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# An Examination of the Blockchain Technology: Challenges and Future Opportunities

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**Abstract:** One of the most recent technological developments, Blockchain technology has the potential to help a lot of organizations. In order to give readers a better understanding of what Blockchain technology is and how it works, this paper's main goal is to give an overview of it. The questions that should be asked to determine whether Blockchain Technology is the best option for organizations are included in another section of this paper. This section will also provide a summary of how Blockchain Technology can benefit businesses. The discussion that follows demonstrates how various industries are currently mastering the technology in order to dominate their fields. This essay will also look at the findings of a study that was done to gauge public awareness of Blockchain technology.

**Keywords**: Blockchain Technology, Challenges and Opportunities, Bit coin, Security

## INTRODUCTION:

Blockchain technology is currently generating a lot of buzz among banks, businesses, and government agencies. Nearly every day, new initiatives and various collaboration agreements on Blockchain applications are announced in the economic press. This includes projects run by governments and central banks as well as banks and private enterprises. [1]

Due to the involvement of an outside verifier and record manager in communications between two groups, it felt necessary to implement this innovative upset. Despite the fact that the outsider's contribution reduced the risk of double spending relative to other factors, the outsider's ability to control the record led to the idea of a conveyed record that should have been available to verify the exchanges. In contrast to the current incorporated one, it is a decentralized framework. [2] "Blockchain is an open record of all Bit coin exchanges
that have ever been executed," according to this statement. It is constantly evolving as completed blocks are added to it with a new set of recordings. It is necessary to make significant changes to the bit coin Blockchain before it can be used for financial transactions. Whether the fundamental issues with Blockchain can be fixed to enable a wide market rollout in terms of performance, scalability, and security is unknown. From the first starting point square to the most recent professional piece, the Blockchain contains general information about the addresses and their adjustments. [3] The Blockchain-based exchange is faster, safer, more secure, and more affordable than traditional frameworks[21].

Blockchain network can track various transactions, orders, payments, accounts. One more advantage of Blockchain is that it provides transparency of the data in a network i.e., one can easily detect if any changes are made by another person or not. The transactions are recorded as a block of data and each block is connected to the ones that are before it and after it. All data transactions are then blocked together: hence it is termed as Blockchain. Blockchain provides greater security with validated transactions that are immutable, greater trust, more efficiency, etc. There are three types of Blockchain: private, public and consortium. Private Blockchain is where a peer-to-peer network is formed and governed by a single organization to maintain the ledger. Public

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Blockchain is also a peer-to-peer network but anyone anywhere in the world can be a part of it and participate in it. Bitcoin is an example of public Blockchain.
This is due to the fact that Blockchain uses a distributed network instead of a centralized weak point that is constantly vulnerable to attacks. It also doesn't have disappointment as a major problem. Public key cryptography is also employed to guarantee the integrity of the data.[19]

## BACKGROUND OF THE STUDY

### What Is Blockchain Technology?

Blockchain technology is defined by features like a distributed database, decentralized network, and digital ledger with the ability to efficiently update and store data. Peer-to-peer networks built on nodes can store and connect more generic assets using the conventional methods used in the financial sector. [4] So, it is also known as 3D technology. By utilizing encryption methods and cryptographic algorithms, the data is secured and kept safe from manipulation. Each transaction is time stamped, stored as a block, and chained together using hashes. Hashing and cryptography both play a significant part in Blockchain technology. The transaction details are stored using the Merkle tree concept.

## CHALLENGES,OF BLOCKCHAIN TECHNOLOGY:

- ✓ **Incipient Innovation**

Making Blockchain widely applicable will depend on resolving issues like exchange speed, the check procedure, and information cutoff points.

- ✓ **Unverifiable Administrative Status**

Since national governments have consistently created and overseen modern monetary norms, Blockchain technology and Bit coin can withstand a restriction in extensive assignment by pre-existing monetary organizations if their organization control status is still contested. [5]

- ✓ **Expansive Vitality Utilization**

The Bit coin Blockchain framework's miners use substantial amounts of computer power to test 450 trillion different game plans per second in an effort to validate trades.

- ✓ **Control, Security, and Protection**

While there are options, such as strong encryption and private or authorization Blockchains, there are still significant security concerns that need to be addressed before the general public adds their own personal data to a Blockchain system.

- ✓ **Combination Concerns**

Applications based on Blockchain suggest policies that call for significant modifications to existing systems or their total replacement. [6] Associations must plan the transition in advance.

- ✓ **Social Gatherings**

Blockchain aims to completely transition to a decentralized framework, which necessitates open speculation from its users and managers.

- ✓ **Cost**

Blockchain offers tremendous time and cost savings for speculation, but the high initial capital costs may be a barrier.

## LITERATURE REVIEW:

The literature search was done based on the working of Blockchain technology and its applications from different journals. To review the relevant Blockchain Technology literature, the research was carried out based on the search using specific terminology Blockchain Technology, Applications of Blockchain Technology, Bit coin, smart contract, security and performance of Blockchain Applications.
**Nakamoto [7]** presented a system for conducting electronic transactions without the use of a third party. The concept of encryption, peer-to-peer connections, and evidence for confirming payments was created to alleviate the problem of double spending while also incentivizing miners. He used the concept of digital signatures. This provided control of ownership but had problems with double spending. A solution for this problem was given by proposing a peer to-peer network using proof-of-work that becomes computationally impractical as honest nodes control the majority of CPU. Nodes can leave and rejoin as they comply with the proof of-work and know when they are not part of the chain.
The Validity of the blocks was based on the voting with their CPU power. Consensus mechanism would help in decision making. The first white paper was published in the year 2008 and a

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prototype was developed. “Satoshi Nakamoto" is the main person with a group who created Bitcoin known as the new cryptocurrency. The POC implementation of Bitcoin and the white paper was released. Valentina discusses exactly how Blockchain works and explores Blockchain potential in the insurance industry. Several cases were identified for which prototypes had already been constructed. They had to be investigated, and only a few of them are in the form of theory that can be fully implemented. Each Blockchain application is subjected to a SWOT analysis.

According to the author Guo, China's banking industry is currently experiencing challenges as well as foreign and internal difficulties. It may be disrupted by the Blockchain. Credit mechanism, payment settlement, and global settlement method are among the applications mentioned by the author. The author mentions a transaction between NAB and Canadian Imperial Bank of Commerce that took a short time to complete and was marred by difficulties.

**Dimiter [8]** explains that data is accessed using IPFS and that there is no single point of failure. The author concerned about the health ecosystem suggests that consent be managed dynamically. Another example given by the author is Nebula Genomics Blockchain, which allows customers to charge a fee for data access while also preventing data from falling into the wrong hands. Finally, the author contends that Blockchain has the ability to disrupt existing methods. Chen examines current educational Blockchain applications and asserts that learning is profitable. Students can be encouraged to learn, and they can earn money while doing so. The use of Blockchain can help to eliminate degree fraud and fraudulent certificates.

**Xin Wang et al. [9]** in “Introducing Inter-Bank Payment mode System on Enterprise Blockchain Platform” say that it helps with gross settlement, gridlock resolution and reconciliation for inter-bank payment business. Banking account holders and Business payments are targeted. Interbank RTGS system facilitates more efficient and secure payment service.

**Z. Zheng et al. [10]** the block body is composed of a transaction counter and transactions. The most extreme number of transactions that a block can contain depends on the block size and the size of every transaction. Blockchain uses an asymmetric cryptography mechanism to approve the confirmation of transactions. A computerized signature based on asymmetric cryptography is used in an untrustworthy climate. We next momentarily illustrate advanced signature.

Despite the fact that Bit coin is the most famous application Blockchain application, Blockchain can be applied into diverse applications a long ways past crypto currencies. Since it allows payments to be finished with practically no bank or any middle person, Blockchain can be used in various monetary services such as computerized assets, settlement and online installment. Moreover, Blockchain innovation is becoming one of the most promising technologies for the up and coming age of web communication systems, such as smart contracts public services web of things (IoT) (notoriety systems and security services.

The author **Guo [11]** claims that there are currently issues with China's banking sector, including both internal and external challenges. The Blockchain might upset it. Among the applications mentioned by the author are credit mechanisms, payment settlement, and global settlement methods. The author describes a transaction that took place between NAB and the Canadian Imperial Bank of Commerce and was plagued by issues. Data is accessed using IPFS, and there is no single point of failure, according to Dimiter.

Concerned about the health ecosystem, the author suggests that consent be dynamically managed. The author also cites Nebula Genomics Blockchain as another example, which enables users to charge a fee for data access while preventing data from ending up in the wrong hands. Finally, the author argues that Blockchain has the potential to revolutionize current practices. In his analysis of

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current Blockchain applications in education, Chen argues that education is profitable. Students can be inspired to learn while also having the opportunity to make money. The use of Blockchain technology can assist in eradicating certificate and degree fraud.

The research conducted by Richard Kullu et al. Researcher's operations of the proposed system authentication, data security, scalability, transparency, trust, intermediary Blockchain use cases in banking. Objective of this research is to provide current research topics, challenges and future directions regarding Blockchain technology. Nikita Singh et al. proposed DLT Based E-Cheque System, Multithreaded Parallel Transaction Search Algorithm (MPTSA) e-cheque. A clearance framework based on Blockchain Technology for Cheque Processing is proposed with respect to Scalable and novel electronic cheque clearance framework. Digital banking system for remote areas is to be proposed although it is already provided by micro-bank. Due to security and session based payment their adoption is prevented. So, in a remote place, the author presented a novel Blockchain-based digital payment mechanism.

Payment providers operate several proxy nodes in the proposed Ethereum, are made up of miners, vendors, and ordinary consumers. Thystem, which are sporadically linked to isolated communities where local Blockchain networks, such as e suggested system's practical capability was demonstrated by constructing NFC-enabled payment gateways using Raspberry Pi, a digital wallet application, and processing nodes on off-the-shelf PCs. The research was carried out to analyze the Information and Communication Technology (ICT) as a necessary condition for banks profitability.

**Michael Crosby's** [12] paper discusses the significance of Blockchain instead of digital money. The Publicity pattern of 2015 projects descending slope and thus disillusionment as far as the innovation based digital money. Blockchain is being recognized based on business applications and start-ups chipping away at them. Reception is a significant test that slowly moves on as a product. Due to the risks associated with it just not many start-ups might be successful. Blockchain innovation is described as an alter obvious record, which makes use of cryptographic hash functions. It generates two information messages that produce the same Hash or tag. In the event that a message is exposed to errors or purposefully messed with then there will be a distinction in the hash worth and unique hash esteem. Blockchain is visualized as a connected list. However, one can't insert another block in the chain easily

## DATA AND METHODOLOGY

If Blockchain Technology is the future, it was necessary to conduct a study to find out how much business professionals already know about it. Are people in the business world familiar with Blockchain technology? According to a specific study, there appears to be a lack of awareness. [13] The response rate was unexpectedly 100% when only a 90% response rate or higher was anticipated. There is a lack of awareness, according to the findings of a study (Appendix A) done on August 15, 2018. 40 participants, some of whom were Certified Public Accountants, received the study (CPAs). By August 18, 2018, we had received all 40 responses. The participants received the study either directly or via email. Participants were instructed not to conduct any online research before responding to any of these questions. They were also instructed to keep their responses a secret from one another. The investigation asked the following queries: Do you know what Bitcoin is? Do you know what Ethereum is? Is Blockchain technology still relevant today? Can the distributed ledger have a

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future? Describe Bit coin. The study's copy is available in the Appendix section.

The research methodology for this study, systematic mapping of Blockchain technology, was chosen. A systematic mapping study's objectives are to give a summary of a research area, determine whether research evidence is present, and quantify the amount of evidence. We adhere to the methodical mapping procedure outlined by Petersen et al. in this study. In order to find pertinent papers, we also use the guidelines for a systematic literature review provided by Kitchenham and Charters. [14]

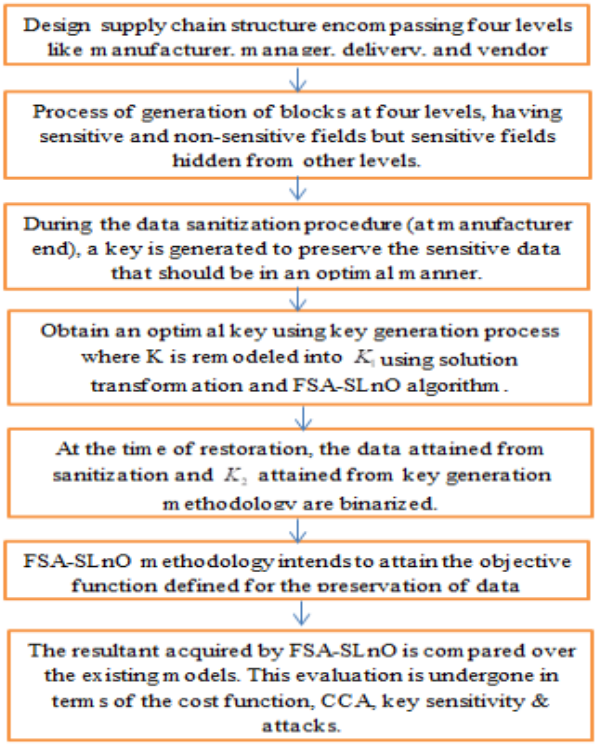


**Fig: 1** Frame work of the study

Our objective was to examine the existing studies related to Blockchain technology, so we selected the systematic mapping process as our research methodology. The mapping study's findings would aid in identifying and mapping potential research gaps and fields of study related to Blockchain technology. Adapted system design, development, and implementation for supply chain management's security in information sharing strategy using cutting-edge privacy preservation tactics; see Fig.1.

The following are the methods employed in research with the intent of developing optimal key generation for secure information sharing:

This study introduces a novel method for protecting individual privacy while using the Blockchain to share sensitive information. In an effort to address the security concerns raised in the review, numerous researchers have written extensively on the topic. Blockchain technology (where data is transferred in "blocks") will be used in this project for its data transmission capabilities. Some of the caveats from the past work aren't as robust as they could be. Because of this, a fresh method of protecting users' anonymity has been adopted. Data restoration and data sanitization are two of the methods proposed to protect users' privacy. During Blockchain-based transmission, raw data is cleansed using a predefined set of rules.

**RESULTS:**

The results are discussed in detail below. Table 1's first question revealed that 60% of respondents were familiar with Bit coin. Only 4% of the participants had heard of Ethereum when the second question was asked. Given that 82 percent of respondents to the "Is there a future for Blockchain Technology?" question had never heard of it, it appears that there is a lack of awareness.[15] Additionally, 80% of respondents claimed to be unaware of distributed ledgers. It was interesting to see that less than 6% of participants believed that Blockchain technology had no future. The answers to the multiple-choice question "What is a Bit coin?" can be found in Table 2. 85 percent of those taking part were unaware that it was mined using math. Approximately 8% of the participants believed it to be stock traded on the NASDAQ or the NYSE. [16] These findings can be summed up as showing that many people have heard about Bit coin from a variety of media, including the internet, social media, and the news. The study also demonstrated the general ignorance of Blockchain technology.

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| Question | Yes | No | Never Heard of it |
|---|---|---|---|
| Have you ever heard of Bit coin? | 28 | 17 | n/a |
| Have you ever heard of Ethereum? | 3 | 52 | n/a |
| Is there a future in Blockchain Technology? | 7 | 4 | n/a |
| Is there a future in the distributed Ledger? | 4 | 4 | n/a |

**Table: 1** Reactions to the Blockchain Technology Familiarity Study

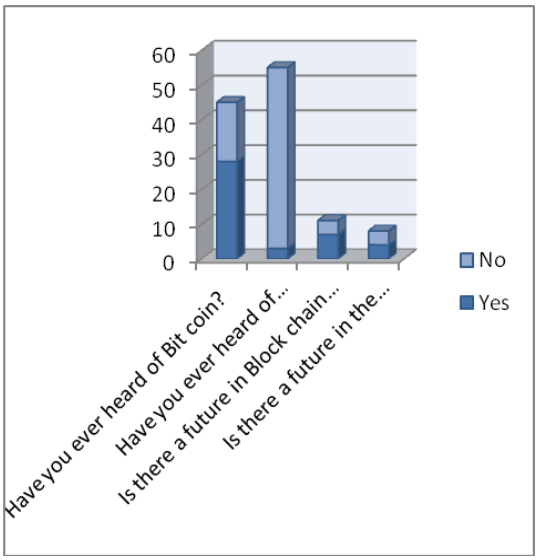


**Fig: 2** Reactions to the Blockchain Technology

| Casino Coin From Las Vegas | Mined Using Mathematics | Stock Traded on NYSE or NASDAQ | Same as Gold | None of the above |
|---|---|---|---|---|
| 0 | **6** | **4** | **5** | **40** |

**Table: 2** What is a Bitcoin, according to the multiple-choice question?

In an interview discussed milestones for Blockchain technology in 2018. (A website for developers). According to him, this year will be the year that non-technical and generally uninterested people learn about and start to understand what a Blockchain. The public's awareness and acceptance of this technology are being increased in 2018". Additionally, Bahga and Madisetti state, "Blockchain is a young technology and is primarily used in the financial sector" (Bit coin being the most popular application). [17, 18, 20, 22] The widespread adoption of Blockchain technology is being hampered by other industries' lack of knowledge about it.

**CONCLUSION:**

Blockchain Technology is explained above. The timeline highlights provide an overall history of the technology, including the creation of Ethereum, R3 Consortium, Linux Foundation Project, and Enterprise Ethereum Alliance. Automotive, Government, Healthcare, Real Estate, and Software initiatives were examined. Appropriate questions and detailed planning are needed to determine if Blockchain Technology will work for a company. This paper outlined the steps a

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company must take to develop a Blockchain solution. The five core principles teach Blockchain Technology basics. This paper was written to increase knowledge of Blockchain Technology. A 2018 study of 53 business professionals shows a need for information. Over 82% of respondents had never heard of Blockchain Technology. If Blockchain Technology is better understood, acceptance and approval will follow. Future research will show which industries used Blockchain Technology successfully. We hope that this our study will help for the researcher to understand the basic challenges and opportunities in blockchain technology. We also expect that the beginners in blockchain technology will be benefited from our this study for their further research.

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