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# To Study The Effect of Blockchain Technology In Banking System

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*Abstract- Blockchain technology is a method for storing digital data in a shared public database. This technology became well-known mostly as a result of the launch of the original cryptocurrency, Bitcoin. This technology is used by bitcoin to provide secure record-keeping. This paper will first provide a general overview of blockchain and demonstrate its operation. The discussion will next go on to some generic blockchain applications. In addition, you should conduct a brief assessment of this technology generally and specifically as it relates to the banking sector. Similar to other industries and services that have undergone radical change as a result of "digitalization and technology," such as the movie and television industry, navigation services, etc.*

*Due to its high levels of security, transaction transparency, decentralization, and efficiency, blockchain technology has the potential to totally disrupt the banking industry. The relationship between blockchain technology, financial technologies, and sustainability will also be covered. Finally, it will be examined how blockchain technology will change the financial sector and how difficult it will be to embrace and execute.*

***Keywords:*** **- Blockchain, Blockchain Architecture, Need of Blockchain, Application of Blockchain**

## I. INTRODUCTION

The banking business has been serving as a middleman for financial transactions since its inception. They've been offering the trust necessary for the flow of money. The banking system has always been impacted by technology. Banks have continuously changed how they operate to keep up with information and technological innovation. For information flow, banks are now linked to technology networks like SWIFT. Therefore, the banking sector depends entirely on technology to carry out daily tasks. Blockchain may therefore be a key driver for the banking industry.

Banks are frequently criticized for being wasteful, expensive, and opaque. Fintech companies like PayPal, Revolut, and N26 are upending traditional banks with their creative solutions. Blockchain offers an answer to these complaints as well as a competitive edge over the Fintech sector. The interest in blockchain has expanded significantly over time, and recently, central banks and governments have also been investigating its potential applications. The potential of blockchain is being explored by numerous banks globally, so the future is undoubtedly bright.

- A blockchain is an online ledger that uses a data structure to simplify transactions
- It allows users to securely manipulate the ledger without the need for a third party
- It enables the use of cryptocurrency in a decentralized environment
- It provides transparency through distributed ledger technology, where network participants share the same documentation
- It reduces the need for third parties or intermediaries, resulting in lower costs
- It offers new tools for authentication and authorization in the digital world and enables the creation of new digital relationships.

## II. LITERATURE REVIEW

**C Mallesha, S.Haripriya: -** " The 21st century is all about technology. With the increasing need for modernization in our day-to-day lives, people are open to accepting new technologies. From using a remote for controlling devices to using voice notes for giving commands; modern technology has made space in our regular lives. Technologies like augmented reality and IoT have gained pace in the past decade and now there's a new addition to the pack i.e. Blockchain Technology. In the simplest terms, Blockchain can be described as a data structure that holds transactional records while ensuring security, transparency, and decentralization. You can also think of it as a chain or records stored in the forms of blocks which are controlled by no single authority. A blockchain is a distributed ledger that is completely open to any and everyone on the network. Once information is stored on a blockchain, it is extremely difficult to change or alter it. Each transaction on a blockchain is secured with a digital signature that proves its authenticity. Due to the use of encryption and digital signatures, the data stored on the blockchain is tamper-proof and cannot be changed."

**Thulya Palihapitiya: -** "Today, banks are affected by economic and digital transformation, financial innovations and development of the internet. Blockchain technology with cryptocurrency is an underlying technology with promising application in the banking sector.

Therefore, Aim of this paper is to do research on the impact of the Blockchain platform in the banking industry. To understand this technology, this research is to analyze technology functions with the model and anatomy of Blockchain architecture. Many researches for Blockchain technology are carried out consensus algorithms and four of them are discussed in this paper. How the banking industry deals with this platform with advantages and limitations are mainly discussed in this paper."

**Satoshi Nakamoto : -** In his white paper proposed "a peer-to-peer version of electronic cash which would allow online payments to be sent directly from one party to another without going through a financial institution or third party". This emerged as a foundation for the most popular blockchain application i.e. bitcoin.

**Melanie Swan : -** Explains that the "blockchain is a decentralized public ledger that can be used for the registration, inventory, and the transfer of all assets in finances, property as well as in intangible assets such as votes, software, health data, and idea". He considered the theoretical, philosophical, and societal impact of cryptocurrencies and blockchain technologies.

## III. METHODOLOGY

### A. HOW BLOCKCHAIN WORKS?

Blockchain, the name is adapted from the way it works – blocks connected to form a chain. The transaction recorded in a block contains a hash (digital signature), hash of previous block and the ledger of all valid transactions. The hash links the block one after another and strengthens the verification of the previous block. Thus, an immutable blockchain is formed.

1. A node of the network starts a transaction by creating,then digitally signing with its private key.
2. The transaction is represented as a block.
3. The block is broadcast to every participant in the P2P network.
4. The transaction is propagated by using Gossip protocol, to participants to validate the transaction based on data and history of transaction. More than 50% of nodes are required to verify the transaction.
5. When the transaction is verified and validated, a block can be added to the blockchain.
6. Newly created block now becomes a part of the ledger and money (cryptography like bitcoin) moves to the other party.

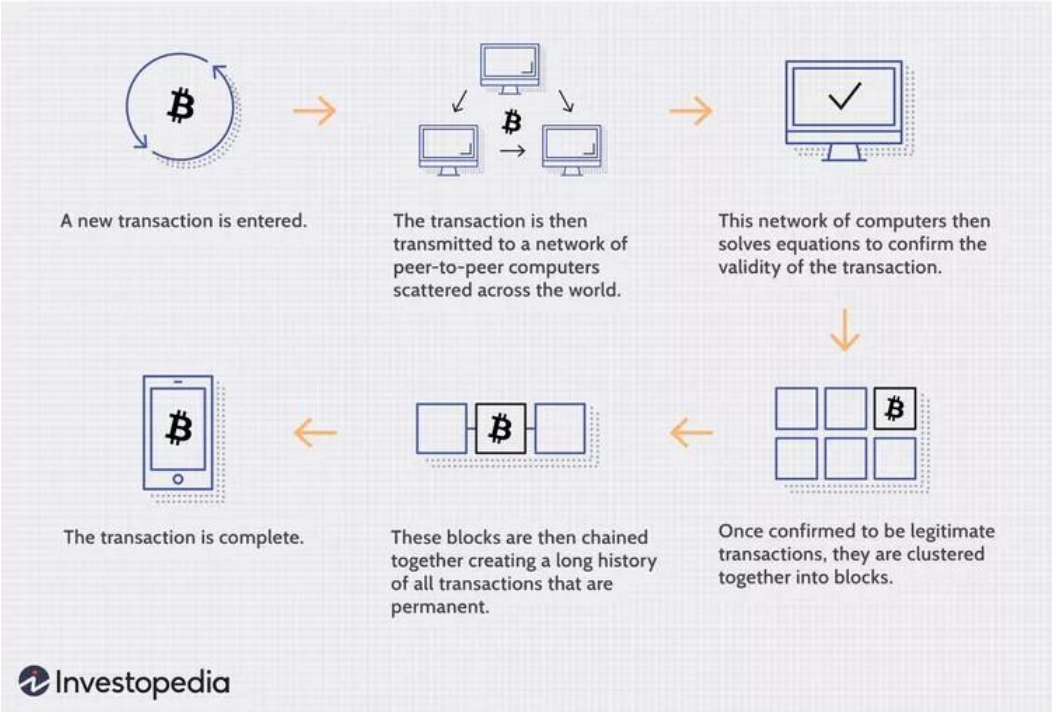


Figure 1: How a Blockchain works

**1) Public Blockchain -** This provides an open platform for people from various financial organizations like banks and backgrounds to join, transact and mine by decentralized consensus mechanisms. There are no restrictions. So they are called 'Permission less' blockchains. Blockchain is specific to the user without specific validator nodes. All the participants have power to write and read transactions, and perform auditing and view transactions of the blockchain.

**2) Private Blockchain -** These systems facilitate exchange of data and private sharing among a group of individuals or selected people or multiple organizations controlled by selective individuals or one organization. These blockchain systems are called permissioned Blockchain. Therefore unauthorized access can't do, without any special permission. Each and every node maintains a copy of the ledger to reach a consensus, but unlike public blockchain the writes are restricted.

**3) Consortium Blockchain -** This blockchain system can be considered as a partially private and permissioned blockchain, not a single organization or person but a set of predetermined nodes that are responsible for consensus and block validation. Nodes decide who can join the network and mine data. . This is not a fully centralized system, but it has the ability to control some selected validator participants or peers. There are some limited abilities to read and write transactions. These nodes do not guarantee immutability and irreversibility.

**B. BLOCKCHAIN ARCHITECTURE**

The Blockchain architecture consists of four concepts as decentralization, digital signature, data mining and data integrity.

**1) Decentralization**: Blockchain distributed control among all the participants or peers in the chain and creating a shared infrastructure.

**2) Digital signature**: An exchange of transactional value using public keys by the mechanism of a unique digital sign enabled by Blockchain. All the participants in the network know the code for decryption. Private keys known only to the owner to create ownership.

**3) Mining**: Every user in the system mines and digs data which is evaluated according to the cryptographic rules. This also acknowledges miners for confirmation and verification of the transactions.

**4) Data integrity**: Algorithms and agreements among participants ensure that the transaction data, once agreed, cannot be tampered [1]. Data stored in the system act as a one version for all parties while reducing risk of fraud.

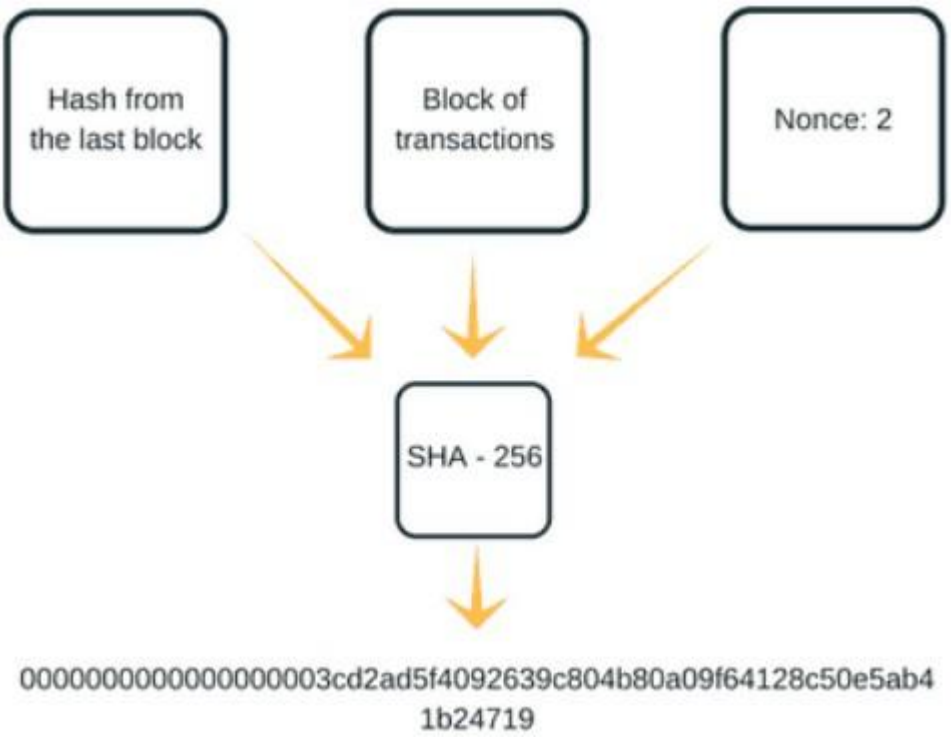


Figure 2: How the hash value create for each block

## C. BLOCKCHAIN TRANSFORMATION OF BANKING SERVICES

Blockchain technology promises a huge opportunity to recover the challenges in the banking industry. There are several use cases with advantages and limitations with blockchain technology.

1. **Payments** : These are the important use case of any financial and banking systems. Both commercial and central banks are going to use this blockchain technology for the payment process. These are important for cross border payments, without third party payments can be done very quickly. Some problems related to the cryptocurrency exchange to the local money can happen because of changes in exchange rates.

2. **Digital verification**: This can be done by removing all traditional verification systems like identity, face checking and proof of client intention by using blockchain. Blockchain provides ways to choose users who can identify them and others who like to share their identity without repeating registration for each banking service. Because of the shared ledger system, any participant can access information without permission. Therefore private information should not be added to the blockchain.

3. **Lending**: Traditional banks provide different kinds of loans. But it takes a long time. Blockchain can be used for this lending system with superfast transactions in a transparent way. Banks provide loans, KYC (Know Your Customer) and BSA (Bank Secrecy Act) and link all of them to a single consumer block. This system helps to save money and time for waiting the traditional long process.

4. **Bookkeeping**, Accounting and Auditing: Most of the traditional banks still depend on paperwork like double entry transactions and after a long process they digitize the details slowly. Banks can directly enter their transaction details into the shared ledger system . All the records are transparent and irreversible when using blockchain. This system has a feature of smart contracts which can pay invoices automatically. People who work in banks should have prior knowledge about blockchain is a considerable limitation.

5. **Crowdfunding**: This is an online raise funding mechanism by involving large numbers of people with small amounts of money. Initial Coin Offerings (ICOs) have the ability to sell

their tokens via the internet, with the decentralization advantage by using blockchain technology. This has a risk because of the legal issues in ICOs.

6. **Smart contracts**: Smart contracts are a set of code which is stored in Blockchain. These programs execute automatically when conditions are met. They perform cryptographic transactions, transparency without intermediaries because of the decentralized ledger in blockchain.

7. **KYC (Know Your Customer)**: Traditional KYC processes use a lot of time to perform individually in all banks and other financial institutions. Using Blockchain, independent verification of each customer of one bank can be accessible for other banks. This process helps to eliminate duplication, reduce administrative effort and save time.

## D. LIMITATIONS OF BLOCKCHAIN TECHNOLOGY

**1. High initial cost**: Blockchain saves transaction cost and time but it needs high initial capital cost.
**2. Complexity**: This technology involves entirely new vocabulary. Participants should have specialized knowledge about the technology.
**3. Network size**: Blockchain requires a large network of participants. If it is not a widely distributed grid of networks, it becomes more difficult to achieve the benefits.
**4. Transaction cost**: Transaction cost for the first few years is free. But after that there is a rising transaction cost in the network.
**5. Limited scalability and storage issues**: Blockchain has a consensus mechanism to verify the transactions. This limits the number of transactions that can be made in a given time period. Blockchain has an immutable distributed chain of blocks that grows at a very rapid space, then this can course for storage issues.
**6. Unavoidable security flaw:** If more than half of participant nodes to service the network are a lie, it will become a truth.
**7. Energy and resource consumption:** A blockchain network consumes heavy resources. When the blockchain network grows, miners need to validate the blocks. So it increased heavy energy consumption

### E. FUTURE IMPROVEMENTS OF BLOCKCHAIN TECHNOLOGY

1. Blockchain and bitcoin are really hard to those who are not working with technology and software development. So one of the future improvements is to build tools to make the transactions easier.
2. Storing data in the Blockchain is quite expensive so make a solution to store the data off the chain and send them to the blockchain periodically.
3. Making laws to adopt blockchain technology for the industry is necessary for the revolution of the banking industry.
4. Blockchain will hope to reduce their prices and improve their quality of services with new features in near future.

## IV. CONCLUSION

Blockchain is a decentralized digital ledger which cannot achieve hacker's objectives. Therefore Security wise, it is a very important technology to adopt in Sri Lankan Financial industries like banks. This also helps to enhance the efficiency of the banking industry. There are a lot of opportunities with Blockchain technology with immeasurable values. This provides a unique way to establish cryptography transactions, by enabling simplification of money in the world. Giants in the banking industry started to search possible new use cases to expand their services by using Blockchain. This technology revolutionized the underlying sectors in credit information systems, payment clearing, lending systems, digital verification, audit keeping systems, crowdfunding, smart contract and KYC in banking. PBFT is the best consensus algorithm for payments and transactions. Banks used POW for digital verification because it is the best algorithm which provides better security. PBFT or BFT is mostly used for syndicated lending in the banking industry. Both PoW, Pos and DPoS are used for crowdfunding in the banking sector. Based on the type of cryptocurrency algorithms will change in smart contracts. If the cryptocurrency is Bitcoin for smart contracts most of the time we use POW. If the cryptocurrency is Ethereum for smart contracts most of the time we use POS. Most of the banks used PoW for KYC. Prospect of this technology into the banking industry will occur in the near future. When using Blockchain, there are some challenges. To solve these challenges we should provide facilities to reduce initial cost to adopt blockchain in the banking sector. System usage complexity is high. Therefore developers should reduce complexity and give prior knowledge for the users. Then we can minimize adoption and usage problems related to blockchain technology. Blockchain should develop for small scale

networks as well in future. According to the consensus algorithm power consumption can be changed. Therefore we should select the best algorithm for relevant banking service. Developers should reduce unwanted security flows and make them simpler to use. This paper gives a comprehensive review of the blockchain revolution in the banking industry. Blockchain is the next best invention after the internet. Therefore my opinion is that blockchain is a great disruptive technology which will revolutionize the banking sector in a better way in the near future.

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