

Transition of Digital Currencies towards Central Bank Digital Currencies (CBDCs): Emerging Issues

Dr. Awadhesh Kumar Tiwari *

Dr. Ajay Pratap Yadav**

Prabodh Singh***

*Assistant Professor, Department of Commerce, C.M.P. Degree College, University of Allahabad, Prayagraj

**Assistant Professor, Department of Commerce and Financial Studies, Central University of Jharkhand, Ranchi

*** Research Scholar, Department of Commerce, C.M.P. Degree College, University of Allahabad, Prayagraj

Abstract

CBDCs, as a form of digital fiat currency, have a different ontological status compared to crypt currencies, which are decentralized and operate independently of a central authority. The paper discusses how individuals and society perceive and understand CBDCs and cryptocurrencies. While deliberating upon future implications of CBDC's as replacement and substitute of physical money and traditional financial transactions, paper centers on understanding the fundamental of CBDCs and cryptocurrencies, and how they differ in their essential properties and how they are perceived by individuals and government.

Keywords: CBDC "Central Bank Digital Currency", Cryptocurrency, Bitcoin, Virtual Digital Assets.

Date of Submission: 26-08-2023

Date of Acceptance: 06-09-2023

I. Introduction

The world around us is rapidly moving toward a highly digital age. Now that goods and services are being delivered in a more digitized form, money is on its way to becoming fully digitized as well. The world has already started gearing itself for such a catalyst with the introduction of paperless payment, but this digitalization of money is in its pseudo form as the origin of money still takes place in the form of paper. A currency can be fully stated digital when from its origin till its transaction it remains fully digital. It can be accessed via computers and have no physical existence. This has led us to witness the rise of two new types of money, and CBDC "Central Bank Digital Currency" (www.skillsyouneed.com).

There are approximately 21,910 cryptocurrencies as on Dec 7, 2022 (Hicks, 2022). Bitcoin is the most popular cryptocurrency that is completely decentralized. Thousands of alike decentralized cryptocurrencies now exist, together making billions of dollars in worldwide transaction volume every day (De Bode et al., 2021). Crypto currencies like stablecoins are backed by assets or fiat currencies, like the dollar. Distributed-ledger technology underpins cryptocurrencies, which means that devices all over the world continuously verify transaction accuracy. But bitcoin and "stablecoins" like Diem (formerly Libra) (which peg their value to the dollar) are also posing a threat to state authority.

As centralized bank, a nation's central bank issues and manages a digital currency known as "digital currency. The IMF reports that more than 100 nations are investigating CBDCs in some capacity. However, only a small number of nations and territories will either implement CBDC by 2022 or have firm intentions to do so. A few locations where CBDC is already accessible include the Central Bank of The Bahamas (Sand Dollar), the Eastern Caribbean Central Bank (DCash), the Central Bank of Nigeria (e-Naira), and the Bank of Jamaica (JamDex) (www.forbes.com).

The present paper deliberates upon transition of digital currencies towards virtual digital assets and Central Bank Digital Currency (CBDC) and its potential implications in future. While conversing the polarization between crypto currencies and CBDC's, this paper presents the way in which cryptocurrencies and CBDC's are contrasting.

Virtual Digital Asset (VDA)

According to the Finance Bill of 2022, a virtual digital asset (or "VDA") is any data, code, or token generated using cryptographic techniques or in another way that satisfies certain requirements set forth by the government, such as offering a digital representation of value that can be transferred, stored, or traded electronically. A VDA also includes a Non-Fungible Token (NFT). The law specifies that VDAs are not a type

of currency, a means of exchange, or legal tender. Crypto currency, which is encompassed under the concept of VDAs is fundamentally different from CBDC (Munoyat, 2022).

Philosophy of Crypto currency

Being a subject that deals with the philosophy of finance, cryptocurrencies are intrinsically philosophical. The ideas underpinning cryptocurrency and the people who embrace it are among its most fascinating aspects. With cryptocurrencies, there is no longer a requirement for a "third party" to verify transactions and money, which is their entire function. Anarchist thought has a strong influence over this concept. According to the theory, people will make better decisions with their money if they are allowed to spend it anyway they like and are not subject to central planning (Idell, 2021).

The philosophy underpinning crypto currencies founded on the concept of stateless money, which seeks to facilitate financial autonomy. Stateless money denotes a currency that operates autonomously, independent of any central authority or government. It is a currency not backed by any state or government and is not bound by their regulatory measures. As a result, citizens are liberated from the impact of rising inflation and periodic recession, given that the political system is geared towards controlling fiat money, and cannot restrain the urge to increase its supply. This is done based on principles of decentralization, transparency, security, geographical freedom and privacy which crypto currency follows.

- Cryptocurrencies are decentralized digital currencies that operate independently of government or central authority control. Instead, they rely on distributed networks across the globe to maintain and validate transactions, ensuring their integrity.
- Transparency is a fundamental principle of crypto currency, as all transactions are publicly visible on the blockchain network and cannot be altered, ensuring accountability. Additionally, cryptocurrencies are transparent because their source code is publicly available and open source.
- Security is also a key feature of cryptocurrencies, as they use advanced cryptographic techniques to protect users' funds and personal information from theft, fraud, and other malicious activities. This is achieved through encryption and cryptographic hashing on the blockchain network.
- Geographical freedom is another essential characteristic of cryptocurrencies, allowing users to make payments to anyone around the world without intermediaries and regardless of geographical barriers, as long as they have an internet connection.
- Cryptocurrencies allow users to make transactions anonymously, using pseudonyms or anonymous addresses, encryption, and privacy-focused protocols to protect their personal identities.

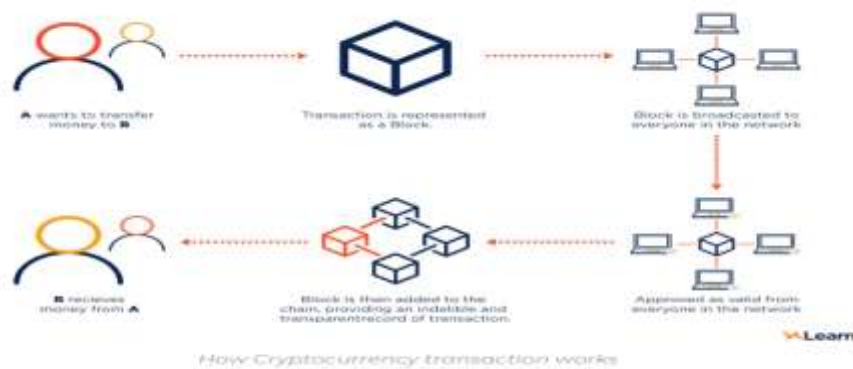
II. Cryptocurrency: As Virtual Digital Asset

Cryptocurrencies are totally decentralized and cannot be regulated by the government. It use cryptography rather than a central authority to manage its ledger and balances and to secure and verify transactions. Today, block chain technology is the most widely used type of ledger system for cryptocurrencies. It has gained quite popularity in the mess and has now started to challenge the hegemony of central banks over circulation.

Bitcoin is the most popular cryptocurrency (Hyatt, 2021) and is considered by many to be the very first crypto currency, but cryptocurrency existed before that, but it didn't obtain general attention until a few years after Bitcoin was introduced in 2009. The foremost cryptocurrency was e-Cash, created by the company DigiCash in 1990 and founded by American cryptographer David Chaum, who outlined the early form of anonymous cryptographic electronic money in a conference paper published in 1983 titled "Blind Signatures for Untraceable Payments" (Chaum, 1983). This concept was intended to allow untraceable payments that did not rely on centralized entities e.g. banks or government (Jones & Chandler, 2022) but unfortunately, the company went bankrupt before this could be fully realized.

Several other attempts were made for creating a crypto currency, such as Bit Gold, but they also could not solve the problem that plagued e-Cash. The infamous double-spending issue (digital data can be copied and pasted) without the service of a central authority. Double-spending is a problem that arises because digital currency can be very easily duplicated. Thus, it wasn't until a decade later in 2008, an anonymous individual or group, published under pseudonym; Satoshi Nakamoto, set the course for Bitcoin and later cryptocurrencies by publishing a white paper entitled "Bitcoin—A Peer-to-Peer Electronic Cash System" (Jones & Chandler, 2022). The paper outlined a system for creating a digital currency that did not require trust in any third party. This ultimately ushered Bitcoin's innovation, the most popular cryptocurrency in the current market. Satoshi Nakamoto mined the origin block of Bitcoin on January 3, 2009. This origin block — which resulted in 50 bitcoins standing mined — is now referred to as the Genesis Block. Bitcoin had practically no value at this juncture, as well as for the first few months of its existence. Later in the same year, it launched as open-source software.

Cryptocurrencies count on open-source code not only to function, but also to create faith and transparency. Open source is a crucial component in the Bitcoin and cryptocurrency domain, because, like cryptocurrencies, open source is “decentralized,” signifying there's no single administrator or entity in charge of it. Cryptocurrencies need a decentralized way of handling the code base, where it's public for everyone to view, modify and even try out for themselves.



Source: <https://www.moneycontrol.com/news/business/personal-finance/bitcoin-part-1-heres-how-the-crypto-currency-works-6400621.html>

Decentralization is an important objective for cryptocurrencies because it prevents any single entity from having control over the currency. Users who possess their own bitcoin retain full control over it, unlike today's major online financial systems where the only choice for individuals is to count on third parties, such as banks, with their money.

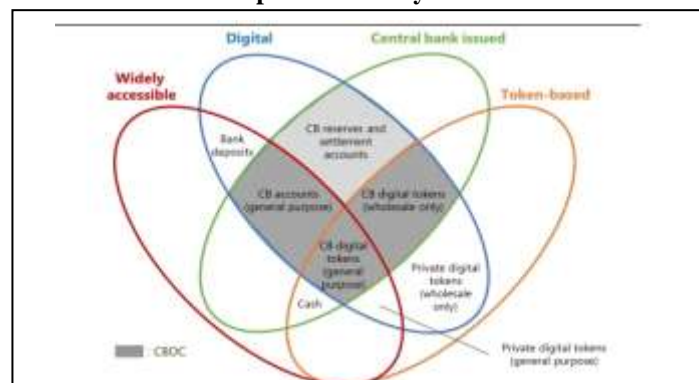
III. CBDC: A Central Bank Instrument

With the popularity of cryptocurrencies and stablecoins, central banks around the world have realized they must provide an alternative or risk losing control over money. Worldwide, this has allowed Central Banks to create Central Bank Digital Currency (CBDC) to counter them. CBDCs are central bank-issued virtual currencies.

For central banks, digital currency offers a securer, faster and more flexible alternative to notes and coins. CBDC (Central Bank Digital Currency) which are regulated and issued by central bank to supplement and replace standard currency. Thus, occasionally referred to as a digital representation of a country's fiat currency (Kumar A., 2022).

A taxonomy of currencies is represented by the "money flower" in *Bech and Garratt's (2017)* illustration. It considers CBDC in relation to other forms of currency. This particular version concentrates on the combinations of four essential characteristics: issuer (central bank or other); form (digital or physical); accessibility (widely or restricted); and technology. (token- or account-based). CBDC stands for central bank digital currency (omitting the existing monetary counterparties and certain non-monetary counterparties' access to digital central bank money). Crypto-assets and monetary systems like bitcoin and ethereum are examples of private digital tokens (general purpose). Bank deposits are not widely accessible in all jurisdictions.

Graph : 1 – Money Flower



Source: Based on Bech and Garratt (2017).

CBDCs will help central banks become stronger players in online payments. In that way, reliance on purely private payment systems would be less dangerous to financial stability. A trusted, official platform might be appealing to some people who wish to keep some of their digital cash.

There are several justifications for exploring digital currencies, and different nations have different justifications for releasing CBDCs. The following are some of the most frequently cited reasons: promoting competition and stability in the national payments market, which may necessitate encouragement to offer a more affordable and efficient money supply; increasing payment efficiency and lowering transaction costs; developing programmable money and increasing transparency in money flows; and providing seamless and easy money flow.

Central banks around the world want to seize the growth of cryptocurrencies by offering an alternative of their own with central bank digital currency. But this does not seem to be the case as both cryptocurrency and CBDC “Central Bank Digital Currency” being digital currency are more polar than it seems.

A secure central bank instrument may be one justification for the introduction of CBDC in a jurisdiction, particularly if the use of cash were to fall dramatically. Compared to central bank paper money, technological advancements over the past several decades have greatly increased the convenience and effectiveness of digital forms of private sector payment instruments (i.e., banknotes). In Sweden, these developments have led to an absolute decline in the amount of cash in circulation. The Riksbank (Central bank of Sweden) is investigating whether an e-krona (The Riksbank is looking at the possibility of issuing so-called e-kronas, a digital addition to currency, and if such a complement may assist the Riksbank in its mission to promote a secure and effective payment system.) would provide the general public with continued access to central bank money and increase the resilience of the payment system (*E-Krona Project Report, 2017*).

IV. Polarization Between Cryptocurrencies and CBDC

Since its introduction, there has been controversy about their use. Some contend that cryptocurrencies are more of a speculative asset than money, acting more as a store of value and unit of account than as a means of trade (*Yermack, 2015*). When a government issues currency with the guarantee "I promise to pay the bearer," it is referred to as public money. In its place, money may also be seen as private money that commercial banks issue through bank lending. Private money creation, on the other hand, is based on a monetary base of sovereign currency notes and coins. Money is regarded as a product of the state by Chartalism (*Wray, 2011*). The essential idea of money's foundation and denomination does not change, with public money supporting private money, even if the credit theory of money sees money as credits or debits (*Mitchell-Innes, 1914*). Private money existed even before as the government did not issue money, rather, banknotes were produced privately by banks. But over time, it is seen as a valuable public service (*White, 2021*). This has resulted in the government taking control of the supply of printed money. But with the rise of crypto currency, the sovereignty of the central bank over the money supply has been threatened and at the same time acts as a threat to national security (*Antanas et al., 2020, UNCTAD, 2022*). One more reason why cryptocurrencies have been popular is that they act as a hedge to monetary policy uncertainty as it has been observed that monetary policy uncertainty leads to stabilized cryptocurrency volatility (*Hsiao et al., 2022*).

This has led to central banks wanting their own digital money, which resulted in the creation of CBDC “Central Bank Digital Currency”. The CBDC has been defined “CBDC as a digital representation of a sovereign currency that is a liability of a jurisdiction's central bank or other monetary authority and is issued by those institutions” (*Kiff et al., 2020*). The CBDCs can help the Central Bank keep its role of providing money, stability, and access to a digital economy (*Deloitte, 2022*).

With a modernized version of central bank money, CBDC's seeks to improve payments maintaining essential qualities of finality, liquidity, and integrity that can only be provided by the central bank (*Auer et al., 2021*). CBDCs may facilitate direct, prompt, and targeted transfers of aid or stimulus packages to the public or businesses. Additionally, given the potential for programming, they could establish a feedback loop on the use of such funds to help with policy decisions (*Bossone & Natarajan, 2020*).

It has been examined that CBDC “Central Bank Digital Currency” could make it comfortable for monetary policy to operate in an open manner. If central bank digital money is centrally controlled, it can act as a free medium of commerce, a safe place to preserve value, and foster true price stability (*Bordo and Levin, 2017*).

The conceptual framework for presenting the polarization between the cryptocurrencies and the CBDC “Central Bank Digital Currency” is based on the attributes of cryptocurrencies and CBDC, why individual prefer cryptocurrencies and CBDC, and lastly, how the government view cryptocurrencies and CBDC.

CBDCs are issued and endorsed by a central authority, while cryptocurrencies are decentralized and generally created through a process called "mining." CBDCs are legal tender and they are regulated by governments, while the legal status of cryptocurrencies differs by jurisdiction and is not universally accepted. The main intent of CBDCs is to provide a digital alternative to cash, while the main intent of most

cryptocurrencies is to provide a decentralized means of exchange and store of value. CBDCs are not anonymous, as transactions can be tracked and traced, while cryptocurrencies offer contrasting degrees of obscurity through the use of pseudonyms or other methods.

CBDCs are generally considered to be more secure than cryptocurrencies, as they are backed by the full faith and credit of the issuing central bank and transactions are recorded on a secure, centralized ledger. Cryptocurrencies, on the other hand, rely on decentralized networks and complex cryptography to maintain security. A central authority operates CBDCs, so scaling the network is much easier. In a cryptocurrency grid, connections have to run a shared consensus to change any elements of the grid. This could give a challenge when the grid needs to rise, but the connections are not in agreement over the way forth.

The primary rational motive for individuals to invest in cryptocurrencies is asset potential of such currencies. This means there's a prospect of a high return on assets. This cannot be said for CBDC as they are the fiat currency of the nation and its value remains the same over time.

Cryptocurrencies, unlike fiat money, have a restricted supply limited by mathematical algorithms which act as a Long-Term Store of Value. The supply of CBDC is guided by the central bank just like a fiat currency, as a result, it has the same inflationary effect as a fiat currency.

Committing to crypto renders investors with a ton of transaction freedom, something that is not offered by most financial systems. If you need money, crypto and its affiliated exchanges are easy to access and liquidate.

The reliability of crypto is another cause individuals are deciding to commit to digital currencies. There is a finite supply of bitcoin, and as a result, it is a long-term and sound form of currency that is not subject to diluting from inflation by political or government agencies.

The government of India does not view cryptocurrency as a currency nor even as a financial asset or real assets or even digital assets. Therefore, it cannot be controlled by any financial sector regulator. According to the Reserve Bank of India, it is not possible to regulate something that is not defined (*Reserve Bank of India, 2022*).

Since every economy is unique, there is no single argument in favour of CBDCs. When geography prevents physical banking, for instance, a CBDC might be a key step toward financial inclusion. In other cases, a CBDC could provide as a crucial fallback in the event that other forms of payment are unsuccessful. One such instance when the Eastern Caribbean Central Bank expanded the CBDC pilot to include regions affected by a volcanic explosion. Therefore, central banks should modify programmes to suit their unique needs and conditions (*Georgieva, 2022*).

The aim of central banks is to lessen the effect of CBDCs on credit provision and financial intermediation. This is crucial for the economy's machinery to function properly. The CBDCs available in the nations do not pay interest, which makes them functional but less alluring as a savings vehicle than conventional bank deposits.

In order to prevent a rapid inflow of bank deposits into CBDC, ownership of CBDCs was also restricted in each of the three projects that are now implementing CBDC—in the Bahamas, China, and the Eastern Caribbean Currency Union.

Limits on CBDC ownership also assist in balancing the need for privacy with the prevention of nefarious financial flows. If the dangers of money laundering and terrorist funding are low, smaller assets are permitted without the need for complete identification. This could be beneficial for financial inclusion. At the same time, more thorough inspections are needed for larger transactions and holdings.

When it comes to CBDC legislation and adoption, privacy issues could be a deal-breaker in many nations. So it's crucial that lawmakers choose the appropriate blend. Finding a careful balance between design and policy advancements is crucial to the introduction of a CBDC. The appropriate design requires time, money, and ongoing learning from experience, especially cross-national shared experiences. There will be a need for strong cooperation with private enterprises in order to properly distribute CBDCs, develop e-wallets, expand functionality, and push the bounds of technology. But the policy considerations, such as creating new legal frameworks, rules, and case law, are equally crucial. A CBDC needs careful planning on both fronts in order to meet policy objectives like financial inclusion and prevent unfavorable side effects like unexpected capital outflows that could threaten financial stability. Trust in CBDCs will be supported by deliberate design and policy considerations when taken as a whole.

Before a country begins a CBDC, it must carefully analyse each of the issues. By purchasing CBDCs, clients run up against banks and take out a large sum of money all at once, limiting the banks' ability to lend and driving up interest rates. For countries with fragile financial systems in particular, this is a problem. Operational risks also exist for CBDCs as a result of their vulnerability to cyber-attacks and the need to make them robust against them. Finally, before using this technology, a complicated regulatory structure that includes rules for consumer protection, privacy, and anti-money laundering must be strengthened (www.atlanticcouncil.org).

A CBDC is being investigated by 114 nations, representing more than 95% of the world's GDP. There were only 35 nations exploring a CBDC as of May 2020. A record number of 60 countries are in advanced phases of exploration (development, pilot, or launch). Eleven countries have completely implemented digital currencies, and the 260 million-person trial project in China is anticipated to be expanded to the entire country in 2023. Jamaica is the newest country to adopt the JAM-DEX as its CBDC. By December 2022, every G7 economy would have advanced to the CBDC development level. Project Cedar, a large-scale CBDC experiment by the New York Federal Reserve, has moved the US from research to development (www.atlanticcouncil.org). In The Bahamas, the Eastern Caribbean, Nigeria, and Jamaica, there are four active retail CBDCs. There are already 34 jurisdictions with pilot programmes for both wholesale and retail CBDC. (Auer et. all., 2023).

V. CBDC: An Imperative For Cash Less Economy in India

In terms of innovation in digital payments, India has made significant strides. Due to the passage of a distinct legislation governing payment and settlement systems, the nation's payment eco-system has been allowed to grow in an organized manner. The current state-of-the-art payment systems, which are available 24 hours a day, seven days a week, 365 days a year, and are inexpensive, accessible, convenient, effective, safe, and secure, are a source of pride for the whole country since, in many situations, India is well ahead of the most developed nations in this field (PIB, 2022).

In recent years, acceptance of digital currencies has increased all around the world. In order to further support the digital economy, The Central Bank Digital Currencies ("CBDCs") were welcomed by the Indian government, which proclaimed its intention to incorporate them in the Union Budget 2022-2023. Accordingly, on October 7, 2022 and October 21, 2022, respectively, the Reserve Bank of India ("RBI") published a concept paper and a press release announcing the operationalization of the CBDC-Wholesale (e-W), the pilot launch of the digital rupee for certain use cases.

CBDC is described by the RBI as "a central bank's digital version of legal tender. It resembles sovereign paper currency but is presented in a different way. It can be exchanged for existing currency at par value and will be recognized as a means of payment, legal tender, and a secure place to deposit value." additionally known as the "Digital Rupee" or e-Rupee." CBDCs would appear on the balance sheet of the RBI as a liability because they are a sovereign currency, just like real money does (Kochar and Mediratta, 2031).

CBDC is divided into two categories by the RBI: retail ("CBDC-R") and wholesale ("CBDC-W"). The private sector, individuals, and other non-financial consumers are the main target market for CBDC-R, an electronic equivalent to physical cash that is primarily intended for retail transactions. Given that CBDC-R is a direct responsibility of the RBI, the central bank, it is anticipated that it will give users access to safe money for payment and settlement. Conversely, CBDC-W is made to only be accessed by a limited number of financial institutions in order to settle interbank transfers and related wholesale transactions (www.rbidocs.rbi.org).

Both direct (single tier) and indirect (two layer) systems are available for the issuance of CBDC. In the direct approach, the RBI would be in charge of overseeing every element of the CBDC system, such as account maintenance, transaction verification, issuance, etc. Analogous to the present physical currency format, by using banks and other service providers as middlemen, the RBI will issue CBDC to clients directly.

In a token-based system, the owner of the currency (token) and the capacity to transfer the token would both exist, just like with real money. In an account-based structure, a middleman will handle the token transfer from the payer's account to the payee's account, keep track of the transactions and balances of CBDC holders, and verify the account holder's identification. The central bank suggested that an account-based version of CBDC-W and token-based version for CBDC-R will be preferred. (www.rbidocs.rbi.org).

To promote digitization in order to transition away from a cash-based economy, India is a special scenario because despite significant digitalization in the payments sector, the amount of cash in the economy has increased. The demand for cash has not decreased despite the expansion of electronic payment methods. In the years 2020–21 and 2021–22, the value of banknotes increased by a percentage of 16.8% and 9.9%, respectively, while the volume of banknotes increased by a percentage of 7.2% and 5%, respectively (RBI Annual Report, 2021-22) The second wave of the COVID-19 epidemic led to a higher-than-average rise in the number of banknotes in circulation in the years 2021–2022, which is mostly to blame for the public's precautionary holding of currency.

Additionally, a Reserve Bank pilot study on people's retail payment preferences found that cash remained the most common way of payment and of receiving funds for regular expenses in six cities between December 2018 and January 2019, with digital mode coming in second. Cash is primarily utilized for transactions of low value (up to ₹ 500).

In any uncertain situation, such as the one caused by the COVID-19 pandemic, CBDC can be a favoured method of retaining central bank money as opposed to cash. Additionally, as long as sufficient anonymity is guaranteed, the preference for cash transactions for routine expenditures and modest payments can be moved to CBDC acceptance. This will speed up the nation's conversion to digital technology. Since its

introduction, the Reserve Bank Digital Payment Index (RBIDPI) has shown a considerable increase in adoption and deepening of digital payments throughout the nation. This rise is a sign that the country's use of digital payments is deeper and spreading, and it shows that Indians are interested in using them. Due to its simplicity of use and sovereign guarantee, the central bank's digital currency will therefore, offer an additional alternative for advancing the cause of digital payment, in addition to the variety of other digital payment instruments already accessible.

The growth of national CBDCs and their interoperability are anticipated to be significant drivers of future international commerce and payments in the majority of the world's major countries. The existing SWIFT platform-based system of cross-border payments is increasingly perceived as being expensive and time-consuming, and even the BIS is actively seeking nations to take the international component into consideration when they construct their CBDCs. Further, the significant drive being made by China to develop the digital Yuan as a currency that can be used for cross-border payments to their trading and investment partners is the second external element that is important for India. It would only be a matter of time until these begin to enter the Indian economy if the digital Yuan becomes widely accepted as a worldwide currency. This has serious consequences for data security in addition to the potential for a dollarization-type problem in the traditional sense. It is in India's best interest to prevent this given the tense relationship it has with China (*Priyadarshini and Kar, 2021*).

Fundamental systemic flaws in Indian banking that show up as high levels of non-performing assets (NPAs) and bankruptcy risks. In the event of systemic disintermediation or the potential for a bank run brought on by CBDCs, banks in India will likely require much more support if the banking industry is weak (*Priyadarshini and Kar, 2021*).

VI. Conclusion

There are several clear benefits of CBDCs, including cost savings, risk management, financial inclusion, and increased economic digitization. Recent history has provided some encouraging signs of the country's preparedness, like the quick acceptance of UPI, Fastag, and Rupay cards. There are, however, a few very obvious issues that demand attention. How much traction CBDC will get is difficult to predict given the uniqueness of the underlying concept. The success of CBDC will also be greatly influenced by the availability and widespread use of a number of financial products and payment options, including prepaid payment instruments and UPI. This gives rise to the question, if India is even ready to adopt a new form of payment?

Additionally, the challenge of striking a balance between traceability, anonymity, and privacy must be taken into account when the RBI struggles to build an interoperable system to incorporate CBDC into the Indian economy. Therefore, whether CBDC is a "hit" or a "miss" depends on the judgments that the RBI makes later when they implement the plans. In order to maintain our ability to compete globally, and maintain our competitiveness, we must embrace and develop CBDCs as quickly as possible to protect our financial and digital security.

REFERENCES

- [1]. Andrulevicius, Antanas & Stankevičius, Andrius & Limba, Tadas & Driaunys, Kęstutis. (2020). Cryptocurrency and National Security: Peculiarities of Interaction. *Transformations in Business And Economics*. 19. 138. Retrieved November 3, 2022, from https://www.researchgate.net/publication/342154267_crypto_currency_and_national_security_peculiarities_of_interaction
- [2]. Auer, R., Frost, J., Gambacorta, L., Monnet, C., Rice, T., & Shin, H. S. (2021). Central Bank Digital Currencies: Motives, Economic Implications and The Research Frontier. *SSRN Electronic Journal*, 976. <https://doi.org/10.2139/ssrn.3922836>
- [3]. Bech, M and R Garratt (2017): Central Bank Cryptocurrencies, *BIS Quarterly Review*, September, pp 55–70.
- [4]. Bordo, M., & Levin, A. (2017). Central Bank Digital Currency and the Future of Monetary Policy. *National Bureau of Economic Research*. <https://doi.org/10.3386/w23711>
- [5]. Bossone, B., & Natarajan, H. (2020). Getting Funds to those in need and enabling access to money during COVID-19, Part 3: Central Bank Digital Currencies and other instruments. *Centre for Economic Policy Research*. Retrieved November 4, 2022, from <https://cepr.org/voxeu/columns/getting-funds-those-need-and-enabling-access-money-during-covid-19-part-3-central>
- [6]. Chaum. (1983). *Blind Signatures for Untraceable Payments*. Springer US. https://link.springer.com/chapter/10.1007/978-1-4757-0602-4_18.
- [7]. D., Sabyasachi Kar (2021). Central Bank Digital Currency (CBDC): Critical Issues and the Indian Perspective. https://iegindia.org/upload/profile_publication/doc-240921_152405wp444.pdf.
- [8]. De Bode, I., Higginson, M., & Niederkorn, M. (2021). Central Bank Digital Currency and Stablecoin: Early Coexistence On an Uncertain Road. *Mckinsey*. retrieved November 3, 2022, from <https://www.mckinsey.com/industries/financial-services/our-insights/cbdc-and-stablecoins-early-coexistence-on-an-uncertain-road>.
- [9]. Deloitte. (2022). Central Bank Digital Currencies | Future of Value Transfer Deloitte. retrieved November 4, 2022, From <https://www2.deloitte.com/in/en/pages/financial-services/articles/central-bank-digital-currencies.html>.
- [10]. E-Krona Project Report (2017): The Riksbank's E-Krona Project – Report 1, September Retrieved from https://www.riksbank.se/globalassets/media/rapporter/e-krona/2017/rapport_ekrona_uppdaterad_170920_eng.pdf.
- [11]. Georgieva Kristalina (2022). The Future of Money: Gearing up for Central Bank Digital Currency retrieved From <https://www.imf.org/en/news/articles/2022/02/09/sp020922-the-future-of-money-gearing-up-for-central-bank-digital-currency>
- [12]. Hicks, C. (2022). Different Types of Cryptocurrencies– *Forbes Advisor*. *Forbes*. Retrieved January 20, 2023, from

- <https://www.forbes.com/advisor/investing/crypto-currency/different-types-of-cryptocurrencies/>.
- [13]. Hsiao, S., Zeng, X., & Ma, C. (2022). Monetary Policy Uncertainty and Cryptocurrency volatility. *ssrn.com*. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4261669
- [14]. <https://journals.sagepub.com/doi/full/10.1177/02632764211049826>.
- [15]. <https://rbidocs.rbi.org.in/rdocs/publicationreport/pdfs/conceptnoteacb531172e0b4dfc9a6e506c2c24ffb6.pdf>.
- [16]. <https://www.atlanticcouncil.org/cbdctracker/>.
- [17]. <https://www.forbes.com/advisor/investing/crypto-currency/digital-currency/>.
- [18]. <https://www.moneycontrol.com/news/business/personal-finance/bitcoin-part-1-heres-how-the-crypto-currency-works-6400621.html>.
- [19]. <https://www.skillsyouneed.com/general/digital-crypto-currency.html>.
- [20]. Hyatt, J. (2021). What are the top 10 most popular Cryptocurrencies? Nasdaq. Retrieved November 3, 2022, from <https://www.nasdaq.com/articles/decoding-crypto%3a-the-10-most-popular-cryptocurrencies-2021-08-05>.
- [21]. Idell G. Ada (2021). Into to Crypto Philosophy. <https://medium.com/codex/intro-to-crypto-philosophy-93b5b5525a1f>.
- [22]. India – One of the Pioneers in Introducing CBDC (2022). Press Information Bureau, Ministry of Information and Broadcasting, Govt. of India <https://static.pib.gov.in/writereaddata/specificdocs/documents/2022/dec/doc2022121139201.pdf>.
- [23]. Jones, E., & Chandler, S. (2022). A Brief History of Crypto Currency. *cryptovantage.com*. retrieved October 25, 2022, from <https://www.cryptovantage.com/guides/a-brief-history-of-crypto-currency/>.
- [24]. Kiff, J., Alwazir, J., Davidovic, S., Farias, A., Khan, A., Khiaonarong, T., Malaika, M., Monroe, H., Sugimoto, N., Tourpe, H., & Zhou, P. (2020). A Survey of Research on Retail Central Bank Digital Currency. IMF; International Monetary Fund. <https://www.imf.org/en/publications/wp/issues/2020/06/26/a-survey-of-research-on-retail-central-bank-digital-currency-49517>.
- [25]. Kochar Sumit, Mehdiratta Amrita (2023). India: Central Bank Digital Currency in India. <https://www.mondaq.com/india/financial-services/1269372/central-bank-digital-currencies--a-primer-on-the-rbis-concept-paper>.
- [26]. Kumar, A. (2022). Central Bank Digital Currency Tracker. Atlantic Council. Retrieved November 3, 2022, from <https://www.atlanticcouncil.org/cbdctracker/>.
- [27]. Mitchell-Innes., (1914). The Credit Theory of Money Bank. *Law J.*, 31, Pp. 151-168 (Dec./Jan.), Google Scholar.
- [28]. Munoyat Lalit (2022). Taxation of Cryptocurrency, Virtual Digital Assets, Non-Fungible Tokens. <https://taxguru.in/income-tax/taxation-cryptocurrency-virtual-digital-assets-non-fungible-tokens.html>.
- [29]. Ozili Peterson K (2022). Circular Economy and Central Bank Digital Currency, *Circular Economy and Sustainability* (2022) 2:1501–1516, <https://link.springer.com/article/10.1007/s43615-022-00170-0>.
- [30]. Raphael Auer, Giulio Cornelli, Jon Frost (2023), Rise Of The Central Bank Digital Currencies: Drivers, Approaches And Technologies. Retrieved from <https://www.bis.org/publ/work880.htm>.
- [31]. Reserve Bank of India. (2022). Concept Note on Central Bank Digital Currency. Reserve Bank of India. Retrieved October 22, 2022, from <https://rbidocs.rbi.org.in/rdocs/publicationreport/pdfs/conceptnoteacb531172e0b4dfc9a6e506c2c24ffb6.pdf>.
- [32]. Reserve Bank Of India. (2022). Speeches. Reserve Bank Of India. Retrieved October 23, 2022, from https://rbi.org.in/scripts/bs_speechesview.aspx?id=1196.
- [33]. UNCTAD. (2022, August 10). UNCTAD Spells out Actions to Curb Cryptocurrencies in Developing Countries. UNCTAD. Retrieved November 3, 2022, from <https://unctad.org/news/unctad-spells-out-actions-curb-cryptocurrencies-developing-countries>.
- [34]. White, L. H. (2021). How U.S. Government Paper Currency Began, and How Private Banknotes Ended. Cato Institute. Retrieved November 3, 2022, from <https://www.cato.org/blog/how-us-government-paper-currency-began-how-private-banknotes-ended>.
- [35]. Wray, L. R. (2011). Keynes after 75 Years: Rethinking Money As A Public Monopoly. *SSRN Electronic Journal*. <https://doi.org/10.2139/ssrn.1795503>.
- [36]. Yermack, D. (2015). Is Bitcoin a Real Currency? An Economic Appraisal. *Handbook of Digital Currency*, 31–43. <https://doi.org/10.1016/b978-0-12-802117-0.00002-3>.