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Understanding Central Bank Digital Currency in India: Assessing its Implications for Commercial Banks

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Abstract

The evolution of Central Bank Digital Currencies (CBDCs) is a paradigm shift in the global financial panorama. Through the Digital rupee (e₹) initiative of Reserve Bank, India is actively exploring its own model. Backed by State, CBDC aims to enhance efficiency of payment by reducing reliance on physical currency and foster financial inclusion. However, this emergence of CBDC raises significant questions about its impacts on commercial banks which traditionally serves as the backbone of the financial system of a Country through its exclusive functions of deposit mobilization, credit creation and facilitation of payments.

This paper examines the impact of CBDC adoption on commercial banks in India. It explores how the Digital Rupee may affect the deposit base, management of liquidity and profitability of banks. Analyzing global experience such as Bahamas' SandDollar, Nigeria's eNaira, European eEuro, etc., the paper contextualizes the Indian approach within a comparative framework.

The findings aiming contribution to the current discourse on digital money and stability of banks and offering suggestions for regulators and financial institutions to navigate this emerging landscape.

Keywords: CBDC, Reserve Bank of India, E- Rupee, Commercial Banks, Digital Currency.

1. INTRODUCTION

A remarkable transition of payment from barter to coins, paper currency and most advanced digital currency, has been witnessed by the world economy. The rise of technology in the field of digital currencies introduced cryptocurrencies like Bitcoin, which lacks in regulatory authority, the central banks across the globe started exploring sovereign- backed digital currencies to ensure economic stability in the digital era. Central Bank Digital Currency (CBDCs) have evolved as a regulated response to the risks caused by

rivate virtual currencies. Countries like eYuan of China[1], SandDollar of Bahamas[2], eNaira of Nigeria[3],etc., have already developed CBDCs, showing a global shift towards digital currency ecosystems.

The Reserve Bank of India (RBI) introduced the Central Bank Digital Currency in India popularly known as Digital Rupee or eRupee (e₹). Finance Minister Nirmala Sitharaman had announced the launch of CBDC from FY 2022-23 onwards in the Union Budget placed in the parliament on February 01, 2022.[4] The RBI has launched pilot projects in December 2022, for CBDC- Retail i.e. for individuals consumers and business and CBDC- Wholesale i.e. for inter-bank settlements and financial institutions. The motivation behind launching of CBDC is a secure and alternative to cash which aims to strengthen the payment ecosystem and reducing dependency on physical currency.

However, these innovation raises significant concerns for the traditional banking sector in India. The introduction of CBDC in economy could potentially effects the functioning of mobilizing credits, extending credits and managing payment systems. Understanding these critical implications is significant to ensure that CBDC must complements rather than disrupts the stability and profitability of commercial banking system of India.

1.1 Literature Review

a) ML Tannan (2021)- The book gives the conceptual understanding of Central Bank Digital Currency. A currency, which is different from other currencies like crypto and similar to physical bank notes.
b) Concept note on CBDC (2022)- RBI published a detailed note on CBDC and its application process in India. It highlighted the motivation and objectives behind the introduction of CBDC in India.
c) Olayinka David-West (2023)- This research aimed at analysing the progress of Nigeria's eNaira. Highlighting the impacts of intermediate model of CBDC, which intact the commercial banks with this new digital money technology.
d) HaiChen Bai, Lin William Cong (2025)- This research work analyses the use of Chinese digital currency e-Yuan in retail market. Evidence shows that individuals in China is still using the existing electronic payments app such as AliPay and WeChat pay.

1.2 Objectives and Scope of the study

- To understand the concept of Central Bank Digital Currency (CBDC) and how it is different from other online modes of payment like UPI, Net Banking, etc.
- To analyse the application of CBDC in India.
- To understand the advantages of CBDC.
- To analyse the implications of CBDC on commercial banks in India.
- To suggest the measures for mitigating the risk of CBDC on commercial banks.

1.3 Limitations of the study

- It does not analyse the overall implication of CBDC on the Indian economy.
- It is limited to the implications on commercial banks and does not include NBFCs, or other financial institutions.

[1] HaiChen Bai, Lin William Cong, et. al., Adoption of Central Bank Digital Currency: Initial evidence from China, https://www.sciencedirect.com/science/article/abs/pii/S0929119925000033, 2025.
[2] Digital Bahamian Dollar, https://www.sanddollar.bs
[3] Jack Ree, Five Observations on Nigeria's Central Bank Digital Currency, https://www.imf.org/en/News/Articles/2021/11/15/na111621-five-observations-on-nigerias-central-bank-digital-currency
[4] India – One of the pioneers in introducing CBDC, https://ibef.org/blogs/india-one-of-the-pioneers-in-introducing-cbdc

1.4 Research Methodology

This paper adopts a doctrinal and analytical approach . The study uses data such as reports of RBI and other global studies on CBDC. Other international models of CBDC are also analysed and assess its implication on the commercial banks of India and to suggest the measures for mitigating the associated risks.

1.5 Research Questions

Whether Central Bank Digital Currency has certain implications on the commercial banks of India which can be mitigated through adequate measures by Central bank?

2. Meaning and concept of CBDC

CBDC is a digital form of bank note issued by a central bank which accounts the same use as of traditional physical bank note but in a digital form. From buying daily groceries to paying for a heavy transaction, this digital currency holds the same value as any other payment form. The Rs. 500 digital bank note is as valuable as Rs. 500 of physical bank note in our pocket. "CBDC is a new form of money that exists only in digital form. Instead of printing money, the central bank issues widely accessible digital coins so that digital transactions and transfers become simple."[5]

Unlike the other forms of digital currencies such as Bitcoin, CBDC is a legal tender issued by a central bank of a country in a digital from. Legal tender of currency means, when the law of a country recognizes a form of money as an official medium of payment and it is accepted for the settlement of debts and financial obligations within that country for e.g. physical bank notes. CBDC is as similar as bank notes but in digital form i.e. when a person is required to pay for goods or services, he must need an electronic device to settle digital payments such as mobile phone, unlike the physical hard cash. CBDCs can help attain financial stability, financial inclusion, easy cross- border payments and enhance financial stability by providing a resilient and secure payment system.[6]

3. Application of Central Bank Digital Currencies in India

One of the important functions of RBI is the management of currencies in India. RBI is responsible and empowered too, for designing, production and overall management of currencies.[7] "To meet the demand of the day, RBI and central government are leading the payment system of India towards the digital development. RBI introduced CBDC system in 2022, as pilot project, for general public. With some restrictions, currently people started using digital rupee for their financial transaction. In 2025, 6 million users are currently using the CBDC pilot project in India."[8]

There are two types of CBDC issued in India, a) CBDC- R, for general purpose of retail which means general public can use it for payments, and b) CBDC- W, for settlement for interbank transfers.[9]

RBI has started indirect model of CBDC for now in India. CBDC has two models[10], a) direct model- where the central bank will be responsible for managing all aspects of CBDC system viz. issuance, keeping of

[5] Central Bank Digital Currency, https://www.edps.europa.eu/press-publications/publications/techsonar/central-bank-digital-currency_en
[6] M L Tannan, Banking Law & Practice in India, Lexis Nexis, (28th ed.), 2021.
[7] Sec. 22 of Reserve Bank of India Act, 1934.
[8] India CBDC Tracker, https://cbdctracker.hrf.org/currency/india
[9] Concept Note on CBDC, https://rbidocs.rbi.org.in/rdocs/PublicationReport/Pdfs/CONCEPTNOTEACB531172E0B4DFC9A6E506C2C24FFB6.PDF
[10] Ibid.

account and verification of transactions, other model is, b) Indirect model, which is as similar as physical currency management system wherein other commercial banks serves as intermediaries between RBI issued bank notes and distribution among general public. In the annual report of 2025[11], RBI revealed that it has issued (Quantity) 494.1 Lakh eRupee (digital bank note) containing total value of 1,016.5 Crore.

After announcing of CBDC's indirect model, many commercial banks have developed mobile apps for accessibility of e-rupee, for e.g. eRupee by SBI, Bank of Baroda Digital Rupee, eRupee by Bank of Maharashtra, PNB Digital Rupee, Digital Rupee by ICICI, HDFC bank Digital Rupee, Digital Rupee by IndusInd bank, Digital Rupee by Union Bank of India, etc., any person having bank account, can download their respective bank's app for Ios or Android mobile phones and use the digital rupee for payments.

3.1 How to pay and receive digital rupee

To pay and receive digital bank notes-

Step 1- the payer and payee must have e- wallets with them which means- if A has to pay a 500rs digital bank note to B, firstly both the parties must download and register on the Digital rupee app.

Step 2- generate the unique secure PIN no. as we do in UPI transactions.

Step 3- then A has to load money in his e- wallet through his bank through net banking or UPI transactions.

Step 4- now, A has two options, either a) to scan the QR code of B, or b) by entering the registered phone number of B.

Step 5- then select the bank note to transfer, click on pay and enter PIN number.

B will receive the payment of 500rs digital bank note in his e- wallet.

That's how the payment and settlement process completed in CBDC payment system.

3.2 How CBDC is different from other digital modes of payment

a) **CBDC and Cryptocurrencies-**

Cryptocurrencies such as Bitcoin, Dogecoin, Wink, etc., are decentralized currencies which means they are not controlled by any single and sovereign authority whereas CBDC is centralized and usually controlled by the central banks of the country. Cryptocurrencies are considered as a Virtual Digital Assets (VDA)[12] and not as proper currency, you can buy or sell cryptos, however, it is not so in the case of CBDC, it is a legal tender in India and considered as currency with same value as physical bank notes. Cryptos are not the recognized and legal form of payment in India, but the digital rupees are.

b) **CBDC and UPI-**

While the CBDC is a digital version of a country's national currency that is issued and controlled by the central bank, UPI (Unified Payments Interface) is a real- time payment system that allows individuals to instantly transfer money between bank accounts using their mobile devices.[13] UPI is a kind of process of transfer money from one bank to another using a third party app such as Google pay, Paytm, Phone Pay, etc., but Digital rupee is in actual a currency and a digital bank note is transferred from payer to payee, here, no bank account, as such in UPI transaction, is involved.

[11] Annual Report 2024-25, https://rbidocs.rbi.org.in/rdocs/AnnualReport/PDFs/0ANNUALREPORT202425DA4AE08189C848C8846718B080F2A0A9.PDF

[12] Section 2(47A) of Income Tax Act, 1961; Ashish Deep Verma, Cryptocurrency in India: A Guide to Taxation and Compliance in 2025, https://www.barandbench.com/view-point/cryptocurrency-in-india-a-guide-to-taxation-and-compliance-in-2025, Bar and Bench, 2025

[13] Difference Between Central Bank Digital Currency (CBDC) and UPI, https://paytm.com/blog/digital-currency/difference-between-central-bank-digital-currency-cbdc-and-upi/

c) **CBDC and Net banking, Cards, NEFT, RTGS, IMPS-**

In Net banking, credit and debit cards, NEFT, RTGS, IMPS, the money transfers from one bank account to another. Unlike the UPI, no third-party app is required in these transactions, all aspects of these transfers are managed by the banks themselves. But in CBDC, e-wallets are involved and what transfers is not only the value but the actual bank note in digital form.

3.3 Advantages of CBDC-

There are different primary reasons given by different countries behind the acceptance of CBDC in their financial systems. Sweden seeks to popularize a more acceptable electronic form of currency for less use of paper currency, other countries like Denmark, Germany, Japan and USA seeks to make issuance of currency more efficient, and owing to their geographical conditions, countries like Bahamas and Caribbean wants the easy movement of currency notes.[14] Following are the primary advantages of CBDC in context of India-

a) Instant and secure payments- CBDC facilitates secure and real time payments which reduces the time and costs associated with both domestic and once fully developed, cross border transactions. There are no extra charges applicable in transferring of digital bank notes.

b) Financial inclusion- RBI is developing transfer method of CBDC without using internet. Once developed, it will include all of the population who, either does not have bank accounts or proper network connectivity. Over 20% of Indian population still lacks in proper mobile data internet connectivity[15], the offline technology will have the potential to include much of them. The Bank of Ghana is set to roll out the retail version of its CBDC, the eCedi, by the end of 2025, developing for offline payment to include it 47% lacking internet population.

c) Lower the costs of generating and managing physical currency- Cost of printing of currency as disclosed by RBI in 2025[16] is ₹6,372.8 crore as against ₹5,101.4 crore during the previous year. This 25% increase in the cost was mainly caused by a higher indent for printing banknotes. It is to be noted that this cost is only of printing the bank notes, it excludes the cost of handling, managing, transporting, man power, etc. The digital rupee will help in saving or atleast reducing this cost.

d) Reduced fraud and illicit activity- CBDC will improve the transparency and traceability of transactions. Every digital bank note contains a unique serial number similarly as on physical bank note, which will make the payment traceability much easier and will help in identifying any illicit payment activity carried through digital money.

e) Help in lowering counterfeited bank notes- 2,17,396 counterfeited bank notes (Quantity) were found and reported to RBI.[17] Counterfeited notes are very harmful for the economy of a Country. Through digital bank notes, this problem could be resolved. There will not be any medium to generate counterfeit digital bank notes.

Overall, CBDC aims to push payment structure of India towards more efficiency, inclusivity and secure while fostering innovation and developing digital policy initiatives.

[14] Supra note 9.
[15] Digital 2025: India, https://datareportal.com/reports/digital-2025-india
[16] Supra note 11.
[17] Ibid.

4. Implications of CBDC for Commercial Banks in India and Suggestions with comparative lessons

The introduction of CBDC is set to impact the roles of commercial banks in India. While it offers efficiency, transparency, inclusion, cost saving, etc., it also raises concerns about the deposits, liquidity and customer relationships. Analyzing the implications is vital to assess the future functioning of commercial banks and take learnings from other central banks' systems is crucial.

a) Deposit base and risk of disintermediation-

When general public starts using CBDC's e- wallets, the fund will move from bank accounts into RBI held e-wallets and this movement could result in low deposits in banks which will reduce funds available for lending. This is an alarming situation for funding and profitability also on overall business of a bank. Moreover, the profit earning through ecosystem of financial business of banks from UPI and cards will also get hampered. To fulfill the business demands, banks may lend the money on higher rate of interest to general public, small businesses, etc., which will impact the growth of the nation.

To deal with this situation, many central banks designed two- tiered or intermediated models to limit direct deposit outflows. Right now, what RBI is introduced as pilot project is intermediated model, where banks are functioning as intermediaries. RBI may introduce, where RBI will give its own e-wallet without any intermediary bank. Nigeria[18] and Bahamas use this intermediated distribution model to keep other commercial banks engaged and reduce disintermediation.

b) Liquidity management & systemic stability-

Frictionless transfers of money to CBDC e- wallets could make deposits more "runnable"[19] in emergency situations. It will increase the needs of short-term liquidity of the bank. For instance, if there is a rumor of failure of a bank and the depositors start withdrawing their money, the faster mode of CBDC allows depositors to withdraw to their e- wallets very easily. Earlier it takes time to withdraw money through availability of cash, cash queue, NEFT/ RTGS. It is appropriate here to argue that this faster withdrawal can also be done through UPI or Net Banking, but in that case the money will get transferred from one bank to another which means it will remain in the system, however, in case of CBDC e- wallets the money will be held in the wallets and does not remain in the system and neither RBI nor any other bank can take the money back to bank accounts without the consent of the depositors.

To handle this situation, it is appropriate to impose holding limit on e- wallet for individuals. Right now, there is no limit given in any law in India, to hold a maximum physical bank notes by an individual. A person can possess as much cash as he wants with him provided the source of that money is legal. But this approach in CBDC may face adverse implications. The European Central Bank has put a limit of €3,000.00[20] Digital Euro to be hold by an individual in its e- wallet. Sand Dollar of Bahamas introduced two tier wallet system[21], Tier I wallets have $1,500.00 monthly transaction limit and Tier II wallets have an $10,000.00 transaction limit, similarly Nigeria's eNaira adopts four types of wallet system[22] viz. Bronze, Silver, Gold and Platinum wallet, with different holding and daily transaction limits.

[18] Olayinka David-West, CBDC Field Research Insights: Nigeria's eNaira: Enabling Possibilities, "https://www.imtfi.uci.edu/research/2022/cbdc_nigeria_david-west

[19] When deposits can be withdrawn on demand by depositors, making them susceptible to sudden large-scale withdrawals- often termed as "bank runs".

[20] Know your (holding) limits: CBDC, financial stability and central bank reliance, https://www.ecb.europa.eu/pub/pdf/scpops/ecb.op326~d5c223d9b4.en.pdf

[21] Individual, https://www.sanddollar.bs/individual

[22] Your eNaira Wallet is in your control, https://enaira.gov.ng/for-individuals/

Currently, authorised commercial banks for eRupee pilot project have developed the practise of putting limit on holding. A person can hold maximum of one Lakh digital rupees in its CBDC e- wallet with a maximum limit of 10,000.00 rupees per transaction. RBI should consider developing the holding limit system further.

c) Operational and Compliance costs (Cybersecurity, privacy)-

When commercial banks will acts as the intermediaries, they have to bear additional costs for development of the infrastructure for CBDC. The cost includes for onboarding, KYC, AML, Cybersecurity, etc. These costs will not be much effective for large cap banks, but for mid and small size banks will face the costs issues. RBI to guide and support other small size and mid-size banks to be in the system of CBDC, so that they should not be left out from the new development.

d) Financial inclusion and reach-

The advancement of CBDC might result in effective offline capable e- wallets, but may pose risks of bypassing banks and weaken the branch- based inclusion efforts. A coordinated approach can use the outreach network of banks while extending CBDC to remote population. If the developed offline mode of operating CBDC that too bypassing the commercial banks, will make the branches of banks situated in remote areas less functional. RBI to include the commercial banks in development of offline CBDC network.

e) Increased competition for deposits-

To retain customers and maintain their deposits, banks may offer high interest rates. These increased interest rates will affect the profitability and net interest margins, resulting in high interest rates on lending. Banks may choose to impose high rates of interest on loans providing to general public or businesses.
Addressing this concern, to reform in monetary policy tools such as repo rate, CRR, SLR, bank rate, etc. which will create a balance between profitability of banks and inflation in the economy. RBI, in its pilot projects does not introduced interest on keeping money in e- wallet and it should not be done in the future and should encourage people to deposit extra money in the bank account.

5. Conclusion-

The introduction of CBDC in the world and in India represents a transformative step towards development of money and payment system. The RBI piloted Digital Rupee or eRupee or e₹, marked a significant step in the Indian economy. RBI claimed the potential of CBDC in enhancing efficiency, transparency and inclusion in the financial system. However, its anticipated implications on other commercial banks are concerning. The CBDC has the potential to alter traditional functions of the banks such as deposits mobilizing, extending credit and managing payment systems. International experiences from European Bank, China, Bahamas, Nigeria, etc., highlights both risks and its mitigation strategies, including limits, intermediated distribution model, tiered interest rates, etc. While application of CBDC in Indian economy, safeguard the interest of commercial banks is paramount. This will require a calibrated approach i.e. to increase its application gradually, that balances innovation and prudence. The ultimate success of CBDC will depend upon how effectively RBI manages the transition and ensures complementarity rather than conflict between CBDC and commercial banks in financial ecosystem of India.