

# A Study on the Impact of Blockchain Technology in the Banking Sector

M. P. Jasir<sup>1</sup>, K. U. Jaseena<sup>1</sup>, Bhavya Kamal K Menon<sup>2</sup>

<sup>1</sup>Department of Computer Applications, MES College Marampally, Aluva, Kochi, Kerala, India

<sup>2</sup>Department of Electronics, MES College Marampally, Aluva, Kochi, Kerala, India

## ABSTRACT

Artificial Intelligence, Robotics Process Automation, Cyber-Security, and Blockchain are the key innovations that are going to transform banking in the near future. Blockchain has the potential to disrupt traditional business models and replace existing systems. Banks should develop and share a secure database of client information to reduce the time, effort, and costs associated with interbank transactions. Blockchain technology is being used by banks to accelerate digitalization. It applies mathematical, cryptographic, and economic principles and maintains a database between various participants without the need for a third party or central authority. The validity of a transaction can be verified by the parties involved in the transaction using a distributed database. Each group of these transactions is referred to as a block. A key benefit of Blockchain is that financial transactions are validated, cleared, and settled instantly without the need for a central authority. Capital markets and other financial services will undergo a major change as a result of blockchain technology. It can radically change the banking and finance sector, offering ample opportunities for growth and innovation, and can reduce risk and cost. We aim to assess the banking industry's impact on blockchain technology in this paper. A blockchain-based business solution provides transparency and security. However, blockchain adoption faces some challenges, such as security, privacy, and scalability, which must be addressed before it can be commercially viable. The purpose of this paper is to provide an overview of Blockchain Technology, as well as its benefits and applications in the banking industry. The paper also discusses various Blockchain Technology challenges in the banking industry.

**Keywords:** Blockchain Technology, Banking sector, Digitization,

## I. INTRODUCTION

Banks are among India's oldest and largest financial service providers. Several significant changes in the banking sector's operation have occurred since liberalization. Banks in India have shifted from "conventional banking" to "convenience banking." In 1988, the RBI established a computerization committee led by Dr. C. Rangarajan. The goal was to improve customer service, accounting, and MIS reporting. Banks began their journey into information technology with the introduction of stand-alone PCs, followed by Local Area Network (LAN) and the adoption of core banking, which proved to be a promising step towards enhancing consumer convenience through 'Anywhere - Anytime Banking'. Furthermore, with the entry of private sector financial institutions and foreign banks, the transition from paper-based to computerized banking has

accelerated. Banks saved both money and time by implementing new technologies such as e-banking, MICR-based cheque processing, electronic funds transfer, inter-connectivity among bank branches, and ATM implementation. (Automated Teller Machine). The banking system experienced a digital revolution with the adoption of NEFT (National Electronic Fund Transfer), ECS (Electronic Clearing Service), and RTGS (Real-Time Gross Settlement). Internet banking, mobile banking, debit cards, credit cards, prepaid cards, and other financial services have gained widespread acceptance in the Indian banking system. The National Payments Corporation of India's (NPCI) launch of United Payments Interface (UPI) and Bharat Interface for Money (BHIM) are significant steps towards payment system innovation. (RBI, 2017). As a result, there has been remarkable progress in the banking sector in terms of the digital revolution. Today, the financial institutions' objective is to provide customers with quick, error-free, and high-quality service.

Artificial Intelligence, Blockchain Technology, Robotics Process Automation, and Cyber-Security are the key innovations that will shape the future of banking by 2020 [1]. Banks are advancing digitalization through the use of Blockchain Technology, which is the most innovative phenomenon and is regarded as a global force of disruption. Blockchain technology will usher in the Fourth Industrial Revolution around the world.

Blockchain Technology is a new technology that uses mathematical, cryptographic, and economic principles to maintain a database between multiple participants without the need for a third party or central authority. It is a secure distributed database in which the validity of a transaction can be verified by the parties involved. Each group of these transactions is known as a "block." Once completed, a Block records some or all of the recent transactions and adds them to a Blockchain as a permanent record. The benefit of Blockchain is that financial transactions no longer require any central authority and can be validated, cleared, and settled instantly. Blockchain technology appears to be an innovation that will have a significant impact on capital markets and other financial services. Blockchain is going to shake up the banking industry in the coming years.

The paper is structured as follows. Section 2 discusses related works, and Section 3 discusses the benefits of block chain technology. Sections 4 and 5 discuss the applications and challenges of blockchain technology. The paper concludes with summaries in Section 6.

## II. RELATED WORKS

Since 2008, the term "blockchain technology" has been in use. The first application was for bitcoins. Blockchain can be used to register contracts, transfer assets or inventory in finance, and transfer tangible or intangible property. Gupta and Gupta [1] presented Blockchain Technology applications in the Indian Banking Sector. Patki and Sople [2] demonstrated how blockchain can be implemented, as well as the challenges it faces, in the Indian banking sector. Kumari and Devi [3] talked about the impact of FinTech and Blockchain Technologies on Banking and Financial Services. Guo and Liang [4] developed blockchain technology applications in the banking industry. Laroiya et al. [5] also discussed blockchain technology applications. The impact of blockchain technology in the banking industry was assessed by Ramchandra et al [6]. Ali et al. [7] surveyed the impact of blockchain technology in the financial services sector: Jena [8] investigated the factors influencing blockchain technology adoption in the banking sector. Hariguna et al. [9] discussed how Blockchain technology will impact future change. Knezevic [10] investigated the impact of blockchain technology platforms on the financial and other industries. Palihapitiya [11] discussed the Blockchain revolution in the banking industry. Hassani et al. [12] investigated the impact of blockchain and big data technologies on banking.

### III. BENEFITS OF BLOCKCHAIN TECHNOLOGY

Blockchain is an innovative technology that has the potential to transform the banking and financial sectors by providing numerous opportunities for growth and innovation while also reducing risk and cost. It will result in a major transformation of the banking sector, rendering many current systems and processes redundant and obsolete. The following are some of the benefits of Blockchain Technology:

- **Reduced transaction costs:** Blockchain technology allows market participants to gain direct access to dematerialized assets and stored data. It saves banks money on reconciliation and protects them from fraud losses. Blockchain ensures that payment and settlement occur concurrently, resulting in lower treasury costs for fund management. Due to near-real-time transaction processing, blockchain used in cross-border remittances can assist users in obtaining the best exchange rates from foreign- exchange marketplaces.
- **Efficiency:** Blockchain accelerates transaction processing by reducing decision-making time across organizations with minimal human intervention. It eliminates the need for duplicate record keeping, reduces reconciliations, and reduces errors and frauds, resulting in faster payment and settlement. In the event of a catastrophic event, such as a war, flood, or earthquake, the remaining Blockchain participants can approve a transaction.
- **Eliminates intermediaries:** The foundation of any business is trust. The cryptographic blockchain replaces third-party intermediaries as the keeper of trust. When parties transact directly with each other without the need for a central authority or a middleman, it reduces overhead costs.
- **Transparency:** Blockchain aids in the preservation of an irreversible record of transaction events in sequential order, resulting in greater transparency in business transactions. It provides the origin of messages in the payment area, resulting in transparency and risk reduction.

### IV. APPLICATIONS OF BLOCKCHAIN TECHNOLOGY

Blockchain technology can be applied in a variety of industries, and industry leaders are customising Blockchain applications to meet their specific needs [1]. The following are some useful cases of Blockchain Technology and their applicability to the banking sector:

**Digital Currency:** Cryptocurrency functions as a medium of exchange, employing cryptography to make transactions more secure and to control the creation of new units of currency. Bitcoin, Ethereum, Ripple, Litecoin, and other popular cryptocurrencies are listed below. Since users have control over their transactions, cryptocurrencies aid in the prevention of identity theft. It protects the merchant from the risk of fraud as the transactions are irreversible once completed and do not contain any personal information. It also allows money to be sent and received anywhere in the world at any time without the involvement of central authorities. The transactions are verified immediately and are visible to all participants. Furthermore, the transaction cost of converting into fiat money is very low.

However, there are some limitations to digital currencies. The demand for digital currency is growing by the day, but there are only a limited number of digital currencies available. As a result, digital currency has experienced high volatility and risk. The Reserve Bank of India has also issued periodic warnings to virtual currency users about potential financial, operational, legal, customer protection, and security risks. Because cryptocurrencies have no intrinsic value, currency holders may face increased risk due to price volatility and

liquidity. It is difficult to meet the Anti-Money Laundering (AML)/ Combating Terrorist Financing (CFT) requirements for digital currency transactions. The privacy concerns associated with digital currency schemes have also discouraged various financial system participants from using it for their own or their customers' benefit.

Many central banks around the world have begun developing a digital version of their fiat currency in order to reap the benefits of Blockchain Technology. For example, the Canadian Central Bank has created the CAD coin as a digital version of the Canadian Dollar, and the Dutch Central Bank is experimenting with DNB coin virtual currency.

**Trade Finance:** It is the most commonly recommended application of Blockchain Technology. A complex letter of credit transaction can be made simpler and faster if all of the major corporations, shippers, manufacturers, and customs authorities join the Blockchain network. Exporters, importers, and their respective banks share the information on a private distributed ledger. Following the fulfilment of certain conditions, the trade deal can be executed automatically via various smart contracts. The parties can view data as well as actions taken on their systems.

Multiple records for currency trade are created and reconciled for buyer, seller, broker, clearer, and third parties in foreign exchange trading. Currency exchange Cobalt DL, a blockchain startup, uses Blockchain to eliminate multiple trade records. Technology is far more efficient than existing infrastructure because it eliminates unnecessary licence fees, ticketing fees, overheads, and so on.

**Blockchain Technology in Capital Markets:** Blockchain technology has the potential to completely transform capital market trading processes. Currently, various capital market intermediaries update their respective ledgers based on messages exchanged amongst them for proper accounting and business transaction execution. This is a time-consuming and expensive procedure. There is sometimes an additional delay in transaction settlement because intermediaries may need to complete additional formalities for some transactions.

Blockchain technology can be used in trade and securities servicing. KYC checks can be completed much more quickly and cheaply with the help of KYC data stored in Blockchain. Transparency, reduced credit exposures, real-time matching of transactions, and prompt irrevocable settlement will all be enabled by blockchain. It eliminates intermediaries, resulting in lower margin and collateral requirements.

Blockchain technology can be used in custody and securities services. Securities are issued to the parties involved on the Blockchain platform, which simplifies accounting and administration of securities due to automatic subscription and redemption processing.

**Supply Chain Financing:** Small and medium-sized enterprises (SMEs) face numerous challenges in obtaining credit due to a lack of adequate collateral and credit history. Blockchain can improve supply chain finance by increasing security, efficiency, and decision making. According to the Global Trade Review (2015), several institutions, including Standard Chartered Bank, DBS Bank, and the Singapore Infocomm Development Authority, are working on a Blockchain-based invoice trading platform.

**Monitoring of Consortium Accounts:** One of the most important applications of Blockchain Technology is the prevention of money laundering. The lender does not track the final use of funds because the borrower moves funds from one bank to another in multiple transactions. Blockchain technology aids in the monitoring of a borrower's final use of funds provided by a consortium of banks. It will result in a reduction in Non-Performing Assets (NPA) because banks will be able to monitor the final use of funds. All group members have access to information about the movement of funds, which helps to strengthen the monitoring mechanism.

**Know Your Customer (KYC):** Banks are concerned about the rising costs of complying with Anti-Money Laundering (AML) and Know Your Customer (KYC) regulations. Every bank and financial institution must perform the KYC process separately. Currently, banks must upload KYC data to a central registry, which banks can access to perform due diligence on existing or new customers. Blockchain technology would eliminate this duplication of effort. All client updates will be available in real time to all banks. It will aid in the reduction of fraud and NPAs, which have long plagued the Indian banking sector.

Top Indian banks such as ICICI Bank, Yes Bank, Kotak Mahindra Bank, and Axis Bank are increasingly recognising Blockchain Technology's enormous potential. They believe that Blockchain Technology will transform the banking industry. They are utilising the technology for vendor financing as well as international trade financing. ICICI Bank successfully completed its pilot project in cross-border remittances with Dubai's largest bank, Emirates NBD. The time required to settle cross-border remittances has been reduced from two days to a few minutes thanks to Blockchain Technology. In collaboration with global financial institutions, Axis Bank Ltd. and Kotak Mahindra Bank Ltd. have jumped on the Blockchain bandwagon. They primarily work in the cross-border remittance and trade finance industries.

## V. CHALLENGES OF BLOCKCHAIN TECHNOLOGY

Blockchain technology has enormous potential, but it faces a number of challenges that may slow its adoption rate. Among the difficulties are:

- **Interoperability:** There is currently no international standard for competing Blockchain systems. Greater interoperability is required to integrate Blockchain into existing practises and processes and to make it compatible with the wider web. If all parties are on the same Blockchain network, operational feasibility can be achieved. Interoperability issues are becoming more prevalent as the number of competing Blockchain networks grows.
- **Privacy:** Data on Blockchain Technology is inherently shared publicly among all system participants. There are several issues with transaction privacy on Blockchain because the data is made public and anyone can see it. Although private blockchains are more secure, they have interoperability issues with other Blockchains.
- **Encryption:** There are numerous issues concerning the encryption of Blockchain data. If the key is made public, anyone can access the encrypted data, and if the key to unlock the Blockchain is lost, it is impossible to recover it. Encryption used in Blockchain technology may be broken through system loopholes as people discover new ways to manipulate or misuse data.
- **Security:** Because of its complex cryptography, blockchain is supposed to be extremely difficult to hack. Any security breach necessitates massive computing power on the part of cyber security attackers. There must be multi-level security in place, including authorization of parties accessing Blockchain, protection from malicious insiders, cyberattacks, transaction security, and infrastructure security. Depending on the nature of the transactions, blockchain systems can be permissionless or permissioned.
- **Scalability:** As the number of Blockchain applications grows, so does the need for a larger Blockchain database, as well as faster database access. The speed and accuracy with which a transaction is processed will be critical in making it commercially viable. To handle enormous volumes of data as handled by the current system, Blockchain Technology must have a very high processing speed.

- **Energy Consumption:** The use of Blockchain Technology consumes a significant amount of energy. Technology has its own massive carbon footprint. It necessitates massive computing power far exceeding that of the world's fastest supercomputers.
- **Legal Framework:** National and international regulations do not exist for Blockchain Technology and its applications. Though various governments around the world are investigating Blockchain applications, more clarity on the legal aspects of Blockchain Technology is needed.

The aforementioned limitations or challenges may dampen enthusiasm for Blockchain potential, but they can be addressed with incremental improvements to the Blockchain framework over time.

## VI. CONCLUSION

Blockchain will have a significant impact on the banking industry. It has the potential to displace traditional business models and obsolete existing systems. Different banks should create and share a secure database of client information to help reduce time, effort, and cost in interbank transactions. In order to progress towards a cashless society, now is an excellent time to begin appropriate efforts to digitize the Indian rupee using Blockchain technology.

Fintech and startups should collaborate closely with government agencies and regulators to ensure that the legal and regulatory framework is conducive to the use of Blockchain applications. To address current inefficiencies and problems, industry needs should be identified and customized Blockchain solutions developed. To make Blockchain commercially viable, some issues such as security, privacy, and scalability must be addressed. Blockchain awareness should be spread through various trainings, workshops, and by incorporating it into educational institutions' curricula.

Traditional banks will migrate to the digital banking portal due to the need for technological transformation, collaboration, and business savings. Banking and financial services are constantly on the lookout for cutting-edge technology to improve client experiences. Needs in the financial sector are being driven by the development of new technologies and rising consumer expectations, while digital transformation is critical to increasing consumers. While blockchain technology continues to face numerous challenges, it remains the most promising technology in the banking and financial sectors.

## VII. REFERENCES

- [1]. Gupta, A. and Gupta, S., 2018. Blockchain Technology Application in Indian Banking Sector. Delhi Business Review, 19(2), pp.75-84.
- [2]. Patki, A. and Sople, V., 2020. Indian banking sector: Blockchain implementation, challenges and way forward. Journal of Banking and Financial Technology, 4(1), pp.65-73.
- [3]. Kumari, A. and Devi, N.C., 2022. The Impact of FinTech and Blockchain Technologies on Banking and Financial Services. Technology Innovation Management Review, 12(1/2).
- [4]. Guo, Y. and Liang, C., 2016. Blockchain application and outlook in the banking industry. Financial innovation, 2, pp.1-12.
- [5]. Laroiya, C., Saxena, D. and Komalavalli, C., 2020. Applications of blockchain technology. In Handbook of research on blockchain technology (pp. 213-243). Academic press.

- [6]. Ramchandra, M.V., Kumar, K., Sarkar, A., Mukherjee, S.K. and Agarwal, K., 2022. Assessment of the impact of blockchain technology in the banking industry. *Materials Today: Proceedings*, 56, pp.2221-2226.
- [7]. Ali, O., Ally, M. and Dwivedi, Y., 2020. The state of play of blockchain technology in the financial services sector: A systematic literature review. *International Journal of Information Management*, 54, p.102199.
- [8]. Jena, R.K., 2022. Examining the factors affecting the adoption of blockchain technology in the banking sector: An extended UTAUT model. *International Journal of Financial Studies*, 10(4), p.90.
- [9]. Hariguna, T., Durachman, Y., Yusup, M. and Millah, S., 2021. Blockchain technology transformation in advancing future change. *Blockchain Frontier Technology*, 1(01), pp.13-20.
- [10]. Knezevic, D., 2018. Impact of blockchain technology platform in changing the financial sector and other industries. *Montenegrin Journal of Economics*, 14(1), pp.109-120.
- [11]. Palihapitiya, T., 2020. *Blockchain Revolution in Banking Industry*. University of Moratuwa, Sri Lanka.
- [12]. Hassani, H., Huang, X. and Silva, E., 2018. Banking with blockchain-ed big data. *Journal of Management Analytics*, 5(4), pp.256-275.