International Journal of Advance and Applied Research
www.ijaar.co.in
ISSN – 2347-7075 Impact Factor – 8.141
Peer Reviewed Bi-Monthly
Vol. 6 No. 22 March - April - 2025

Block Chain Technology in Banking Sector

Dr. Surwase Suwarnamala Maruti
Assistant Professor

Corresponding Author – Dr. Surwase Suwarnamala Maruti
DOI - 10.5281/zenodo.15533508

Abstract:

In the last few years, all of our attention has turned to a new technology. This technology is Blockchain. Blockchain Technology is a rapidly developing, promising and revolutionary next-generation technology. It has changed the entire process of how our business works. If we want to understand it in simple terms, we can say that this technology is just like Google Docs; but it is many times more advanced and complex. Blockchain technology can be defined as a data structure that securely stores transactional records while promoting transparency and decentralization. This framework significantly reduces the risk of fraudulent activities and transaction duplication, eliminating the necessity for intermediaries. In India, banks serve as some of the most experienced and prominent financial intermediaries. The banking sector has undergone substantial transformations, shifting from traditional banking practices to more convenient banking solutions. The primary aim of my study is to examine and analyze the effectiveness of blockchain technology within the banking sector, as well as to address the associated challenges concerning data privacy and the security of customer information in the context of blockchain technology.

Keywords: Block Chain, History, Block chain in Indian Banking System

Introduction:

Blockchain technology is a type of digital ledger technology. It records information and transactions in such a way that it is difficult to change, hack, delete, or corrupt them, or to cheat the system. These transactions are copied and distributed across a network of all computer systems on the blockchain. In other words, it is a decentralized distribution network that records many transactions in the form of blocks on a chain. When a new transaction is made on the blockchain, its information is added to the ledger of every participant in that chain. Since all these things are updated in real-time, no one can change them. This is why blockchain transactions are considered truly transparent. If someone tries to change them, that person will have to change every block on the relevant blockchain. This is a practically complicated and almost impossible task. Moreover, transactions in the ledger are authorized by the owner's digital signature. This makes them more authentic. Moreover, the system can immediately detect any attempt to alter transactions. Products based on blockchain technology such as Bitcoin and Ethereum (an alternative currency) have become very popular in the past few years. Why is blockchain technology so popular? The most important reason behind the popularity of blockchain technology is its transparency and immutability. It is a decentralized peer-to-peer network system that does not have a specific owner. Unlike other centralized, traditional transactions, there is no need to control transactions. This technology works

on the mutual consent of users and developers, which is why it becomes more trustworthy (Blockchain is trustworthy). In traditional transaction methods, there is always a need for an intermediary to control transactions between two people. Your bank is a good example of a money transaction. When you send money to your friend or family member, your bank is involved in this process. The bank also keeps a record of all your transactions and monitors them; However, the same bank can also tamper with it, which makes these transactions unsafe. Blockchain technology eliminates this intermediary. Because it is an end-to-end technology. Moreover, it is a digital ledger, the records of which cannot be easily tampered with. In addition, blockchain makes the transaction process easier and faster. This is why Bitcoin and blockchain products in services such as finance, supply chain, health, and manufacturing are becoming increasingly popular.

History of Blockchain:

The history of blockchain technology began with the emergence of Bitcoin in 2008, although blockchain technology already existed. This technology is used to record transactions in a decentralized, secure, and transparent manner.

Blockchain technology was initially introduced in 1991 as a method for time-stamping digital documents, ensuring they could not be backdated or modified. This technology utilizes cryptographic methods to create secure chains of blocks that store these time-stamped documents (Haber and Stornetta, 1991). A decentralized digital currency known as "bit gold" was also developed during this time, serving as a direct precursor to the architecture of Bitcoin. This research further established the groundwork for smart contracts (Szabo, 1998). In the 2000s, systems utilizing cryptographically secured chains began to emerge, along with concepts for their application (Konst, 2017). Initially, blockchain technology garnered interest for its capacity for anonymity, akin to cryptocurrencies; however, its true value became evident through its complete transparency (Popovski and Soussou, 2018). In 2009, Satoshi Nakamoto implemented blockchain as the public ledger for Bitcoin. Although it was not the first proposal for an online currency, Bitcoin addressed several challenges in the field and has emerged as the most successful (Nakamoto, 2008). The original and largest blockchain facilitating Bitcoin transactions serves as the foundation for the ledger designed by Nakamoto (Nakamoto, 2008). The necessity to rely on a central authority and the dynamics of power and governance over information have been significantly transformed (Haber and Stornetta, 1991). Subsequently, in 2014, Vitalik Buterin introduced the Ethereum protocol, which enabled tokenization through smart contracts (Buterin, 2016). While the original Bitcoin blockchain requires users to possess a functional understanding of its mechanics, Ethereum offers a more user-friendly interface that provides a framework for tokens, such as those used in art investments (Buterin and Obrist, 2018).

Blockchain in Indian Banking System:

In the discussion paper titled ‘Blockchain: The India Strategy,’ published by Niti Aayog in January 2020, it was recognized that blockchain has the potential to significantly transform various facets of both government and private sector activities. The document highlighted that NITI Aayog has focused on four key areas to evaluate the potential of blockchain technology in enhancing efficiency and to gain insights into the challenges that may arise during its implementation.

The discussion paper concluded that the primary requirement for an effective

blockchain-based solution is the reduction of intermediaries. It highlights India's distinctive approach, where the government takes the initiative in establishing public digital infrastructure, thereby enabling private sector innovation to build upon it for further advancements.

In pursuit of implementing blockchain technology in India to enhance various financial services, 15 banks—comprising 11 private banks and four public sector banks—have established the Indian Banks' Blockchain Infrastructure Company Private Limited (IBBIC).

The private banks involved include HDFC Bank, ICICI Bank, Kotak Mahindra Bank, Axis Bank, IndusInd Bank, RBL Bank, Yes Bank, IDFC Bank, South Indian Bank, and Federal Bank. The public sector banks participating are the State Bank of India, Bank of Baroda, Canara Bank, and Indian Bank.

These Indian banks aim to utilize blockchain technology to address challenges in processing Letters of Credit (LCs), GST invoices, and e-way bills. Currently, the issuance of LCs requires human intervention for authentication and fraud detection, resulting in extensive paperwork. By adopting blockchain, these banks anticipate a significant reduction in transaction processing time and paperwork.

The proposed system will utilize Finacle Trade Connect, a blockchain-based trade finance solution developed by Infosys. This solution aims to digitize the trade finance business process, encompassing ownership validation, document certification, and payment processing, all while operating on a distributed, trusted, and shared network. It supports various functions, including Letters of Credit, Bill Collection, Purchase Order Financing, and Invoice Financing, among others.

Here are several banking services where blockchain technology could bring significant changes:

- **Customer KYC and Fraud Detection/Prevention:** Blockchain can securely store customer data across various blocks, enhancing the protection of sensitive information against cyberattacks. By utilizing a blockchain for KYC data, financial institutions can access necessary customer information in a decentralized manner. This technology also aids in fraud prevention by providing a transparent audit trail and incorporating multiple redundancies, making it nearly impossible to alter any data once recorded on the network. Consequently, the decentralized nature of blockchain facilitates safer and more efficient information sharing among financial entities.
- **Loans and Credit Assessment:** Traditional banks rely on credit reporting systems, such as CIBIL, to evaluate loan applications. By eliminating intermediaries in the lending and credit sectors, blockchain technology can enhance the security of borrowing processes and potentially lower interest rates.
- **Payments:** Currently, international money transfers can take several days and involve multiple intermediaries, each charging fees that increase the total cost for customers. By implementing a decentralized ledger for transactions, blockchain technology can enable quicker payments with reduced fees compared to traditional banking systems.
- **Clearance and Settlement Systems:** A critical aspect of trading stocks, commodities, or debt is determining ownership. Presently, this process involves brokers, exchanges, central securities depositories, clearinghouses, and custodian banks. Blockchain has the potential to streamline transaction settlements directly between banks,

offering improved tracking capabilities compared to conventional methods like SWIFT. Distributed ledgers can lower operational costs and move us closer to real-time transactions among financial institutions.

- **Trade Finance:** Trade finance plays a vital role in the global financial system, yet it predominantly relies on manual and paper-based documentation. Utilizing data blocks can securely store essential information such as the country of origin, product details, and transaction specifics, which are crucial since banks involved in trade finance primarily handle documentation. By eliminating the cumbersome, paper-intensive bills of lading process, blockchain technology has the potential to enhance transparency, security, and trust among global trade participants.

On an international scale, several companies, including WeTrust (lending), Ripple (clearance and settlement), and Wave (letters of credit), are demonstrating that blockchain technology can enable banks to execute financial transactions in a more cost-effective, secure, and expedited manner.

In India, the adoption and integration of blockchain technology by banks is still in its early stages, resulting in a limited number of success stories and case studies. However, this situation is expected to change in the near future.

Conclusion:

Blockchain serves as a crucial application for banks, facilitating their operations efficiently. It is a broad topic, making it challenging to address all its facets in a limited timeframe. Nevertheless, significant efforts have been made to highlight the key elements, including the use of encryption and digital signatures. The data recorded on the blockchain is secure and immutable, ensuring it cannot be altered. In India, banks are among the most experienced and prominent financial intermediaries. The implementation of blockchain technology has the potential to significantly transform transaction processing and verification, enhance asset management, and improve financial operations across various organizations.

References:

1. Agarwal, A., Parihar, M. and Shah, T., 2020, Feasibility of Adoption of Blockchain Technology in Banking and Financial Sector of India. Advances in Intelligent Systems and Computing, 479–487.
2. Ahmed, M. R., Meenakshi, K., Obaidat, M. S., Amin, R. and Vijayakumar, P., 2021, Blockchain-Based Architecture and Solution for Secure Digital Payment System. 2021 International Conference on Communications, 1-6. Bedi, P., Gole, P., Dhiman, S. and Gupta, N., 2020. Smart Contract-based Central Sector Scheme of Scholarship for College and University Students. Procedia Computer Science, 171, 790-799.
3. Bfsi, E. T., 2021, How Indian banks are leveraging blockchain technology. ETBFSI.Com. https://bfsi.economictimes.indiatimes.com/news/banking/how-indian-banks-areleveraging-blockchain-technology/88027231.
4. Bharti, A.K., 2019, November. A study of emerging areas in adoption of blockchain technology and it's prospective challenges in India. In 2019 Women Institute of Technology Conference on Electrical and Computer Engineering, WITCON ECE, 146-153.
5. Buterin, V., 2016, What is ethereum? Ethereum Official webpage. http://www. ethdocs.org/en/latest/introduction/what-is-ethereum. html.

6. Chacko, N. M., Narendra, V. G., Balachandra, M. and Kaushik, S., 2022, Blockchain Framework for Agro Financing of Farmers in South India. Communications in Computer and Information Science, 679–690.
7. Chavan, A.B. and Rajeswari, K., 2020. Design and development of self-sovereign identity using Ethereum blockchain. In Sustainable Communication Networks and Application: ICSCN 2019, 523-531.
8. Springer International Publishing. Collomb, A. and Sok, K., 2016. Blockchain/distributed ledger technology (DLT): What impact on the financial sector? Digiworld Economic Journal, 103, 93-110.
9. Dahiya, R., 2021. Blockchain Technology-Applications & Opportunities in Banking. Amity Management Review, 10
10. Sinha, S. (2017). FinTech: The New Frontier. IEEE Potentials., 36(6), 6-7, 2017.