



E-RUPEE: A STEP TOWARDS DIGITAL ECONOMY

Dr. Nirmala Khess

K.B. Women's College, Hazaribagh, Vinoba Bhave University
nirmalakhess@gmail.com

Co-Author – Dr. Sanjiv Chaturvedi
Marwari College, Ranchi, Ranchi University

On December 1, 2022, India introduced its Digital Rupee, also known as the Central Bank Digital Currency (CBDC) or e-Rupee, a legal tender in digital form issued by the RBI. The Unified Payment Interface (UPI) has experienced significant growth in India, with a reported increase of 118% in 2022. The advent of digitalization has propelled the Indian economy forward, and the e-rupee marks a new payment landscape, enabling extensive foreign transactions and providing Indians worldwide access to international transactions, impacting both the economy and fintech industries.

While addressing the challenges associated with managing physical cash, the e-rupee enhances efficiency in the financial services industry. This digital currency, represented as a digital token, acts as the electronic equivalent of a banknote, facilitating seamless electronic transfers. The RBI has categorized the digital rupee into Retail e-Rupee and Wholesale CBDC based on usage, functions, and accessibility levels.

Despite the numerous benefits, challenges such as security concerns, KYC procedures, fraud, and data loss may arise. This descriptive paper underscores the advantages of the e-rupee, its influence on the Indian economy, and its implications for various financial services industries. Additionally, the paper delves into the prospects and challenges that the e-rupee may encounter in India.

KEYWORDS: e-Rupee, Digital currency, Digitalisation, RBI, Unified Payment Interface (UPI), Retail e-Rupee, Wholesale CBCD, etc.

INTRODUCTION

DIGITAL CURRENCY:

Digital currency, also referred to as digital money, electronic currency, or cyber cash, exists solely in digital or electronic form, lacking physical attributes. Digital currencies rely on online connections or specific networks, with transactions facilitated through computers or electronic wallets. In contrast, physical currencies, like banknotes and minted coins, have tangible attributes and necessitate physical ownership for transactions.

Digital currencies share utility with physical currencies, functioning as a medium for acquiring goods and settling service payments. They also find specific applications within online communities like gaming sites, gambling portals, or social networks. One notable advantage is the ability to facilitate instant transactions seamlessly across borders. To



illustrate, a person in the United States can use digital currency for transactions with someone in Singapore, as long as both are linked to a common network.

Digital currencies go beyond the conventional framework of currencies, challenging the association solely with sale and purchase transactions. This shift in perspective is evident in diverse use cases, such as gaming network tokens that can enhance a player's experience by extending their life or providing extra abilities. In these instances, the interaction with digital currencies represents a transfer of value rather than a traditional purchase or sale transaction.

The different types of Digital Currencies:

Digital currency serves as a comprehensive term encompassing various electronic currencies in existence. Digital currencies include cryptocurrency, virtual currency, and central bank digital currency¹.

CRYPTOCURRENCY:

Cryptocurrencies are digital currencies that use cryptography to secure and verify transactions in a network. Cryptography plays a role in overseeing the creation of currencies like Bitcoin and Ethereum, which fall under the category of cryptocurrencies. The regulation of cryptocurrencies varies depending on the jurisdiction. Cryptocurrencies are categorized as virtual currencies due to their unregulated nature and exclusive existence in digital format.

VIRTUAL CURRENCY:

Virtual Currencies are unregulated digital currencies controlled by developers or a founding organization consisting of various stakeholders involved in the process. A virtual currency, such as a gaming network token, can be algorithmically managed through a specified network protocol, with its economics crafted and overseen by developers. Put, virtual currency, or digital money, is a form of currency predominantly in digital format. It typically operates without significant regulation, being issued and often controlled by its developers. This type of currency is utilized and acknowledged electronically within the confines of a particular virtual community².

CBDC (Central Bank Digital Currency):

Central Bank Digital Currencies (CBDCs) are digitally regulated currencies issued by a country's central bank, potentially serving as a supplement or replacement for traditional fiat currency. Unlike physical and digital forms of fiat currency, CBDCs exclusively exist in digital format. Countries like England, Sweden, and Uruguay are exploring the possibility of introducing digital versions of their native fiat currencies. CBDCs are seen as a way to enhance the efficiency and security of centralized payment systems, reduce the costs and risks associated with handling physical cash, and promote financial inclusion for individuals and businesses lacking access to traditional banking services. Additionally, CBDCs could simplify cross-border payments and diminish the reliance on foreign exchange. However, the introduction of a U.S. CBDC poses challenges, including the need for Congressional

¹ Al-Laham, Mohamad; Al-Tarawneh, Haroon; Abdallat, Najwan (2009). "Development of Electronic Money and Its Impact on the Central Bank Role and Monetary Policy" (PDF). *Issues in Informing Science and Information Technology*. 6: 339–349. doi:10.28945/1063. Retrieved 12 May 2020.

² European Central Bank (October 2012). "1". *Virtual Currency Schemes*. Frankfurt am Main: European Central Bank. p. 5. ISBN 978-92-899-0862-7. Archived from the original on 2012-11-06.



authorization, the establishment of robust privacy and security measures, and careful consideration of potential impacts on monetary policy and operational management during the transition from conventional money to CBDCs.

E-RUPEE:

India has been experiencing significant growth in digital transactions, witnessing a 118% increase in both volume and value of UPI transactions in 2022. The launch of the Central Bank Digital Currency (CBDC), known as the digital rupee or e-rupee, on December 1, 2022, aims to provide continuous access to the payment system for customers. This electronic form of cash, initially focused on retail transactions, will undergo a pilot phase covering Mumbai, New Delhi, Bengaluru, and Bhubaneswar, involving key banks such as State Bank of India, Bank of Baroda, and different private banks; HSBC, IDFC First bank etc.³

The e-Rupee, functioning as a digital replica of paper currency, operates without intermediary banks. Similar to physical currency, the security of e-rupee lies with the user. Recognized as the Central Bank Digital Currency (CBDC), it holds the same value as Indian rupee notes and can be used nationally and internationally without the need for bank deposits. Unlike traditional currency, e-Rupee doesn't accrue interest and can be transacted through digital wallets provided by various banks, stored on mobile devices.

The RBI categorizes e-Rupee into two types: Retail E-rupee, primarily for retail transactions accessible to everyone, and Wholesale CBDC, designed for limited access by select financial institutions. This digital currency is expected to transform financial transactions, particularly in government securities and interbank transactions, enhancing efficiency and security while minimizing operational costs.

Issued in denominations similar to paper currency, e-Rupees will be distributed through banks, facilitating person-to-person (P2P) and person-to-merchant (P2M) transactions. Digital tokens can be withdrawn from banks, stored in digital wallets, and used for online or in-person transactions or transfers via apps. The introduction of e-Rupee reflects a significant step in the evolution of digital currencies, distinct from cryptocurrencies and UPI transactions, with a focus on accessibility, security, and efficiency⁴.

LITERATURE REVIEW

The introduction of the e-rupee pilot in 2022 by the Reserve Bank of India (RBI) signifies a significant advancement in the realm of digital payments. Leveraging blockchain technology, this central bank digital currency (CBDC) presents itself as an electronic alternative, potentially offering enhanced security and government backing in contrast to private digital currencies. While the wholesale pilot implementation of the Indian CBDC received positive reviews, this article focuses on the retail CBDC, also known as the Digital Rupee for Retail (e₹-R).

³ "First pilot of Digital Rupee to commence on Tuesday: RBI - Times of India". *The Times of India*. 31 October 2022. Retrieved 31 October 2022.

⁴ Mitesh Thakker . "E-rupee and its impact on the Indian Economy" Voices, India, TOI, May 2, 2023, 12:44 PM IST



Propelled by pandemic-induced lockdowns and boosted by increased smartphone penetration, digital payment systems have matured in India. In 2022, the United Payments Interface (UPI) facilitated a staggering 7,404.45 crore transactions, equivalent to 2,347 transactions per second. The total transaction value soared to Rs 125.95 lakh crore, marking a 1.75x increase compared to 2021. The introduction of a sovereign digital currency like the e-rupee has the potential to elevate the digital payment landscape further.

CBDC systems operate on blockchain technology, eliminating the expenses associated with managing and distributing physical cash. This results in CBDC transaction costs being among the lowest globally. Additionally, these systems operate 24x7, ensuring real-time transactions throughout the year.⁵

OBJECTIVE OF THE STUDY

E-Rupee is a new concept for Indians in the field of online payment and transactions system and in the past years we have seen a tremendous growth in this system. The main objective of this study is as follows:

1. To understand the functioning of the mechanism of e-rupee.
2. To know the Advantages of e-rupee.
3. To know the impact of the e-rupee on the Indian economy.

MECHANISM OF E-RUPEE

As of now, nine countries have already implemented digital currencies, with eight of them being small island nations in the Caribbean. Among these nations, Sweden is actively conducting real-world trials of its digital currency, the Krona, while the Bahamas has successfully issued the "Sand Dollar" to all its citizens. In October 2021, Nigeria joined the list of countries with a digital currency, introducing the e-Naira, and China initiated a trial run of its digital currency, the e-RMB. Additionally, countries like Japan and Singapore are currently exploring the multifaceted aspects of transitioning to a central bank-backed digital currency, and the United States Federal Reserve has released a comprehensive report outlining the costs and benefits associated with the issuance of a digital dollar. This global trend reflects the growing interest and momentum in the development and adoption of central bank digital currencies (CBDCs) around the world, with at least 87 countries actively researching or developing CBDCs and 14 running pilot programs to assess their viability and potential impact on the financial landscape.

On December 1st, 2022, the Reserve Bank of India (RBI) issued a notable declaration, revealing intentions to initiate a pilot program aimed at creating a Central Bank Digital Currency (CBDC). This digital representation of the Indian Rupee will be underpinned by blockchain technology and other advanced innovations, bridging the gap between the physical and digital realms of currency. Regulatory oversight will be provided by the RBI to ensure its stability and secure usage. The decision to introduce the digital rupee followed comprehensive consultations with the RBI, and the timeline for its official launch will be

⁵ Mallikarjun Karra, "India's e-rupee is here: What to expect from the retail CBDC pilot" ET CONTRIBUTORS, Last Updated: Mar 06, 2023, 11:19 AM IST

determined by the central bank. Prime Minister Narendra Modi emphasized the digital rupee's versatility, as it can be exchanged for physical cash, opening up exciting prospects within the fintech sector. The RBI Deputy Governor has also outlined a phased implementation strategy, with a focus on both wholesale and retail segments of CBDCs. Several prerequisites must be addressed before the Digital Rupee's release, including designing the currency's issuance, anonymity levels, and technology infrastructure. Additionally, the creation of a centralized payment system, interoperability with other virtual digital assets, and the development of programmable features like smart contracts are key components of this transformative initiative. These steps signify India's commitment to embracing digital currency innovations and modernizing its financial ecosystem.

Applications of E-Rupee:

- **Retail Transactions:** E-Rupee can facilitate retail payments, including purchases of groceries or payment for taxi services.
- **Wholesale Transactions:** E-Rupee can be utilized for wholesale payments, such as acquiring goods from suppliers or settling service-related charges.
- **Remittances:** E-rupee can serve as a means for remittances, allowing individuals to send money to family members in different countries.
- **Government Payments:** E-rupee can be employed for government transactions, such as the payment of taxes or utility bills.

The Reserve Bank of India has not disclosed a specific timetable for the introduction of the E-Rupee. However, its launch is anticipated in the near future.

How the E-Rupee will Work? As Per the Pilot Programme Launched:

Step 1: Installation of E-Rupee App.

In the first step you need to install an e-rupee app from the Play store or any app store. In the app store you will find various e-rupee app from different banks, but in this digital rupee app the UI (User Interface) of every app is similar which is different from UPI apps. In UPI app the UI of every app is different.

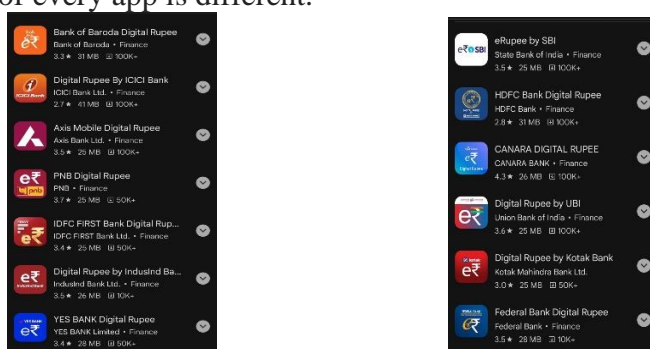


Fig1.1 E-Rupee Apps

Step 2: Registration.

After installing the e-rupee app you need to register yourself, like you register on any bank specific app. Firstly the app asks you to select the sim which is registered with your bank account, then you need to give your biometric. Secondly, app ask you to generate the 6-digit PIN and lastly you will select your bank account Number.

Step 3: Loading of Currency.

Simply you load your currency from your bank account and the denominations were shown in your wallet as per sum of the currency.



Fig. 1.2. The digital currency notes and coins

Step 4: Send Money.

Finally, you are ready to send money. You can send money anyone but the other person should also have e-rupee app on his smartphone. The currency note you send to other person he will receive the same note with same serial number. It is just like the physical note send online.

Till date the UPI and digital rupee are not linked but as per RBI's vision they both get linked and connected so you can easily transfer the money on UPI too. In this pilot programme they also give a safety feature for the users that no one can take a screenshot or screen recording of this app.

ADVANTAGES OF E-RUPEE

The rollout of the Central Bank Digital Currency (CBDC), named the Digital Rupee, is set to mark the beginning of an era characterized by secure and risk-free online payments. This development holds noteworthy implications for the digital economy in the foreseeable future. This innovative digital currency is expected to facilitate the development of a global digital payment system, bringing about transformative changes in the fintech sector. It will alleviate the burdens associated with cash handling, printing, and logistics management.

The Digital Rupee promises to enhance the digitization of the economy and streamline cross-border transfers, not only within India but across international jurisdictions. Its implementation is poised to combat counterfeiting of currency and contribute to the ongoing efforts against black money and corruption. Moreover, the Digital Rupee is set to expedite financial inclusion and reduce transaction costs, particularly in cross-border transactions, offering an alternative payment system and expanding the arsenal of tools available to central banks for monetary policy management.

One notable advantage of CBDC is its inherent security and reliability. In contrast to commercial banks that may occasionally falter, with depositors potentially facing substantial losses despite deposit guarantee schemes, parking funds with the central bank eliminates the



risk of default. Additionally, CBDC has the potential to bridge the gap between the vast number of mobile phone connections and the relatively fewer bank accounts, potentially reducing the reliance on traditional card networks and payment gateways. With 1.2 billion mobile phone connections in India, the CBDC stands as a promising solution to enhance financial accessibility and connectivity within the country.

1. Digital Payment without a Bank Account:

The vision of RBI for the launch of the e-rupee is that it can be reachable to every Indian. With the launch of the Jan-Dhan Yojna account, most citizens have bank accounts but still, some numbers don't have them. For targeting every citizen RBI's vision is whether a person having a bank account or not can use e-rupee.

2. Reducing Cash Management Expenses:

It reduces the expenses spent on printing currency notes and reduces cash management expenses. E-rupee makes the monetary system more efficient and the financial markets more stable.

3. Cashless Society:

One of the notable benefits of central bank digital currency alternatives is the progression toward a society where cash is less prevalent. Cashless societies envision a total elimination of reliance on physical notes or coins for financial transactions. As a growing number of individuals shift towards digital transactions, with a decline in ATM cash withdrawals, Central Bank Digital Currencies (CBDCs) emerge as a promising substitute. The fact that CBDCs are digital currencies supported by central banks instills a higher level of trust among the populace.

4. Improve Cross-border transactions:

CBDC, such as the e-rupee, can potentially enhance counterparty credit risk in cross-border payments and settlements among banks. The benefits of CBDCs are particularly evident in the context of financial institutions and markets.

5. Addressing Systemic Risks:

Internationally, there are around 3,000 privately issued cryptocurrencies. According to the IMF, the primary motivation for exploring national digital currencies is to address the proliferation of private forms of digital money. Industry estimates indicate that in India alone, there are between 15 million to 20 million crypto investors, with a collective crypto holding value of around 400 billion rupees (US\$5.37 billion). Many cryptocurrency exchanges encourage individuals to invest and trade in cryptocurrencies without furnishing essential information about the product and its inherent risks. There exists a potential risk of these companies facing bankruptcy without adequate safeguards. In contrast, the digital rupee enjoys government backing, providing a layer of protection in the event of any financial crisis.

6. Stabilizing Volatility: The regulation of the national digital currency by the RBI guarantees a lower level of volatility compared to other digital currencies.



7. **Negative Interest Rates:** In challenging economic situations, a Central Bank may seek to encourage spending through the implementation of negative interest rates. However, the current limitation lies in the potential for people to simply withdraw their money from banks. CBDCs offer a solution to this issue, as negative interest rates can be easily applied to CBDCs held in wallets.
8. **Complementing Blockchain-led Decentralized Finance:** The digital rupee serves as a bridge between fiat money and decentralized finance, complementing the virtual digital asset (VDA) markets. Since all crypto assets' final returns are in sovereign currency, the digital rupee contributes to the growth of decentralized finance by connecting fiat money with the crypto space.

IMPACT ON ECONOMY

1. Transforming the Money Transfer Service Sector:

The conventional processes of both domestic and international money transfers are constrained by turnaround times, batch runs, bank holidays, and weekends. In contrast, digital currency transactions operate at a rapid pace, 24/7, with anticipated lower transaction-related expenses compared to current costs. The implementation of digital currency in India has the potential to revolutionize the global money transfer service industry by providing seamless international currency compatibilities.

2. Achieving cashless economy:

While the anonymity associated with physical cash remains appealing to a significant number of individuals and is unlikely to be completely replaced in the near future, the rise in financial inclusion facilitated by the e-Rupee is expected to foster a broader acceptance of a cashless payment ecosystem in India. Through the adoption of digital currency, specifically the e-Rupee, the government aims to move towards a cashless economy. For individuals, a cashless economy translates to the convenience of digital transactions and liberation from the potential risks associated with carrying and storing physical cash.

3. Improved execution of government initiatives:

Although the allure of anonymity linked to physical cash continues to attract a substantial number of individuals and is not likely to be entirely supplanted in the foreseeable future, the increased financial inclusion enabled by the e-Rupee is anticipated to encourage wider acceptance of a cashless payment ecosystem in India. The government's pursuit of transitioning to a cashless economy is facilitated through the adoption of digital currency, specifically the e-Rupee. For individuals, a cashless economy equates to the ease of digital transactions and liberation from the potential risks associated with carrying and storing physical cash.



4. Impact of the Digitalisation on the economy:

Cryptocurrency in India has faced strict regulation and potential bans, with the RBI opposing "private virtual currencies" like Bitcoin and Ethereum due to their unregulatable nature. Cryptocurrency, while challenging to regulate, offers undeniable benefits over physical cash, particularly as digital payments gain popularity. To harness these advantages, the RBI is introducing the digital rupee, aiming to supplement rather than replace physical cash, reducing dependence on it. This shift toward digital payments is expected to cut costs associated with printing, storing, and transporting physical cash. However, challenges such as limited internet access and financial knowledge persist in India. Despite a 55% rise in digital payments over the last five years, there is room for improvement, and the implementation of the digital rupee serves as motivation for people to learn about cryptocurrency, financial management, and the internet.

5. Impact on Indian Businesses:

The ₹ is currently undergoing a pilot stage, with the participation of nine selected Indian banks focusing on settling inter-bank transactions. The retail segment of ₹ is scheduled to launch next month, targeting businesses. The initial rollout of the retail ₹ will be limited to specific locations, merchants, and customers as part of the ongoing pilot phase. A significant portion of business transactions in India occurs online, with the second quarter of this year witnessing 20.57 million online transactions. This surge in digital transactions has prompted payments giant Visa to explore long-term partnerships with fintech in India, particularly in the B2B space. Businesses opt for digital transactions over cash due to various risks associated with cash transactions, including physical damage, theft, accounting errors, and susceptibility to fraud and money laundering.

6. Digital currencies, existing in the online realm, are immune to tearing or physical damage:

Cryptocurrencies, including the upcoming Digital Rupee, are highly secure due to blockchain technology, and the RBI ensures protection even against quantum computing attacks. Digital payments eliminate manual tracking and accounting errors associated with physical cash, providing seamless integration with accounting software. Fintech solutions like RazorpayX integrate with software such as Tally and Zohobooks, automatically recording transactions for businesses. The Digital Rupee minimizes fraud and money laundering risks, reduces settlement risk to nearly zero, and fosters innovation in the retail space. The RBI plans to introduce the ₹ through private parties, akin to the BHIM infrastructure's impact on platforms like PhonePe and Google Pay. This digital currency will be held in digital wallets, streamlining adoption across businesses and paving the way for an "₹" option on regular payment platforms.



METHODOLOGY OF THE STUDY

Secondary Data:

The paper adopts a descriptive approach, relying solely on secondary sources for the study, including newspapers, the internet, journals, magazines, papers, articles, search engines, and other pertinent platforms.

Data Analysis:

To accomplish this study, the data gathered through secondary means includes articles, business magazines, newspapers, international journals, reports from private institutions, news channels, published research, internet sources, and extensive library research.

CONCLUSION

In the fast-paced digital era, traditional forms of currency are transforming, and one noteworthy development is the introduction of digital or electronic versions of national currencies. The e-rupee, in the context of India, represents a bold step towards embracing the potential benefits of digital currency in a rapidly evolving financial landscape. The e-rupee, much like other digital currencies, is designed to exist in electronic form, allowing for seamless, secure, and instant transactions through digital platforms. One of the primary motivations behind the adoption of digital currencies is to enhance financial inclusion by providing a more accessible and efficient means of conducting transactions.

E-rupee operates on blockchain technology, ensuring a high level of security and transparency in transactions. The decentralized nature of blockchain reduces the risk of fraud and unauthorized access. It also eliminates the intermediaries in financial transactions, the e-rupee can potentially reduce transaction costs for both individuals and businesses. This could lead to more cost-effective and efficient cross-border transactions. The advent of the e-rupee reflects India's embrace of technological advancements. It positions the country at the forefront of the global shift towards digital currencies, opening up new opportunities for innovation and economic growth. However, the introduction of digital currencies also allows the government to have greater control over the monetary system. Regulations can be implemented more effectively, and the central bank can monitor and manage the digital currency infrastructure.

While the e-rupee presents promising opportunities, there are challenges and considerations that must be addressed. These include concerns about data privacy, cybersecurity, and ensuring that the benefits of digital currencies are accessible to all segments of society.

The e-rupee represents a significant leap into the digital future of currency. As technology continues to advance, the adoption of digital currencies is likely to become more widespread globally. The success of the e-rupee will depend on effective implementation, public trust, and the ability to address potential challenges. If managed thoughtfully, the e-rupee could be a catalyst for financial inclusion and economic progress in the digital age.



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