

# THE IMPACT OF BLOCKCHAIN TECHNOLOGY ON FINANCIAL MARKET

Jiya Mishra

B.com (Honours) Accounting and finance,  
Contact no.: 8320870366, email id: jiyamishra2710@gmail.com

## Abstract

Blockchain is a data storage method that makes it hard or impossible for other parties to change, hack, or control the system. A blockchain, also known as a distributed ledger, is a system of computers that copies and distributes transactions among themselves. [1] This research aims to define the blockchain-based digital capital market, examine its features, and investigate how its parallels to the efficient capital market can promote financial inclusion. The introduction of blockchain technology into the financial system is a significant development. The historical research on the subject reveals a research gap in that there is a lack of knowledge about this innovation and a dearth of information covered in a single paper. The goal of this study is to gather specific data about its potential application in the financial market, including what modifications it might bring about and how it might impact its operation. The examination of security concerns highlights the significance of blockchain technology in creating unchangeable ledgers and thwarting fraudulent activities. Decentralization is the main topic of many concerns, which assess its effects on system resilience and transparency. A critical evaluation directs future research by highlighting implementation gaps, constraints, and untapped potentials. The study concludes by highlighting the difficult balancing act between advantages and disadvantages and, continued technology advancements, and public awareness campaigns to smoothly incorporate blockchain's revolutionary potential into the financial sector.

**Keywords:** Blockchain, Technology, digital capital market, financial system, revolutionary potential.

## INTRODUCTION

The concept of distributed ledger technology (DLT), or blockchain, has caught the interest and capital of financial industry companies. The term "blockchain" describes a decentralized, continuously expanding collection of connected, encrypted data blocks that are connected via a peer-to-peer network. In order to create a network or chain, each block typically includes the data from all previous blocks and transactions in addition to a time stamp, transaction data, and a cryptographic hash of the previous block that was created. [4].

Following the blockchain's processing of the data, every machine in the distributed system locks in at the same time to produce a permanent, transient digital record. Each blockchain system specifies how this procedure is conducted and who is allowed to add additional blocks to the chain. [2]

Bitcoin, a peer-to-peer digital currency system, was first announced by Satoshi Nakamoto in 2008, marking the introduction of block chain technology. The idea was first debated in the fields of computer science and cryptography, but it had little effect on business, society, or the economy. However, as bitcoin's exchange value rose and books highlighted its potential economic significance, public knowledge of blockchain surged in 2015. [3]

Being resistant to data tampering or modifications is a key characteristic of a blockchain. It is a decentralized, distributed ledger system that can effectively and extremely verifiably record transactions between two parties. Typically, a peer-to-peer network manages blockchain, which is verifiable via a consensus-based method for maintaining the ledger's accuracy. On the entire blockchain, the transaction's nature is immediately visible. Transactions rely on cryptographic techniques to ensure that the data recorded in any given block cannot be changed retrospectively without also changing all subsequent blocks, which calls for network majority's complicity. Therefore, the inability of blockchain to be corrupted is a key characteristic. On the blockchain, changing any information unit would be extremely difficult or impossible. The largest advancement in information technology is blockchain. In accordance with the unbending or unyielding principles of arithmetic, we may now record every transaction permanently for the first time in human history.

A blockchain is essentially a series of decentralized, distributed, and unchangeable blocks, every one of which contains a piece of data. To establish an ordered sequence of information, the blocks are joined using cryptographic techniques.

- It is a decentralized system of secure and trusted, distributed database
- It records and share the transaction details across many nodes (computers) so that the data is not modified.
- It was introduced to timestamp the digital documents and prevent tampering of records.
- Each block contains:

- (a) Previous hash – it connects it to the previous block
- (b) Data – it contains sender’s address, receiver’s address and transaction amount details.
- (c) Nonce value – it is a random value used to vary the output of hash value
- (d) Hash – it is basically a digital fingerprint of current block

The **characteristics** of the block chain technology includes the following aspects:

- **Public distributed ledgers**

In distributed ledgers, transactions are recorded, shared, and synchronized in each of their own electronic ledgers using distinct nodes rather than storing all of their financial activities on a particular centralized server.

- **Immutable**

If the block chain is unchangeable and therefore a permanent network, it is said to be immutable. There must be nodes enabling blockchain technology to function. Once uploaded to the block chain, a transaction cannot be removed or altered. This makes the blockchain an irreversible, impenetrable ledger that provides a high degree of security and confidence.

- **Encryption**

The block chain is more secure since each record is encrypted separately. It is not easy to add, change, or remove data from a network. Each piece of data has a unique identity since it has been cryptographically hashed. Each block is cryptographically connected to the others and has a unique hash in addition to the hash of the previous block. Changing each hash ID would be necessary for every attempt to change the data, which is nearly impossible.

- **Consensus**

In block chain technology each of them has a general agreement which helps the network to make fast and equitable decisions. It is an algorithm for making decisions that ensures the system functions properly and helps active nodes arrive quickly. Blockchain will lose its value if there is no consensus.

- **Decentralized**

Because blockchain technology is a deconcentrated system, there is not a single entity in charge of the web. Instead, a sizable number of nodes that collaborates to validate and verify the transactions make up the network. The ledger will be same on every node in the blockchain network.

- **Proof of work (PoW)**

- **Unanimous**

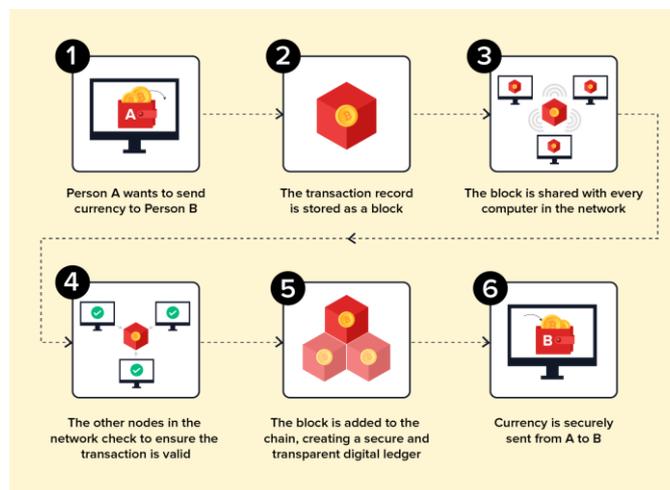
For the addition to the system chain, a block must be accepted by the most vote of nodes; otherwise, it cannot be added.

- Faster settlement
- Transparency
- Smart contracts
- Distributed

All network users have access to a duplicate of the ledger for total transparency. Complete information about every user and transaction on the network may be found in a public ledger. The distribution of computational capacity among the devices ensures a better outcome

- **Mining**

The process of mining involves adding new transaction records to the block chain. Adding more units to the chain of blocks is the method for managing transactions and ensuring security.



## SURVEY REPORTS

HSBC, one of the largest banks and financial services organizations in the world, polled more than 12,000 people in 11 countries and territories for an examination on opinions and technology use. Around eighty percent of people who had heard of the blockchain technology were unable to explain how it operates, and sixty percent of the people surveyed had never heard of it. [2]

Nonetheless, blockchain is making great strides in the finance and trading industries. After more than a year of research with subject matter experts and industry executives, the World Economic Forum, or WEF, released an analysis on the potential development of financial structures in 2016. The research investigated the disruptive technology landscape in financial services, and its findings included:

- Numerous banks conducted blockchain experiments. By 2017, 80% of banks intended to launch DLT initiatives.
- More than 90 central banks participated in DLT talks globally.
- Blockchain was becoming more and more popular worldwide. More than 24 nations were making DLT investments.
- Research on blockchain technology was also growing. Over 2500 patents were filed between 2013 and 2016.
- Between 2013 and 2016, there was an increase in venture capital funding invested in blockchain, totaling over \$1.4 billion.
- The consortium's efforts significantly increased. More than 90 companies joined blockchain consortiums.
- Blockchain technology is expected to account for 10% of the world's gross domestic product (GGDP). [2]

## REVIEW OF LITERATURE

By offering a thorough and critical examination of previous research and scholarship on integrating blockchain in the financial industry, this literature review seeks to further the current discussion. Through a comprehensive analysis of scholarly articles and reports the review aims to clarify the complex aspects of blockchain's influence. In particular, it assesses the impact of blockchain technology.

Developing successful adoption strategies for blockchain technology requires an understanding of the obstacles and problems found throughout this investigation. Legal and regulatory frameworks need to change to reflect blockchain's creative nature and promote an atmosphere that supports technical breakthroughs. Continuous research and development activities are necessary to improve performance and scalability in order to overcome technological barriers.

Loso Judijanto evaluated the effects of integrating blockchain technology into the financial system on the stability, security, and efficiency of financial markets in January 2024. discusses an analysis of the obstacles and difficulties in using blockchain technology inside the banking industry indicates a multifaceted environment. Notable barriers to widespread adoption are those related to laws and regulations.

In January 2024, Vijay conducted an investigation into the effects of blockchain, artificial intelligence, and machine learning on the efficiency and transformation of financial accounting; in 2024, S. Ahmadi conducted a thorough study on the incorporation of big data and AI in the financial industry and its implications for present and potential prospects. This study's objective is to evaluate the integration of blockchain, AI, and ML into financial accounting practices. The purpose of this study is to evaluate the application of blockchain and artificial intelligence (AI) in the subject matter of financial accounting. It also evaluates the noteworthy influence of AI technology in the finance industry. The main goal is to highlight the improvements in financial accounting brought about by the integration of AI, while also pointing out the elements that encourage the combination of blockchain technology and AI in accounting procedures.

Trust in a "trust-free" system: Qingqui Gan's February 2024 assessment on blockchain adoption in the financial institutions and banking industry; Their study examines the elements based on affordance theory that affect the banking and finance sector's adoption of blockchain. They augment the model developed by UTAUT with confidence-related elements (technological and community trust) and advocate for a research framework to examine how trust influences blockchain adoption. [5]

Xia Chen's January 2023 article, "The Economic Worth of Blockchain Submission of Applications: Early Findings from Asset-Backed Securities," At least in China, wherein some ABS are issued utilizing blockchain technology while other ones are not, it has been discovered that the coupon yield is significantly decreased when blockchain technology is used during the issuing of ABS. When compared to regular ABS, the interest rate difference on ABS generated with blockchain technology drops by 31.4 basis points, or 13% relative. The use of blockchain technology may result in a reduction in the amount of deferred interest and improvements to credit processes. This study contributes to the field by providing a small-sample analysis of the financial worth of the application of blockchain in financial markets.

FinTech Frontiers: Blockchain and Cloud Computing and AI Applications for Smart Financial Investment and the banking and finance industry by Swathi G. in November 2023; Examine cloud computing in the fintech sector. Describe the applications of AI in smart finance investing in more detail. Analyse the use of blockchain technology in banking systems. Examine how blockchain, AI, and the cloud are combining in financial.

In general, the literature that is currently available focuses largely on elucidating technical specifics and examining hypothetical use scenarios. One unaddressed matter is the empirical assessment of blockchain technology's possible impacts on financial markets. According to research, value co-creation, coordination mechanisms, and information availability are some of the ways that blockchain technology, when used as a service system, helps ensure that a service system operates appropriately. As a result, it is anticipated that technology will significantly affect the financial industry.

However, prior studies have ignored the importance of blockchain technology in favour of examining a variety of factors in the literature on sophisticated financial markets. The vacuum in the structure of knowledge is filled by this effort. Thus, this study aims to illustrate how blockchain technology could have a big impact on the financial markets.

## RESEARCH OBJECTIVES

Some of the objectives that the study tried to achieve are listed below.

- To explore the field of blockchain technology and get in-depth understanding about its operation.
- To examine how blockchain technology is being used in the banking industry and e-commerce in general.
- To research how blockchain technology affects the financial market.

## RESEARCH METHODOLOGY

This particular study has covered all the aspects regarding blockchain technology; its origin, characteristics, advantages and limitations. It covers the connection between financial market and blockchain technology and how it will be useful for it.

This research is focused on removing some misconceptions of people about fusion of commerce and technology. As well as their unawareness about the innovation of blockchain technology and how impactable it can be on the field of commerce.

This research is based on financial statement analysis and other comparisons of various corporate areas using blockchain technology. For instance, Ripple Net, SBI, etc.

The period of study is of five fiscal years 2018-2019 to 2022-2023.

The data sources used were secondary in nature. Annual reports, publication and other relevant data were taken into consideration.

Capital structure and independent variables and profitability indicators were used as data tools.

## BLOCKCHAIN TECHNICAL APPLICATIONS IN THE FINANCIAL MARKET

Blockchain is crucial to the financial sector because it gets rid of middlemen, which helps the market grow. Blockchain is a distributed database or ledger that can be accessed by a network of peers. It is secured by cryptography using public keys and consists of a connected sequence of blocks with time-stamped transactions that the network community can independently verify. This is why blockchain enables the creation of a distributed ledger that allows any web-based transaction containing digital assets to be examined at any time without endangering the anonymity of the parties involved or the assets. Examples of blockchain technology's impact on e-commerce and its range of applications include as follows:

- Security of customer's data.
- Fraud prevention in e-commerce system process
- Faster checkout in e-commerce
- Reduced shipping costs
- Providing a more secure & efficient payment system
- Creating a system that allows for easier of tracking process
- Providing more transparent & efficient system for reviewing customer data
- Developing system that allows for easier returns & refunds

The time-consuming, intricate, costly, and hazardous procedures involved in financial market operations could be decreased by implementing blockchain technology. For instance, smart contracts utilizing blockchain technology can take the position of attorneys and banks in asset purchase agreements. Share ownership can also be managed via smart contracts. Blockchain technology can facilitate peer-to-peer

financing via distributed share offers. The following are some areas in which the financial markets business can employ blockchain technology to solve some of its most significant issues, including:

- It enables the creation of electron notes, which solves issues with counterfeiting, default risks, and rouge-trading.
- It is a new type of digital currency that combines blockchain technology and all the benefits of electronic notes.
- It offers decentralization and will do away with the need for a third party to oversee the exchange of value between two parties.
- It is currently widely used in the financial market, particularly in asset-backed securitization, cross-border payments, and financial notes.
- It provides defense against financial risks, enhanced operating efficiency, and reduced govt. regulatory costs.

## ANALYSIS AND DISCUSSION

The case study of SBI, the first bank to use blockchain technology, helps to understand how it is applied.

### STATE BANK OF INDIA

With its main office located in Mumbai, Maharashtra, State Bank of India (SBI) is a publicly traded, global public sector bank and financial services regulatory agency in India. SBI ranks as the 48th biggest bank in the world by total assets, making it the only Indian bank to be included in the Fortune Global 500, a ranking among the world's largest corporations for 2020. This public sector bank is the largest in India, with a 25 percent share of the market in deposits and loans and a 23-percentage marketplace position in assets. The company employs over 250,000 people, making it the eighth largest employer in India.

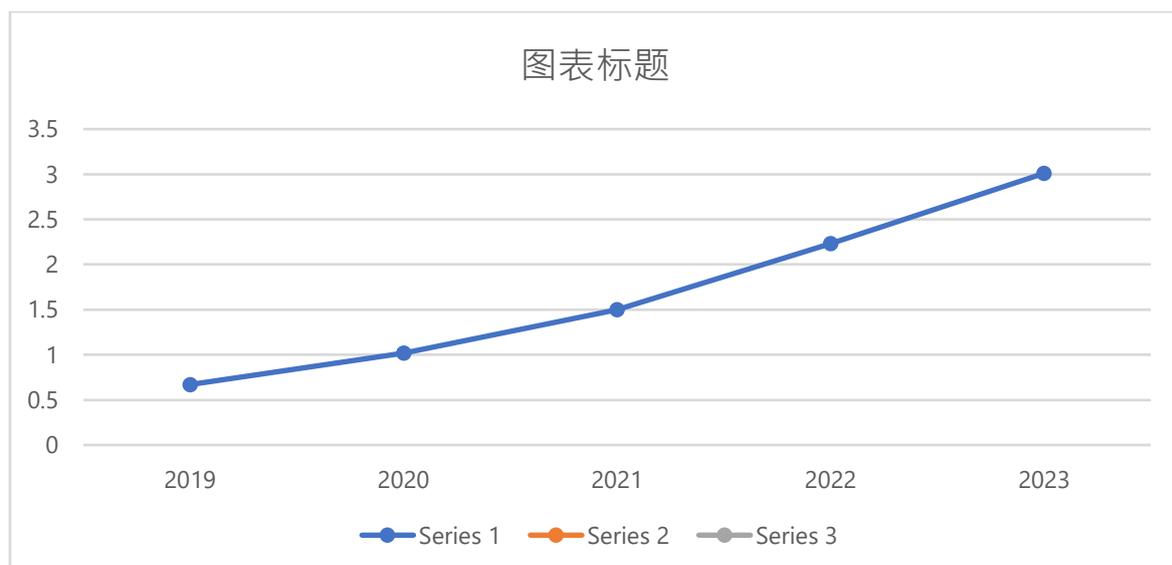
### Blockchain technology and SBI

As the first Indian bank to join the Blockchain Collaborative Consortium (BCC), SBI launched its entry into the blockchain space in 2017. With this move, the bank demonstrated its dedication to investigating the enormous potential of distributed ledger technology (DLT) and blockchain to improve its offerings.

The most recent endeavour seeks to improve the banking systems' security, efficiency, and openness. Experts believe that blockchain technology might readily prevent frauds like the issuance of fictitious LCs.

Blockchain technology allowed domestic LCs to be disbursed in four hours instead of the four to five days it took with traditional techniques, stated to Varun Bakshi, RBL Bank's head of transaction processed in banks and products. According to reports, the freshly implemented system is expected to be operational in a little over a year, with every financial institution holding an equal ownership of 6.66%.

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This is the profit growth chart of SBI over the years. After the application of SBI is utilizing Link, a global bank's blockchain technology, which is intended for a network of peer-to-peer (P2P) users that includes enterprises,

fintech start-ups, and global financial institutions. Liink is being used by SBI to communicate with other financial institutions about payments.

The average cost of bank-led remittances worldwide is 10% of the gross consideration cost. Remittance processes could be made easier by using blockchain technology and cryptocurrency, as certain projects like Ripple have suggested.

To make remittances easier, SBI offers a vast network of correspondent banking relationships with over 600 overseas institutions. Customers of SBI can currently send and receive money using services like SBI Express Remit, demand drafts, wire transfers, telegraphic transfers, and personal or travellers' checks.

Financial markets and blockchain technology have been shown to be significantly and favourably correlated by empirical research; that is, the more evolved the financial markets in these countries, the more inventive the blockchain ecosystem. Additionally, the empirical results have demonstrated the unidirectional causality between blockchain technology and the latter, i.e., the notion that blockchain technology induces economic growth in the two countries.

Blockchain technology is being used by a number of Indian firms, including Bitbns, Lysto, Pillow Fund, Polygon, CoinDCX, and Unocoin.

## CONCLUSION

Blockchain technology is still relatively new, but it's gaining popularity in the financial industry. Nonetheless, this study makes clear that technology in financial markets has the potential to be empowering. The technology is still in its early stages; thus, a deeper understanding is necessary. comprehension of the financial markets' potential for realization. Therefore, more research is mandatory to survey how blockchain technology might be used to the actual financial difficulties that people have, particularly in various daily or structural or any kind of particular situations. There could not be a single blockchain for everyone. Conducting additional study on the degree to which blockchain is being adopted by developing country financial markets would be a powerful place to start. In this regard, blockchain technology's potential to promote financial inclusion may be important.

The announcement of the "National Strategy on Blockchain" by MeitY in December 2021, which outlined its ambition to embrace blockchain in numerous industries, indicates the Government of India's considerable interest in blockchain technology and its application to the public sphere.

Blockchain has the potential to revolutionize how all of us—businesses, governments, organizations, and individuals—implement it in our daily lives. It offers a special, safe means of building confidence in almost every transaction, making it possible to simplify money, goods, or private data anywhere in the world. The principles of this technology were examined by analysing blockchain.

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