible with their inventory management system, accounting system, and CRM system. A seamless integration would make operations easier and promote adoption among retailers.

**d) Customer Support:**

E-Rupee customer support would be essential for user trust. Retail customers would want to know that they can get help quickly if they face any issues during the E-Rupee payment process or if they are victims of fraud.

**e) Incentivizing Adoption:**

Offering discounts, rewards, or exclusive deals for E-Rupee transactions could motivate customers to adopt the digital currency for their retail purchases. Implementing such incentive programs and ensuring their effectiveness would be important to drive adoption.

## Conclusion

The potential use of a Retail Central Bank Digital Currency (CBDC) in developing country like India can bring about several benefits and opportunities like engaging with global financial institutions, technology providers, and regulatory bodies can help leverage expertise, share best practices, and ensure interoperability with international payment systems. . A retail CBDC in India could be a game-changer for the country's financial ecosystem. Implementing a CBDC in India would present challenges in terms of technology infrastructure, user acceptance, security and regulatory framework, but it could also bring a host of advantages.

Suggestions aim to highlight the potential benefits of Retail CBDCs in developing countries and provide a starting point for exploring their use. However, local stakeholders and policymakers should conduct thorough assessments, feasibility studies, and consult with relevant experts to design and implement a Retail CBDC that aligns with their country's specific goals and requirements.

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