

BLOCKCHAIN TECHNOLOGY AND **INTRODUCTION TO DIGITAL RUPEE**

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INTRODUCTION

“Blockchain” is a revolutionary “distributed ledger technology” that was initially proposed in 2009 by Satoshi Nakamoto in the innovation and implementation of the cryptocurrency Bitcoin. Blockchain is a conglomeration of many inventions with a distinct commercial value. Blockchain creates a shared ledger that operates as a central repository for all parties participating in a commercial transaction. The blockchain does away with the necessity for a central authority to verify transactions.

Permissioned and permissionless architectures may both use blockchain. These models may be used in a variety of fields, including education, government, finance and banking, universal health care, transportation, cyber security, journalism, law, and the power industry, to name a few. Considerable attempts are being done on a global and national level to adopt “Blockchain-based technologies. Proof-of-concepts (PoCs)” as well as pilot implementations have gone off without a hitch. A national plan on Blockchain technology is required in order to realize the potential of the technology.¹

OVERVIEW OF TECHNOLOGY

Blockchain, a distributed ledger innovation, adds a layer of confidence to transactions by removing the requirement for a “third party to verify them”. Blockchain technology is indeed a hybrid of several technologies, including distributed networks, “cryptography”, and so on.

¹ Blockchain application and outlook in the banking industry, https://www.researchgate.net/publication/311549710_Block_chain_appliation_and_outlook_in_the_banking_industry, last Accessed on 20 February 2022

Cryptographic hash methods protect data and information contained in Blockchain blocks against manipulation. The hash function is used to join blocks together with sufficient security. This results in a Blockchain, which would be a distributed ledger that is stored throughout the network's nodes. At majority levels, it is impossible for an enemy to change the stored information. As a result, when compared to other technologies, Blockchain offers more security.

BLOCKCHAIN TECHNOLOGY'S IMPORTANCE

Without relying on a centralized body for trust, blockchain technology leverages distributed software system to create a shared ledger with such a single source of information for transaction records. As a result, it aids in the creation of confidence in the digital environment through the use of technology. A Blockchain network can represent and monitor any real or intangible item of value, bringing transparency, speeding up processes, and lowering costs. Contracts may be automated using smart contracts on top of the Blockchain network. Transparency, safety, and efficiency are among the advantages of Blockchain technology, which enhance the experience in establishing a mutual trust over the Web for a variety of applications.²

TECHNOLOGY'S VALUE ADDITION IN THE E-GOVERNMENT DOMAIN

The use of Blockchain technology in the e-governance area promotes awareness, transparency, and maybe prevents insider assaults on critical data connected to governance problems. Reliability and accountability are two fundamental elements of e-governance, both of which are strongly supported by Blockchain technology. Because every information or transaction documented in Blockchain is nearly difficult to tamper with, and because “consensus-based transaction” backup and recovery among Blockchain distributed nodes ensures confidence

² National BCT Strategy, https://www.meity.gov.in/writereaddata/files/National_BCT_Strategy.pdf, last accessed on 20 February 2022.

among its stakeholders mostly in the digital world, this technology ensures trust among its stakeholders. Because all stakeholders have access to the very same arbiter of facts in terms of process information “stored on the Blockchain network”, trust is developed.³

This type of technology has the potential to make big improvements in e-governance, where a variety of services have social implications. On the educational system, for instance, student credentials, scholarship information, and other data can be maintained in a Blockchain system. Various parties, such as academic institutions, different departments charged with scholarship disbursements, and appropriate administrative bodies, can collaborate and preserve student records on a consensual basis.

Similarly, in the supply chain area, the Blockchain network's track and trace capacity allows for the avoidance of any unintended mistakes or insider attacks in terms of data maintenance among numerous stakeholders.

As a result, this technology may be efficiently employed in instances when numerous companies or departments are participating in a given workflow, resulting in a system that is not only extremely efficient and more trustworthy and transparent.⁴

“By comparing the properties of the given information report to the of the original version recorded in Blockchain”, authorities may validate the evidence of existence of papers. The digital artefacts associated with documents are stored on a Blockchain, which makes them safe and impenetrable to tampering.

SCENARIO AT THE NATIONAL LEVEL

Blockchain technology has been selected by the “Ministry of Electronics and Information Technology (MeitY)” as one of the significant research fields with application potential in several sectors such as democracy, finance and banking, cybersecurity, and etc.

NATIONAL EFFORTS: DEVELOPED AND PILOTED APPLICATIONS

³ Blockchain: The India Strategy: Part 1, NITI Aayog <https://niti.gov.in>, last accessed on 20th February 2022.

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MEITY

“With C-DAC, Institute for Development & Research in Banking Technology (IDRBT), Hyderabad, and Veermata Jijabai Technological Institute (VJTI), Mumbai as implementing agencies, MeitY has

funded a multi-institutional initiative named, Distributed Centre of Excellence in Blockchain Technology". Agencies have conducted research on the application of Blockchain technology in many fields and generated Proof-of-Concept solutions as part of that process. A blockchain-based property registration system has been developed and is being tested in Telangana's Shamshabad District. Proof-of-Concept solutions have been created to help you get started.⁵

SCENARIO AT THE GLOBAL LEVEL

Blockchain technology and cryptocurrency have now become well-known and well-understood across the world. The use and understanding of Blockchain technology is rapidly increasing. Many countries have realized the value of Blockchain technology and therefore are attempting to be global leaders.

Prototype, Pilot, and Production Applications

Many governments have developed Blockchain-based platforms and services, and many vendors are selling Blockchain-as-a-Service to clients.⁶

1. “China's Blockchain-based Service Network (BSN) program”, intends to enable businesses and people to build Blockchain applications more quickly and affordably. BSN provides a range of developer tools to help in the development of smart city and digital economy apps.

2. A Blockchain-based identification process for smart cities is being developed in China. This technology will issue Chinese smart cities a unique, worldwide digital ID in order to promote

⁵ Tamil Nadu Blockchain Policy 2020 <https://tnega.tn.gov.in>, last accessed on 21 February 2022.

⁶ Bhattacharyya B, Pradhan S (2017) Digital revolution in the Indian banking sector, <http://www.forbesindia.com/article/weshool/digital-revolution-in-the-indian-banking-sector/47811/1>. Accessed 21st February 2022.

communication and data sharing among them. A Blockchain-enabled Notary Service is also being developed in China.

3. The European Blockchain Partnership (EBP) aims at developing a considered reliable, safe, and adaptable “European Blockchain Services Infrastructure (EBSI)” that meet international standards in terms of interconnectivity, confidentiality, cyber security, and policy implementation using Blockchain and distributed ledger technologies.

4. The Smart Dubai program in the United Arab Emirates seeks to make “Dubai the first city to be totally powered by Blockchain by 2021”, improving everything from education and health care to “transportation management” and “green sustainability”.

5. Food and drug inspections in the United States to address the lack of openness and security. The Food Standards Agency in the United Kingdom is utilizing Blockchain to monitor the circulation of meat in order to improve food traceability.

6. The Swiss city of Zug was the first in the globe to accept Bitcoin transactions for tax reasons. They've designed “a Blockchain-based voting mechanism” as well as a Blockchain TaskForce to assist businesses in deploying the Blockchain architecture.

Academics, research organisations, and industry are working on blockchain platforms all over the world, working on enhancing throughput of the system, scalability, and assurance, with the goal of offering Blockchain-based digital transaction portals with interoperability all over numerous chains.

CHALLENGES

BCT has a lot of promise. However, there are a number of obstacles to overcome, including:

- **Interoperability:** There is currently no single worldwide standard for blockchain systems under use around the world. As a result, it is not being integrated into established interoperability processes. This will make it impossible for many parties to operate on the very same blockchain system, resulting in distinct interoperability concerns.

- Security: To safely access the system using BCT, layered security covering authorisation for parties utilizing the system is required, ensuring transaction security against insider threats or cyberattacks.
- Legal framework: The users of BCT and its applications are distributed around the globe. There are now no national or international legislation on the subject of jurisdiction.

REGULATORY AND LEGAL FRAMEWORK

1. The initial use cases could well be selected in such a way that contractual responsibilities and legal elements are not altered. The primary goal should be to use technology to improve transparency and openness in the beginning.
2. As “the national Blockchain framework” grows and based on the lessons learned from implementations, updates to current laws and policies might well be made. As the framework evolves to meet the demands of diverse application domains, MeitY as well as other ministries inside the Indian government may work on particular legislation and policies for it.⁷
3. Relevant parties may be contacted to solve the legal problems of making Smart Contracts acceptable in courts.

THE CURRENT STATE OF AFFAIRS

To address the numerous problems, the responders who are deploying the new technology took the following techniques.

⁷ Blockchain Market Industry Analysis and Forecast (2019-2027) by Provider (Application and solution, Middleware, Infrastructure and protocol), by Organization Size (SME and Large), by Application, by Industry Vertical and by Geography, Report by MAXIMIZE MARKET RESEARCH PVT. LTD.

1. For privacy and security reasons, banks often do not wish to share their whole ledger with partners. As a result, only relevant and secure transaction data was made public on the share ledger for a limited number of transactions on a case-by-case basis. They've all taken adequate precautions to assure cybersecurity.
2. Responders also emphasized the need to start implementing technology changes while integrating with current infrastructure.
3. Fewer respondents wanted regulators to be fully involved and cooperative in the deployment of new technologies in banks. They demanded new regulations.
4. They took the safe way of doing pilot initiatives to achieve scale acceptance.
5. Responders emphasized collaborative efforts in latest technological adaption and implementation with solutions and services, FinTech businesses, select banks, and select clients, similar to but not identical to a "WhatsApp" group with just an administrator.
6. Several of them emphasized cost distribution through joint efforts with partners over a lengthy period of time, and
7. One responder stated that the absence of standards made building interoperability BCT platforms challenging.
8. There is currently no regulation in place for BCT as well as its applications. Nevertheless, regulatory agencies in several nations are looking into the legal aspects of BCT for further clarification.

A NATIONAL BLOCKCHAIN SYSTEM IS NECESSARY

The National Blockchain Framework will help in scaling up established application deployments, establishing common infrastructure, and allowing cross-domain software development. The platform may initially be designed to assist government applications, but it

can subsequently be expanded and adopted to enable other important applications. As a result, infrastructure must be built throughout numerous locations around the country.

Because no single platform can cover the needs of all of the country's application areas, the suggested infrastructure may be used to support many Blockchain platforms. This will allow each application to take use of the platform's unique characteristics. It is also suggested that an indigenous Blockchain platform be designed and developed, including established best business practices and sophisticated technology capabilities.⁸

Domain-specific chains, such as property chains, health chains, education chains, and so on, may be housed and operated using smart contract logic on each of these platforms. The platform would've been capable of supporting several smart contracts and ledgers to fulfil the country's larger needs. Asset generation, asset connecting to users, asset transferring or tracking, and other basic procedure automation functional features might be supplied utilizing straightforward to use and “standardized APIs using the National Blockchain API”. It will make modifying the software applications for just about any workflow specifications easier, as well as allowing users to take use of the National Blockchain architecture.⁹

Any application may employ other general value addition features like “proof-of-storage”, “proof-of-existence”, and “futuristic visualization techniques” and cognition to increase its capabilities. Probabilistic information visualization and knowledge will aid in the development of business information from Blockchain metadata. Linkage points with current national services like “e-Pramaan, Aadhaar, eSign, Digilocker”, and others are also possible. Aspects of security and privacy can be implemented from across Blockchain Framework's tiers.

DIGITAL RUPEE

The government has suggested including an RBI Digital Rupee controlled by RBI in the Union's budget for 2022, revealed by Finance Minister Sitharaman. The use of digital currencies

⁸ Bhattacharyya B, Pradhan S (2017) Digital revolution in the Indian banking sector, <http://www.forbesindia.com/article/weshool/digital-revolution-in-the-indian-banking-sector/47811/1>. Accessed 21st February 2022.

⁹ Mundra SS (2015) Indian banking sector: emerging challenges and way forward. In: Lecture by Mr. S S Mundra, Deputy Governor of the Reserve Bank of India, as part of the Memorial Lecture series launched by State Bank of Mysore, Bangalore.

by central banks will result in more favourable currency administration. From fiscal year 2022-23, the digital rupee released by the Reserve bank would utilise blockchain technology, according to the FM. The Reserve Bank of India (RBI) is developing a tiered usage approach for the introduction of the Central Bank Digital Currency (CBDC) by researching the cases to keep a strategic distance from disruption, the center told the Lok Sabha last year. Authorities stated that the RBI has proposed changing the Reserve Bank of India Act 1934 in October to enlarge the mandate of the bank.¹⁰

THE RESERVE BANK OF INDIA'S DIGITAL RUPEE

The RBI has worked slowly to embrace CBDC after carefully analyzing its impact on a variety of concerns, including how it may affect banks' ability to deploy shops and its possible impact on financial arrangement implementation.

In a resounding rejection of crypto currencies, Nirmala Sitharaman announced that the Digital Rupee will indeed be introduced in India during the fiscal year 2022-23.

One of the most eagerly anticipated developments is the digital rupee. It's crucial to know how the other crypto currencies are taxable or whether the digital rupee provides any advantages, according to Bhatia, BDO India's Tax and Regulatory Services Partner and Leader. "With no expenditure deductions, a 30% tax rate, a resource extraction tax, and also no loss offsetting against the other income sources.

The FM has given crypto transactions much-needed clarity. In the lack of a central authority, however, tracing such transactions can be difficult.

In addition, a number of central banks in large economies are looking at the prospect of launching a central bank digital currency. A CBDC is a virtual currency, except it is produced by the central bank and, unlike other virtual currencies, is backed by the government.¹¹

¹⁰ Union Budget 2022-2023, <https://www.indiabudget.gov.in/>, last accessed on 21st February 2022.

¹¹ Budget 2022: All you need to know about Digital Rupee announced by FM Sitharaman, <https://www.firstpost.com/business/market-roundup-sensex-declines-by-149-points-nifty-ends-at-17206-check-top-winners-and-losers-here-10395591.html>, last accessed on 21s February 2022.

With the advent of private virtual monetary standards such as bitcoins, the problem of CBDC has risen in prominence in recent years. While these independent currencies have their own set of advantages, they are not supported either by the government and hence have no legal standing. The widespread use of various monetary types threatens to upset the system, moreover, it overturns the agile framework of fiat currencies produced by countries inside a border.

According to Shilpa Mankar Ahluwalia, Collaborator & Head-Fintech- Shardul Amarchand Mangaldas & Co., the Authorities as well as the RBI will likely spend the next twelve months thinking through the CBDC system – then by the end of the year, expect more clarification on queries like whether initial use instances will be confined to wholesale usages (or too retail), the role of mediators, or whether digital rupee wallets would be enthralled bearing.¹²

Declaring the budget to launch a digital rupee currency would probably be a trigger for the establishment of a forthcoming esteemed exchange stage which will contribute towards a more diverse payments environment," stated Monish Shah of Deloitte India. For households, commerce, and the economy as a whole, creative and efficient. This will pave the way for improvements in securities settlement for financial systems, nuclear markets, programmable transactions for DBT, and, of course, cross-border transactions.

CBDC'S IMPACT ON CITIZENS' LIVES

CBDC is a lawful payment currency issued by a central bank in digital form. It resembles fiat cash printed on paper and may be exchanged for some other fiat currency. Although experts have offered numerous scenarios about how the digital rupee would be settled, a formal statement first from Reserve Bank of India is anticipated to describe how citizens could deal with the digital rupee.

¹² Which Governments Are Using Blockchain Right Now? <https://consensys.net/>, last accessed on 21st February 2022.

A crucial distinction is that a rupee-to-rupee digital transfer is quick, unlike the present digital payment experiences. The government's goal regarding cryptocurrencies as well as other different monetary types is essentially communicated in the budget proclamation.

The RBI has expressed concerns about currency laundering, terrorist funding, tax evasion, and other issues with private companies on several occasions. The CBDC will be launched by the Reserve Bank of India in the next fiscal year. This comes after the government announced its intention to develop the CBDC, which would be supported by blockchain technology and cryptocurrencies like Bitcoin, Ether, and others, and had planned to disclose its claim CBDC.

The CBDC will be launched by the Reserve Bank of India in the next fiscal year. This comes on the heels of the government's intentions to build a CBDC underpinned by blockchain technology. The digital economy will benefit greatly from the adoption of the central bank's digital currency. A much more productive and cost-effective money management system will be enabled by digital currency.

The introduction of digital currency would also result in a more efficient and cost-effective currency management system. As a result, it is suggested to establish the digital rupee, that will be released by the Reserve Bank of India between 2022 to 2023 and would be based on blockchain and other technologies.

CONCLUSION

The National Plan to Grow a Trusted Virtual Framework for Offering e-Government Services Using Blockchain did lay out all the overall approach as well as the design and implementation techniques for a National Blockchain Platform, which includes the “technology stack”, “legal and regulatory”, “initiatives to make”, “collaborative effort”, “human capital development”, and “possible use cases”. It is intended that this strategy paper will give the required advice and assistance for fulfilling the goal and establishing a countrywide ecosystem for the

development of relevant applications utilizing the National Blockchain Platform in many fields.

“MeitY will collaborate with a variety of government agencies and other stakeholders to put this approach into reality and realize the many benefits of Blockchain technology, including heightened security, trustworthiness, and the capacity to assure tamper-evident payments”.

A specialized team would indeed be formed to assist reference implementation at various state and federal government programs. Current services from MeitY and other government entities will also be migrated to the secure digital service.

The Reserve Bank of India is attempting to develop a prototype blockchain platform across the sector in order to stimulate the usage of BCT. BCT will enhance access for underserved customers, promote company accountability, and enhance consumer security. BCT allows any transaction to take place without the need for a central agency to monitor it. BCT keeps records of money on an electronic 'ledger' that is open to the public.

“The results of this study show that all of the survey respondents are at varying processes of technology acceptance and deployment in different banking procedures. BCT's potential is gradually being recognized in the Indian private sector, with banks like Axis, ICICI, YES, and Kotak Mahindra” using it for domestic and international trade finance”.