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Original Research Paper

Banking

AN ANALYSIS OF THE CHALLENGES, OPPORTUNITIES, AND FUTURE PROSPECTS OF CENTRAL BANK DIGITAL CURRENCIES (CBDC) IN INDIA

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ABSTRACT

The aim of this research is to explore the challenges and opportunities linked to central bank digital currencies (CBDCs). Data was collected from various reports published by the Reserve Bank of India (RBI), the Government of India, and other pertinent documents regarding CBDCs. The results of this study suggest that it will promote the use of digital currency for both individuals and businesses in India. Even without internet access, payments can be processed using specialized technology such as mobile phone signals. The digital rupee is also applicable for government aid and corporate benefits, thus streamlining and clarifying payment procedures. Additionally, this study identified two distinct forms of digital rupees. The first, referred to as e₹-R, is designed for everyday small transactions accessible to everyone, while the second, e₹-W, is intended for banks to manage large payments. Digital currency from banks can accelerate significant transactions and improve security. Ultimately, this study concludes that the digital rupee aims to be as reliable as cash while offering the convenience of digital payments, ensuring safety and ease for a wider segment of the Indian population in their spending activities. The introduction of CBDCs may also stimulate the development of innovative business models, including digital wallets and omnichannel payment solutions, thereby delivering additional value to consumers and businesses and fostering greater financial inclusion in India.

KEYWORDS : Central Bank Digital Currency (CBDC), Blockchain Technology, Distributed Ledger Technology (DLT), E-Rupee, Digital Rupee (e₹), Digital Rupee Retail (e₹-R), Digital Rupee Wholesale (e₹-W), RBI

INTRODUCTION

Central Bank Digital Currency (CBDC) represents a digital variant of fiat currency that is issued by central banks, intended to act as a digital equivalent of a nation's physical cash. It is supported by the government and acknowledged as legal tender. The pilot program for the digital rupee commenced in December 2022. CBDC functions on a secure and transparent blockchain network, employing blockchain technology and distributed ledger technology (DLT) to establish an unalterable record of all transactions. It is also referred to as the digital rupee (e₹). This digital currency can be utilized on your mobile device in a manner similar to banknotes. The e₹ holds the same value as the coins and banknotes you utilize daily. This constitutes official currency that the government asserts is legitimate and can be employed for purchasing goods, transferring funds to sellers, or settling transactions. You can store your e₹ in a digital wallet, which is akin to a dedicated application on your mobile device. This application is accessible through your bank or another reputable company and can be easily linked to your bank account.

Payments can be made by scanning a QR code, facilitating the transfer of money to anyone or direct payments to stores. Digital wallets function similarly to physical wallets, accommodating varying amounts of money and providing change. This system is highly secure to safeguard your funds. The e₹ can be utilized at any hour of the day or night, without incurring additional fees or minimum requirements, and like cash, the e₹ does not accrue interest.

Research Methodology

The objective of this study is to investigate the challenges and opportunities associated with central bank digital currencies (CBDCs). The research gathered data from various reports issued by the Reserve Bank of India, the Government of India, and other documents pertinent to CBDC. A diverse range of prior review literature and reports was taken into account. This study aims to offer recommendations, conclusions, and avenues for further research regarding the challenges and opportunities in CBDC. The findings of this research will be beneficial to various social stakeholders in the future.

Review of Literature

In 2021, Samudrala, R. S., along with his colleagues, assessed the potential risks and challenges related to the implementation of a Central Bank Digital Currency (CBDC) in India. Following this, in 2024, Shukla, A., and others examined the factors that influence the acceptance of CBDCs in India. In 2023, Singh, S., and his team suggested that CBDCs could enhance financial inclusion. In 2026, Razi-ur-Rahim, M., and his colleagues highlighted user-friendliness as a vital element in the adoption of CBDCs, while Sandhu K., et al. in 2025 proposed that this could result in improved financial inclusion. Ogunmola GA and Das U (2024) uncovered insights into users' attitudes and intentions regarding the adoption of the digital rupee. Sethaput, V., and his team (2023) investigated the use of blockchain technology in Central Bank Digital Currency (CBDC). Ghosh, D., et al. (2025) observed that it facilitates smoother global trade and financial integration. Kaur, H., et al. (2025) analyzed the factors influencing the intentions to adopt CBDC in India. Mehlkop, G., et al. (2023) introduced new digital mediums of exchange. Bapat, D., et al. (2026) determined that the adoption of CBDC depends on accessibility, security, and usability. Thapliyal, K., et al. (2025) indicated that the adoption of CBDC could aid in achieving the nation's sustainable development goals. Das, S. (2025) disclosed that blockchain technology has the capacity to minimize fraud and support environmentally sustainable businesses. Shroff, S. J., et al. (2026) provided new evidence concerning CBDC adoption in emerging markets. Kumar, J et al. (2025) pointed out gaps in the existing literature and proposed significant future research directions to enhance the scientific discourse surrounding CBDC. Ozili PK (2023) identified the optimal design for CBDC that satisfies all competing objectives. Bhatnagr, P. (2025) advised addressing the identified challenges to enhance the overall user experience and satisfaction.

RESULTS AND DISCUSSION

The CBDC and digital identity can greatly improve financial inclusion. This approach seeks to offer financial services to those who are unbanked or underbanked, thus promoting financial inclusion. It motivates various users to adopt CBDC and participate in digital financial transactions. By connecting CBDC wallets with other digital platforms, such as e-commerce, digital lending, or insurance services, a comprehensive digital ecosystem is established, enabling individuals to easily and securely access a variety of financial services. As a relatively new development in finance, CBDC

has created numerous market opportunities. It has the capacity to enhance payment systems by providing a secure, swift, and cost-effective payment solution. CBDC reduces reliance on intermediaries in the payment process, which lowers transaction costs and increases speed. Additionally, it grants central banks greater control over monetary policy by allowing for more direct management of the money supply and its velocity, as well as providing enhanced visibility into payment flows. This leads to improved payment efficiency and decreases the costs associated with the printing, storage, and transportation of physical cash. CBDC may signify the future of payments, and it will be fascinating to see how the market evolves as more central banks begin to explore and adopt this technology. It has the potential to revolutionize the financial landscape by offering a digital currency that is more efficient, secure, and transparent.

CONCLUSION

The research established that a Central Bank Digital Currency (CBDC) functions on a robust and open blockchain infrastructure, leveraging blockchain's capabilities to maintain a permanent record of all financial transactions. This framework guarantees that every transaction is documented on a distributed ledger, rendering the data immutable and resistant to alterations. Blockchain utilizes distributed ledger technology (DLT) for the secure and transparent recording of transactions. Renowned for its transparency, security, and permanence, blockchain enables all network participants to access transaction records, thereby fostering a highly transparent environment. The study further indicated that this technology offers a wide range of potential applications across diverse sectors, including financial services, supply chain logistics, and electoral processes. It achieves this by providing a digital currency that is accessible to anyone possessing a smartphone, irrespective of their banking status. When a CBDC user performs transactions through their phone, it is crucial to establish a strong connection between their digital identity and the device. This link is essential for verifying that the appropriate parties are involved, minimizing the risk of fraud, and cultivating trust within the digital financial ecosystem. Ultimately, the study concluded that CBDC is viewed as a technology with significant potential to enhance transparency, mitigate fraudulent activities, and facilitate secure direct transactions between individuals without the need for intermediaries. Central Bank Digital Currency holds the potential to transform the future of Digital Rupee Retail (e -R), Digital Rupee Wholesale (e -W) payment systems and improve financial accessibility in India.

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