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A Study on the role of CBDC in transforming the Indian Digital Economy

A Project Submitted to

University of Mumbai for partial completion of the Degree of

Bachelor of Arts

Under the Faculty of Arts

Paper XV(INDIAN FINANCIAL SYSTEM)

Semester VI/ TYBA (Economics)

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2022-2023

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Certificate

This is to certify that Mr. Aaron Alex Luke has worked and duly completed his project work for the degree of Bachelors in Arts (Majors in Economics) under the faculty of Arts in the subject of Indian Financial System Semester VI and his project is entitled as ‘A Study on the role of CBDC in transforming the Indian Digital Economy.’ I further certify that entire work has been done by me under the Guidance of Professor Shivangi Tripathi. I have put enough effort to make my project precise. I recommend my project for evaluation.

Certified by:

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Name and Signature of the Professor:

Acknowledgment

I would like to express my special thanks of gratitude to my research supervisor, Professor Shivangi Tripathi, Department of Economics, for giving me the opportunity to do the research and providing invaluable guidance throughout the research. She has taught me the methodology to carry out the research and to present the research work as clearly as possible. It was a great privilege and honor to work and study under her guidance. I am extremely grateful for what she has offered me.

I would also like to extend my gratitude to the Founder sir Prof. Asgar E. Lakdawala for providing me with the facility that was required.

Thanks of course to my family for their support.

Abstract

India has made magnificent progress towards innovation in digital payments. CBDC is a currency in digital form that is issued by a central bank. CBDC is a sovereign currency that holds unique advantages of central bank money ie trust, safety, liquidity, settlement finality and integrity. It shall be accepted as a medium of payment, legal tender and a safe store of value. The key motivations for exploring the issuance of CBDC in India, include reduction in operational costs involved in physical cash management, fostering financial inclusion, bringing resilience, efficiency, and innovation in the payments system, adding efficiency to the settlement system, boosting innovation in cross-border payments space and providing public with uses that any private virtual currencies can provide, without any associated risks. It will provide the public with the benefits of virtual currencies while ensuring consumer protection by avoiding the damaging social and economic consequences of private virtual currencies/ Crypto Currencies. India's digital economy would make the monetary and payment systems more efficient and contribute to furthering financial inclusion.

Keywords: CBDC, sovereign, financial inclusion, private virtual currency, cryptocurrency

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1. Introduction

In simple terms, a CBDC is a currency in digital form that is issued by a central bank and is a Rochemont (2019) define a CBDC as a digital form of central bank money that is different from the balances in traditional reserve or settlement accounts.

The idea of “Central Bank Digital Currencies” (CBDC) is not a recent development. Some attribute the origins of CBDCs to Nobel laureate James Tobin, an American economist, who in 1980s suggested that that Federal Reserve Banks in the United States could make available to the public a widely accessible ‘medium with the convenience of deposits and the safety of currency.’ It is only in the last decade, however, that the concept of digital currency has been widely discussed by central banks, economists & governments.

The history of money goes back to thousands of years. From the early days of bartering to the first metal coins and eventually the first paper money, it has always impacted how we function as a society. Currency has evolved to take several different forms. In modern economies, currency is a form of money that is exclusively issued by the sovereign (or a central bank as its representative) that has legal tender. Paper currency is essentially a debt instrument. It is a liability of the central bank and the asset of the holding public. Maintaining monetary and financial stability and promoting broad access to safe and efficient payments has been among the main objectives of the RBI. It is secured by virtue of the statutory responsibility of currency management conferred on the Reserve Bank in the Preamble of the Reserve Bank of India Act, 1943.

India has made an impressive progress towards innovating our digital payment system. Payment system are changing at an increasing pace. Reserve Bank of India has taken several initiatives since the eighties to bring in technology based solution to the banking system. The rapid mushrooming of private cryptocurrencies in the last few years has attempted to change the fundamental notion of money as we know it. Claiming the benefits of decentralization and through blockchain technology, cryptocurrencies are being hailed as innovation that could disrupt the traditional financial system which paved the idea of CBDCs.

2. Literature Review

There is a substantial amount of research and articles on Central bank digital currencies (CBDC). Few of the previous works are relevant and are reviewed in this paper. Following research paper and articles are majorly been referred (Paper citation).

(Bordo, 2017) show that CBDCs are useful for transparent conduct of monetary policy. It can serve as a costless medium of exchange, secure store of value and stable unit of account. They also suggests that the policymakers should be aware of several salient risks of taking a relatively passive approach which are macroeconomic instability, loss of monetary control, systemic risks and susceptibility to severe downturns.

(Andolfatto, 2021) shows the impact of CBDC on banks and find that interest bearing CBDC will increase financial inclusion, diminish the demand of cash and expand depositors base of banks.

(Holden, 2019) conducted a survey of studies on CBDC and found that central banks are progressing from conceptual work into experimentation, proof of concept and are in cooperation with other central banks. Only few central banks are proceeding to the pilot stage with CBDCs, and even fewer central banks see the issuance of CBDC as a short or medium term goal. Financial inclusion project create a clear mandate for central bank action and a lack of current infrastructure limits the disruption a CBDC could create while simultaneously encouraging the use of new technology. To meet the payment needs of the future, the physical cash is unlikely the answer. Yet, most people have to wait to use CBDCs. Central banks are working hard to make sure the wait is worth it.

(Ozili, 2021) shows how the creation of a central bank digital currency can lead to the collapse of digital currencies including cryptocurrencies and bitcoins. They show that central banks will leverage on their monetary powers and the trust that the citizens have in government backed money. This will therefore give central banks strong incentives to issue a central bank digital currency. He further stressed that the issuance of a central bank digital currency can erode the trust in cryptocurrencies, and can lead to the collapse of cryptocurrencies although not immediately.

(Davoodalhossenini, 2022) finds the optimal monetary when only cash, only CBDC, or both cash and CBDC are available to agents in Canada. He finds that a more efficient allocation can be implemented by using CBDCs than with cash if the cost of using CBDC is not too high.

3. Research Problem

Wide proliferation of crypto currencies has the potential to diminish monetary authorities's potential to determine and regulate monetary policy and the monetary system of the country which could pose serious challenge to the stability of the financial system of the country.

The Government and the Central Bank of India are concerned about the adverse effects of cryptocurrency. It includes high price volatility, prone to cyber attacks, greater anonymity in transaction, vulnerable to money laundering and financing terrorism activities. This also entail credit risk which has the potential to cause economic and financial instability.

4. Rationale

The research has been undertaken mainly with the purpose to gather some insights in how CBDCs would improve efficiency and stability of our financial system. There has been substantial amount of research undertaken on CBDCs of various countries and their various role on stabilizing the economy. Emergence of cryptocurrency is a recent phenomenon. The Reserve Bank of India has been consistent in highlighting various risks related to the cryptocurrencies. These digital assets undermine India's financial and macroeconomic stability because of their negative consequences for the financial sector which could pose serious challenge to the stability of the financial system of the country. CBDCs will provide the public with benefits of virtual currencies while ensuring consumer protection by avoiding the damaging social and economic consequences of private virtual currencies. On this very role of CBDCs, only a few research has been conducted. This increases the scope for further investigation.

5. Hypothesis

No hypothesis was formulated in this research.

6. Objectives

- i. to portray accurately the characteristics of RBIs Central Bank Digital Currencies (CBDC)
- ii. to study the key motivation for issuance of CBDCs.
- iii. to study the need to issue CBDC as a counter reaction to private virtual cryptocurrency.
- iv. to study the recent development of CBDCs in India.

7. Research Methodology

To fulfil the above research objectives, this study is based on secondary data collected from various reliable online sources, like high impact journals, research papers, news articles, and other trusted platforms.

8. Limitations and further scope

In India, not all people have internet access. This means many Indians will not be able to use CBDCs due to unavailability of connectivity. To ensure the widespread use of CBDC, offline capabilities has to be incorporated.

CBDC ecosystems may be exposed for cyber-attacks as the current payment systems are exposed to. The cybersecurity considerations has to be taken care of both for the item and the environment. For instance, while the token creation process should ensure the highest levels of cryptography to ensure security at the item level, the transaction of tokens also needs to be secured to ensure a trusted environment.

There has being substantial amount of research undertaken on CBDCs and the role it performs in an country economy. One of the main reason why CBDCs was introduced in India was to tackle the wide proliferation of cryptocurrencies. Unfortunately there has being less amount of research undertaken on this very specific role that CBDCs plays as to tackle the negative impact that cryptocurrencies has on an economy.

9. Features of CBDC:

- (a)CBDC is sovereign currency issued by Central Banks in alignment with their monetary policy.
- (b)It appears as a liability on the central bank's balance sheet.

- (c) It must be accepted as a medium of payment, legal tender, and a safe store of value by all citizens, enterprises, and government agencies.
- (d) It is freely convertible against commercial bank money and cash.
- (e) It is fungible legal tender for which holders need not have a bank account.
- (f) It is expected to lower the cost of issuance of money and transactions.

10. Key Motivation:

1. Reduction in cost associated with physical cash management

Cost of cash management in India has been significant. The total expenditure incurred on printing during April 1, 2021 to March 31, 2022 was ₹4,984.80 crore as against ₹4,012.10 crore in the previous year. CBDC affects the overall value of the money issuing function to the extent that it reduces operational costs i.e. costs related to printing, storage, transportation and replacement of banknotes, and costs associated with delay in reconciliation and settlement. Though, initially, establishing a CBDC creation/issuance may entail significant fixed infrastructure costs but subsequent marginal operating costs shall be very low.

2. Efficiency and innovation in payments

CBDC could enhance resilience in payments and provide core payment services outside of the commercial banking system. It provides a new way to make payments and also diversify the range of payment options, particularly for e-commerce (where cash cannot be used, except for the Cash on Delivery (COD) option). The CBDC based payment system is not expected to substitute other modes of existing payment options rather it will supplement by providing another payment avenue to the public. Once CBDC is introduced, innovations around the product would only expand the choices available and healthy competition will help bringing about both cost and time efficiencies.

3. To explore the use of CBDC in cross-border transactions

CBDCs can boost innovation in cross-border payments, making these transactions instantaneous and help overcome key problems relating to time zone, exchange rate differences as well as legal and regulatory requirements across jurisdictions. Additionally, the interoperability of CBDCs presents means to mitigate cross-border and cross-currency risks and frictions.

4. Support financial inclusion

The annual FI-Index for India for March 2022 is 56.4 vis-à-vis 53.9 in March 2021. It demonstrates the fact that despite various measures undertaken by various stakeholders in strengthening financial inclusion in the country, further effort is required by the policy makers to achieve the desired goal. Universal access attributes of a CBDC including offline functionality, provision of universal access devices and compatibility across multiple devices, shall prove to be a gamechanger by improving the overall system for reasons of resilience, reach and financial inclusion.

5. Safeguard the trust of the common man in the national currency along with proliferation of crypto assets

The proliferation of crypto assets can cause significant risks related to Money Laundering & Financing of Terrorism. Further, the increase use of crypto assets can be a threat to the monetary policy objectives as it may lead to creation of a parallel economy. This will likely undermine the monetary policy transmission and stability of the domestic currency. It will also adversely affect the enforcement of foreign exchange regulations, especially, the circumvention of capital flow measures. Further, developing CBDC could provide the public a risk free virtual currency that will provide them legitimate benefits without the risks of dealing in virtual currencies. It may, therefore, fulfil demand for secured digital currency besides protecting the public from the abnormal level of volatility which some of these virtual digital assets experience.

11. Design Consideration for CBDC

- (i) It should not interfere with public policy objectives or prevent banks from performing their monetary stability mandate .
- (ii) It should be used alongside and complement existing forms of money .
- (iii) It should promote innovation and competition to increase the overall efficiency and accessibility of the payment system .

12. Types of CBDCs

CBDC can be classified into two broad types, general purpose or Retail (CBDC-R) and Wholesale (CBDC-W).

Retail CBDC vs Wholesale CBDC

Retail CBDC	Wholesale CBDC
It would be potentially available for use by all, private sector, non-financial consumers and businesses	It is designed for restricted access to select financial institutions
It is an electronic version of cash primarily meant for retail transactions.	It is intended for the settlement of interbank transfers and related wholesale transactions
It can provide access for safe money for payment and settlement as it is a direct liability of the central bank.	It has potential to transform the settlement system for financial transaction and make them more efficient and secure.

13. Forms of CBDC

CBDC can be structured as ‘token-based’ or ‘account-based’. A token-based CBDC is a bearer-instrument like banknotes, meaning whosoever holds the tokens at a given point in time would be presumed to own them. While, an account-based system would require maintenance of record of balances and transactions of all holders of the CBDC and indicate the ownership of the monetary balances.

Considering the features offered by both the forms, a token-based CBDC is viewed as a preferred mode for CBDC-R as it would be closer to physical cash, while an account-based CBDC may be considered for CBDC-W.

14. Ban on Private Cryptocurrencies and advent of Central Bank Digital Currency

Cryptocurrencies have certain characteristics that make regulation necessary. Some of these characteristics are: They lack intrinsic value and are subject to fluctuations, They are decentralised networks with no central authority, The transactions in cryptocurrencies are irreversible, They provide a degree of pseudonymity, although not complete anonymity, to participants in a transaction. India don't have any legislation to regulate virtual currency, any malicious transaction made through it, can't be constrained by any penal provision. The non-existence of such law provides an implicit license to commit any crime through these virtual currency. Hence a Committee was constituted on 2nd November 2017 to study issues related to Virtual Currencies. The mandate of the Committee has been to study various issues pertaining to Virtual Currencies and to propose specific actions regarding the same. The report brought into picture the concept of Central Bank Digital Currency issued by the government and regulated by Reserve Bank of India. With this, the committee recommended a draft the law named "*Banning of Crypto currency and Regulation of Official Digital Currency Bill, 2019*" that prohibits and penalizes the use of any private crypto currency in any manner provided in the bill.

The union former union finance minister Arun Jaitley, in his budget speech quoted that "*Distributed ledger system or the block chain technology allows organization of any chain of records or transactions without the need of intermediaries. The Government does not consider crypto-currencies legal tender or coin and will take all measures to eliminate use of these crypto-assets in financing illegitimate activities or as part of the payment system. The Government will explore use of block chain technology proactively for ushering in digital economy.*"

This was followed up by the RBI in its April 2018 monetary policy meeting. Advocating the distributed ledger technology (DLT) as a significant instrument of prospective economic transformations, the committee referred to some research studies⁷⁵⁸ and deduced several recommendations pertaining to increasing effectiveness of KYC norms, implementations of DLT in the Department of Economic affairs and for such purpose MeitY and GSTN would play a major technology supportive role for exploring and building the uses of DLT.

Provisions of the Draft Bill:

- Cryptocurrency cannot be used as legal tender or currency at any place in India.
- The Bill prohibits everyone to mine, generate, hold, sell, deal in, issue, transfer, dispose of or use cryptocurrency in the territory of India.
- The Central Government is allowed to declare Digital Rupee to be legal tender with the consent of RBI.
- The Reserve bank is empowered to declare any official foreign digital currency as foreign currency in India.
- The use of Distributed Ledger Technology for creating a network for delivery of any financial or other services or for creating value, without involving any use of cryptocurrency is not prohibited.
- Direct or indirect use cryptocurrency shall be punishable with fine or imprisonment of 1 year which may be extended to 10 years or both.
- RBI should be the appropriate regulator of such digital currency by virtue of its powers under Section 22 of the RBI Act.

Way ahead for blockchain technology in India

This disruptive change can be brought about in an orderly manner only if Controlled Blockchains are deployed. Instead of destroying existing systems, we can shift existing systems to newer platforms with minimal disruption and maximal continuity.

15. Recent developments

1. The first pilot in the Digital Rupee - *Wholesale segment* commenced on November 1, 2022. The use case for this pilot project is the settlement of secondary market transactions in government securities. The use of e-W is expected to make the interbank market more efficient. Settlement in central bank money would reduce transaction costs by eliminating the need for settlement guarantee infrastructure or for collateral to mitigate settlement risk. Going forward, other wholesale transactions and cross-border payments will be the focus of future pilots and based on the learnings from this pilot. RBI has identified nine banks for participating in the Digital Rupee's wholesale pilot project, which are:

- a) State Bank of India
- b) Bank of Baroda
- c) Union Bank of India
- d) HDFC Bank
- e) ICICI Bank
- f) Kotak Mahindra Bank
- g) Yes Bank
- h) IDFC First Bank
- i) HSB

2. The Reserve Bank has announced the launch of the first pilot for retail digital Rupee on December 01, 2022.

The pilot would cover selected locations in Closed User Group (CUG) comprising customers and merchants. The *e-R* would be in the form of a digital token that has legal tender. It would be issued in the same denominations as the paper currency and coins are currently issued. It would be distributed through intermediaries like the banks. Users will be able to transact with *e-R* through a digital wallet offered by the participating banks and stored on mobile phones. Transactions can be both Person to Person (P2P) and Person to Merchant (P2M). Payments to merchants can be made using QR codes displayed at merchant locations. The *e-R* would offer features of physical currency like trust, safety and settlement finality. As in the case of cash, it will not earn any interest and can be converted to other forms of money, like deposits with the banks. Eight banks have been identified for phase-wise participation in this pilot phase. The first phase will begin with four banks which are State Bank of India, ICICI Bank, Yes Bank and IDFC First Bank in four cities across the country. Four more banks, ie Bank of Baroda, Union Bank of India, HDFC Bank and Kotak Mahindra Bank will join this pilot subsequently. The pilot would initially cover four cities, viz., Mumbai, New Delhi, Bengaluru and Bhubaneswar and later will be extending to Ahmedabad, Gangtok, Guwahati, Hyderabad, Indore, Kochi, Lucknow, Patna and Shimla.

16. CBDC: Global Scenario

Across the globe, more than 60 central banks have expressed interest in CBDC, with a few implementations already under pilot stage across both Retail and Wholesale categories and many others are researching, testing, and/or launching their own CBDC framework.

As of July 2022, there are 105 countries in the process of exploring CBDC, a number that covers 95% of the global Gross Domestic Product (GDP). 10 countries have launched a CBDC, the first was the Bahamian Sand Dollar in 2020, and the latest was Jamaica's JAM-DEX.

Currently, 17 other countries, including major economies like China and South Korea, are in the pilot stage and preparing for launches in the near future. China was the first large economy to pilot a CBDC in April 2020 and it aims for widespread domestic use of the e-CNY by 2023. Increasingly, CBDCs are being seen as a promising invention and as the next step in the evolutionary progression of the sovereign currency.

17. Suggestion

1. Digital literacy must be improved
2. All Indian should have access to internet so as to ensure wider capability of CBDCs
3. Accessibility to remote areas should be improved
4. Full ban on cryptocurrencies in India must be undertaken so as to enhance the wider efficiency of monetary policy
5. As CBDCs can be posed to Cyber attacks, advanced security system must be employed

18. Conclusion

CBDC is aimed to complement, rather than replace, current forms of money and is envisaged to provide an additional payment avenue to users, and not to replace the existing payment systems. Supported by state-of-the-art payment systems of India that are affordable, accessible, convenient, efficient, safe and secure, the Digital Rupee system will further bolster India's digital economy, make the monetary and payment systems more efficient and contribute to furthering financial inclusion.

19. Bibliography

Andolfatto, D. (2021). Assessing the Impact of Central Bank Digital Currency on Private Banks. *The Economic Journal* .

Bordo, M. D. (2017). Central Bank Digital Currency and the future of Monetary policy. *National Bureau of Economic Research* .

Davoodalhossenini, S. M. (2022). Central Bank Digital Currency and Monetary policy. *Journal of Economic Dynamics and Control* .

Holden, C. B. (2019). Proceeding with caution - a survey on central bank digital currency. *Monetary and Economic Department* .

Ozili, P. K. (2021). *Central Bank Digital Currency can lead to the collapse of Cryptocurrency*.

Sharma, P. (2019). Ban on private cryptocurrencies and advent on Central bank digital currency; The way ahead for blockchain technology in India.