



Central Bank Digital Currencies (CBDCs) and Financial Innovation: A Comprehensive Review, with a Focus on India

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Abstract

Cryptocurrencies have become a game-changing class of digital assets in the fast-paced financial environment of today. This study investigates the fresh avenues provided by the popularisation of cryptocurrencies, which brings centrally regulated digital assets as a financial innovation for greater safety and centralised authority. Using secondary data gathered from academic publications, news reports, this paper analyzes how countries are navigating CBDC adoption. It also delves into the impact of India's digital rupee on the nation's economic landscape.

The paper describes CBDC initiatives taken by different countries including the Eastern Caribbeans' Dcash, China's Digital Yuan, among others, highlighting their unique features and impacts.

In the context of India, the combination of non-remunerative models, token-based technologies, and fixed denominations in the digital rupee shows a deliberate approach taken by CBDC to meet India's unique requirements.

The findings shed light on the various motivations and approaches adopted by nations in the pursuit of CBDC implementation, ensuring a comprehensive understanding of global perspectives, emphasizing the profound significance of CBDCs in reshaping financial transactions, advancing financial inclusion, and bolstering economic stability.

Keywords: Central Bank Digital Currency (CBDC), Financial Inclusion, Cryptocurrency, Digital Rupee, Digital Economy

Introduction

In today's world of constant financial innovation and the changing nature of the financial market cryptocurrency is a buzzword in the class of financial assets. Cryptocurrency was created and launched in 2009 by a talented coder called Satoshi Nakamoto, with exact details and whereabouts of this is still unknown. (Davis, 2011) They mainly are digital assets run on private block-chain i.e, digitally distributed decentralized ledger where every transaction is recorded and whenever a new unit of crypto is mined, block-chains store their unique code to avoid duplications. (Raju *et al.*, 2023) Cryptocurrency and their mining started a new era

of fintech. The rapid shift to focus from 'FINTECH' which emerged in the last decade to 'CRYPTOCURRENCY' to 'CBDC' is more recent innovation shows that the digital finance landscape is changing rapidly. With the emerging demand of cryptocurrency in the worldwide market and their underlying threat several central banks are planning and introducing centralized digital currency, India being one of them. It is the responsibility of central banks to maintain people's trust. They must work closely together to support domestic efforts in order to direct the investigation of central banks' digital currency in order to find reliable principles and foster innovations. (Christine Lagarde, 2020) As CBDC can bring digital finance and economic discipline, it can bring new financial freedom as well as financial security in both financial and economic sectors at national and international level. Centralized digital currency can be a perfect middle point to meet both ends of regulation and anonymity. It can provide privacy but can also prevent criminal abuse of financial systems, geopolitical concerns and may also encourage private sector innovations.

As of December 2022, all G7 economies have progressed to the developmental phase in the creation of their respective Central Bank Digital Currencies (CBDCs). Canada, France, China, India, and South Korea are just a few examples of nations actively researching or conducting pilot programs to explore the implementation of CBDCs. (Amure, 2023)

Our intention of conducting this research is two-fold. Firstly, to examine how countries have navigated the adoption of CBDC, and to evaluate the impact of the digital Rupee on the Indian economy. The research has been based upon secondary data collected from published journals, newspaper articles and reports published by organisations like IMF and BIS.

Literature Review

Auer et al. (2021) highlights the increased research and development undertaken with respect to central bank digital currency (CBDC). It emphasizes how crucial it is to take CBDCs into account in the context of the larger digital economy, taking into account issues with privacy, payment system integrity, and competitiveness. The study emphasizes the significance of carefully analyzing CBDC design decisions and their macroeconomic repercussions, particularly in cross-border situations, to guarantee their proper integration into the monetary environment of the digital era.

The research conducted by **Tourpe et al. (2023)** stressed on the rising demand for a standardized project management technique for Central Bank Digital Currency (CBDC) programmes globally. It introduces the 5P methodology, which provides guidance and structure to CBDC research, experimentation, and development phases. The methodology recognises the distinctive features of CBDC projects, provides flexibility to fit different national contexts, and coincides with the IMF's initiatives to assist successful CBDC management.

Bordo et al. (2017) in their study examined the design elements of the CBDC, such as payment procedures, the coexistence of cash, interest rates, and its influence on monetary and fiscal authorities. Given that CBDC may solve issues like macroeconomic stability, monetary management, systemic hazards, and economic downturns, it emphasizes the need of adopting it as soon as possible. Due to the potential advantages of CBDCs, several central banks are currently investigating them.

Soderberg et al. (2022) examined different countries in their different stages of CBDC journey. It showcased models of CBDC circulation and distribution and design features, keeping in mind country specific needs. It also mentioned organizational changes and selection of pilots and intermediaries for optimal project implementation by maintaining proper communication in between stakeholders.

Vinuela et al. (2020) analyzed past, present and future means of payment and mentioned digitized payment services and financial intermediation as a thing of the present. Here, the 2007 financial crisis, as a result of financial instability, was brought to discuss the need for a stable financial system and the necessity of directing CBDC towards that direction.

CBDC Around The World

Caribbean Islands

DCash is a digital currency launched by the Eastern Caribbean Central Bank (ECCB) in March 2021, providing services to eight Caribbean islands. It is like a high-tech Eastern Caribbean Dollar that is backed by the ECCB. It intends to make financial services more accessible, expedite payments, and develop a strong payment system throughout ECCU member countries.

The ECCB, in collaboration with Bitt Inc. technology, provides the essential tech infrastructure for DCash, revolutionizing the way people and businesses manage their money in the region.

DCash can be used in three modes: person to person (P2P), person to business (P2B), and business to business (B2B) transactions.

DCash has the potential to revolutionize the Caribbean by providing a quick, inexpensive, and transparent payment that boosts cross-border transactions and reduces reliance on foreign banks. It enables safe transactions and minimizes fraud by utilizing blockchain technology, which aligns with the ECCB's goal of modernizing the financial landscape and reducing traditional currency usage.

China

The digital yuan, also known as the e-CNY, is a digital currency developed by the People's Bank of China (PBOC). It is a digital representation of the renminbi, the country's official currency. Unlike cryptocurrencies like Bitcoin, the e-CNY is issued and backed by the PBOC. To increase financial stability and lessen dependency on the US currency, the PBOC is driving the creation of the e-CNY.

Extensive testing and analysis continue to refine the digital currency, with over 20 million stores accepting e-CNY payments and 750 million transactions worth approximately RMB 900 billion recorded in the pilot regions (People's Bank of China 2022).

The digital may reduce dependence on third-party payment systems like Alipay and WeChat Pay and upend conventional banking. Promoting e-CNY in global commerce and banking could boost China's global economic influence.

However, privacy concerns arise as the PBOC would have access to specific transaction details.

United States of America

In September 2022, the White House presented a framework for regulating digital assets, including the exploration of the digital dollar.

A CBDC launched by the US will be the electronic equivalent of the dollar that serves as legal money, is governed by the government, and supplements current payment methods.

The Federal Reserve must make sure a U.S. CBDC satisfies certain requirements before launching it, including safety, public accessibility, the lack of credit or liquidity issues, identity verification among others. By possibly shifting demand from bank deposits to CBDC, the implementation of a CBDC might complicate monetary policy, pushing the Federal Reserve to increase the amount of securities it holds. Fiscal policy impacts include lowering deposits in the banking sector, affecting credit availability and costs. Also, it could alter the financial sector, possibly raising bank financing costs while also encouraging innovation.

Uruguay

The e-Peso Pilot Plan, conducted between 2017 and 2018 by the Banco Central Del Uruguay (BCU), explored the feasibility and the impact of introducing a CBDC in Uruguay.

This pilot focused on simplicity, using a token-based approach. The e-Peso was issued for a maximum of 20 million Uruguayan pesos, equivalent to 670,000 USD. With quick settlements via mobile networks, the e-Peso enabled small payments and peer-to-peer transactions while also providing anonymity and traceability for increased security. With each e-Peso featuring a unique ID serial number, operational risks were mitigated, ensuring against double-spending and falsification.

The BCU concluded that while the legal environment at the time of testing was deemed enough for the central bank, legal amendments would be essential for an official roll-out of the e-Peso.

Bahamas

In October 2020, The Bahamas made history by introducing the world's first central bank digital currency, the Sand Dollar. It was designed to be the digital version of the Bahamian Dollar.

A large number of people on isolated islands lacked access to financial services due to The Bahamas' dispersed terrain of over 700 islands. There are also high costs and vulnerabilities of conventional banking infrastructure. This prompted the central bank to establish a digital currency and promote financial inclusion.

Customers can transact via a mobile app or a Mastercard prepaid card, enabling tiered wallet choices. It functions both as a wholesale CBDC for interbank settlements and as a retail CBDC.

The innovative design of The Sand Dollar overcomes regulatory issues, potentially serving as a template for CBDCs globally, while ensuring financial privacy without altering central banks' core roles.

CBDC In India

After extensive deliberation and a proposal by the RBI in 2017, India implemented the e-rupee, a Central Bank Digital Currency (CBDC), in 2022. It's a digital token mirroring physical currency denominations. Thus began a pilot programme for particular user groups and businesses for the e-rupee. Individual account holders engaged in phased-based adoption through eight chosen banks. Users were able to access e-rupees using digital wallets offered by partner banks,

Digital rupee offers the same level of trust, safety and settlement finality. The RBI is at the forefront of financial innovation, highlighting the dangers of decentralized cryptocurrencies that might jeopardize monetary policy and financial stability, and solidly securing its place as the leader in India's developing digital currency market.

Motivation For Issuance Of CBDC In India

- CBDC aligns with India's drive for a cashless, digital economy, addressing the challenge of excessive cash despite digitization. It provides a secure means for storing funds amid unforeseen events like pandemics can serve everyday expenses with added anonymity, increasing its adaptability.
- Money held in commercial banks have credit and liquidity risk. But central bank money can meet its obligations using its own non redeemable money, thus having no credit or liquidity risk.
- Enhancing cross border payment is a priority and India being G20 president should work towards this. As per BIS survey of central banks CBDC could ease current frictions and particularly so if central banks factor an international dimension into CBDC design from the onset.
- Crypto assets is a new age innovation and providing CBDC is a safe way of introducing this to the public in general. It can act as a countermeasure of proliferation of crypto assets and parallel economy.
- As trading of CBDC is regulated by RBI it is expected to conform with anti money laundering and counterfeit regulations. As a central regulatory authority will have access to some sort of identity, this can aid in reducing the underlying risks associated with crypto-assets.

How Digital Rupee Has Moulded Itself In Accordance To Indian Economic Scenario

- Digital Rupee And UPI Linkage - RBI urged participating banks to make e-rupee interoperable with UPI through a QR code. This will allow payment flows via already well distributed UPI QRs.
- Optimal CBDC Design:

- i. Non Remunerative CBDC Model - The Indian digital rupee chooses a reliable, non-remunerative CBDC model to maintain banking services and avoid bank disintermediation. Despite its diminished value as a store of wealth, it continues to be a desirable payment mechanism.
- ii. Token Based Digital Rupee- The RBI has adopted a token-based CBDC over account based CBDC technology with encrypted ledger records that functions as digital bearer instruments. By allowing "anonymity for small value and traceability for high value" transactions, it finds a balance between privacy and security.
- iii. Fixed Denomination Based CBDC - The RBI's choice to adopt fixed denominations for CBDC is consistent with the denominations of the current physical currency. This method is specifically designed for the Indian market and reduces processing time and performance difficulties that may be caused by changeable token values, thus ensuring a seamless transaction experience and public trust even in digital form.

Conclusion

Central Bank Digital Currencies (CBDCs) are a significant development in the financial landscape, with several countries actively pursuing their implementation. A key issue is identifying the ideal CBDC design that combines privacy, security, and usability.

According to the Atlantic Council, by July 2022, 14 nations will be in the pilot stage, 26 nations in the development stage, and 47 nations in the research stage.

CBDCs have an impact on credit costs and financial stability. They must be carefully considered to make sure that they do not disturb the banking and monetary policy sectors while delivering innovation.

Case studies from several countries are crucial for understanding how various economies customize CBDCs for their own environments. This study sheds light on various tactics and techniques adopted by specific countries.

CBDCs have the potential to transform financial transactions, advance financial inclusion, and improve economic stability in this era of quick financial innovation. For their integration to be effective, there must be ongoing assessment, global collaboration, and a day when digital currencies coexist peacefully with established financial institutions.

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