

Use of Blockchain Technology in Banking in Bangladesh; Usefulness, Hurdles and Recommendations

by

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Abstract:

Access to financial services has always been limited in Bangladesh. Financial inclusion, including all the people with the finance, is a very concerning issue all over the world where Bangladesh is also trying to include all the people with the finance. Bangladesh lies in such a group of countries where approximately 40% of adults are presently under the reach of formal financial services. This study examines financial inclusion in Bangladesh through the use of blockchain, its usefulness, and hurdles towards its successful use and recommendations which may lead to the effective application of blockchain in banking.

Keywords: Blockchain technology, financial inclusion, financial transactions, Bangladesh, etc.

Introduction:

The importance of an inclusive financial system is widely recognized in the policy circle and recently financial inclusion has become a policy priority in many countries. Initiatives for financial inclusion have come from the financial regulators, the governments, and the banking industry. The use of Blockchain in banking in Bangladesh can assist the present policies to achieve a greater financially inclusive economy. Researchers have highlighted requirements for applying blockchain technology in certain cases. As part of these mega-trends, banks are also experimenting with new mobile applications and voice-enabled gadgets to enhance delivery to end mile customers to make a consumer's lifestyle better. Ultimately, the consumers are the driver who needs to continue to accelerate its investments in innovation and digital enhancements.

This study examines financial inclusion in Bangladesh through the use of blockchain, its usefulness, and hurdles towards its successful use and recommendations which may lead to the effective application of blockchain in banking.

Literature Review:

Blockchain is a technology, a universal online database that can be used by anyone and anywhere. It is used with the help of internet connectivity. It does not allow “supporting of faking documents, transactions, and other information” (Karafiloski & Mishev, 2017). “Blockchain is a spreadsheet, a revolutionary picture that has generated thousands of clones across a computer network” (Zibin et al., 2017) that updates the spreadsheet regularly. The user

must have some basic perception and understanding of the blockchain to continue using it (Zibin et al., 2017; Zheng et al., 2017).

The blockchain is a collection of information and a database. This database is accessible by each block to get a copy of a record that has been entered. It means that the information is publically accessible for all without being able to make changes to the records (Yuan & Wang, 2016). All of these blocks have enticements to process and verify the transactions. These characteristics make the blockchain extremely helpful to maintain the records in a transparent and useful way (Zibin et al., 2017).

A blockchain consists of several blocks in a chain where each block contains data, the hash (address) of the block, and the hash of the preceding block (Yuan & Wang, 2016). The Data section contained smart contracts, transactions, and other confidential records. Hash itself is an identification of the block. The Hash of the block is automatically developed when a new block is formed in the chain (Guo & Cheng, 2016). The third element of the block is the preceding hash that is also known as the previous hash. It is an address or hash of the previous block in the chain (Friedlmaier et al., 2018). The benefit of blockchain is that it removes the function of a middle man between two parties (Yuan & Wang, 2016). The transaction can be in various ways like smart contracts, money, etc. The process of transaction in data consists of rules, logic, sources, and destination, apart from other validated information.

The technology used in the blockchain is based on the concept of the peer-to-peer network. This means that every node in blockchain gets a copy of another node (Zibin et al., 2017) and there is no central authority. Each node performs its work as a client or server. It is essential that the blockchain transactions are validated and authorized (Friedlmaier et al., 2018) so every node must verify the other node. In this way, the middle man effort is removed from blockchain technology (Karafiloski & Mishev, 2017).

Blockchain is also known as a decentralized database. It is used to store confidential records of customers. It also manages the records efficiently (Karafiloski & Mishev, 2017). Upon occurring of a new transaction in the network, the existing node validates it and keeps its record. A new block is formed in the chain which is also called as mined of the transaction. After the creation of a new block, the proof of work performs automatically (Friedlmaier et al., 2018) in which the hash of a block is generated for its identification. The previous hash also develops to engage a new block with the chain. Each of these blocks has a unique pointer or a parent block address (Zibin, et al., 2017). In this way, a chain of blocks is formed known as the blockchain.

Blockchain technology is also considered as secured, when someone wants to do tempering in data, hash of block automatically change and then next block previous hash is considered different, the invalid block will be formed due to tempering in any block then the chain of the block also get disturbed (Yuan & Wang, 2016). For legal changes, users will perform proper methodology that is known as proof of work, every node of network validates the node and gets the copy of this node also then change will occur (Karafiloski & Mishev, 2017). As each type of technology has its advantages and disadvantages, major advantages and disadvantages of blockchain technology also exist.

After a new block is validated and added into the system of blockchain, it cannot be altered, tampered or removed. This feature of blockchain is called immutable and increases the security in the network. Further, it is the easiest accountability of the network (Yuan & Wang, 2016). For increased security, encryption and decryption are used which keep the whole data secure from access of the unauthorized users. In this technology, transactions also required validation from the other nodes of the network (Yuan & Wang, 2016).

In blockchain technology, the process of the middleman is eliminated because of high security and confidentiality. Therefore not anyone can easily perform a transaction (Yuan & Wang, 2016). In this technology, every transaction must have the acknowledgment of other nodes and this step leads to the accountability of blockchain (Karafiloski & Mishev, 2017). In blockchain technology, reversible transaction processes cannot be performed This step removes fraud transactions so; transactions can't be reversible in this technology (Guo & Cheng, 2016). Irreversible is also considered a disadvantage if someone accidentally performs a transaction in this chain then it's up to the next block/ customer to return back or not. In different studies, too much verification is considered a disadvantage, if someone wants to change his/ her information or data they need to perform proof of work fully (Guo & Cheng, 2016). In blockchain technology, the data is accessible to everyone, so it cannot be stored in a way that only validated users have access to it (Ekblaw et al., 2016). Blockchain and big data both are independent technologies but nowadays, both are in full stoke (Friedlmaier et al., 2018) and blockchain is a distributed database that stores the records permanently (Labrinidis & Jagadiish, 2016).

Blockchain and big data enhance the quality of data. Big data indicates a huge amount of data is difficult to be managed or processed easily (Ekblaw et al., 2016) and requires many techniques and a lot of effort. Earlier, huge data was managed through various processes but it took ample time to process. Later, new methods and technologies were introduced but were rejected due to efficiency, security, and other issues. Blockchain technology was introduced to the market with the intention of security, scam control, fraud, and managing of data. Since then, this technology is evolving (Ekblaw et al., 2016), and using it, companies are saving big data in the blockchain at reduced cost and time (Guo & Cheng, 2016).

In blockchain technology, transactions are easily performed, within just a few seconds. Therefore, it also reduces the transaction effort (Friedlmaier et al., 2018). Now a day different sectors are using this technology. The banking sector used this technology to maintain user accounts information. In the health care sector, it also used to keep the record of patients, accessible to staff (Eyal, 2017; Eyal et al., 2016). In the education field, educators adopted this technology for providing material to students efficiently and securely, the decentralized network allows authenticated users to access data from anywhere (Friedlmaier et al., 2018).

Objectives:

The objectives of the study are as follows:

- i. To analyze the use of blockchain in banking.
- ii. To present the solutions to the present problems of developing and using blockchain.
- iii. To examine the role of blockchain in the Banking sector.

Research Problem:

Very little researches have been conducted regarding financial inclusion, its advantages, and implication problems, and about the solutions to those problems. Some research works were done by very few different researchers such as Bangladesh Bank, Bangladesh Government, and so on. Recently some articles were published on Blockchain national strategy and advantages of blockchain technology in which the researchers only focused on blockchain strategy and on various blockchain application domains very shortly to demonstrate the advantages of

blockchain. They did address blockchain functions properly and no indication regarding how safe it is in comparison to another digital financial system in payment, settling, and trading so that people can rely on this new innovation in case of payment and transactions. This study is a very small initiative targeting the vast study gap.

Methodology:

For the present study, the data has been collected from published books, articles, journals, newspapers as primary data and analyzed qualitatively.

Blockchain Technology:

Blockchain is a system of recording information in a way that makes it difficult or impossible to change, hack, or cheat the system. A blockchain is essentially a digital ledger of transactions that is duplicated and distributed across the entire network of computer systems on the blockchain. Each block in the blockchain consists of several transactions, and with every new transaction, a record is added to the participant's ledger. The decentralized database which is managed by multiple participants is called Distributed Ledger Technology abbreviated as DLT (Ray, 2021).

In blockchain, the transactions are recorded with immutable cryptographic signature which is called “hash.” This means the change in a block would be immediately visible that it has been tampered with. To corrupt a blockchain system, the hackers need to change every block across all of the distributed versions of the chain. Blockchain are constantly and continually growing as blocks are being added to the chain, adding to the security of the ledger.

The Properties of Distributed Ledger Technology (DLT)

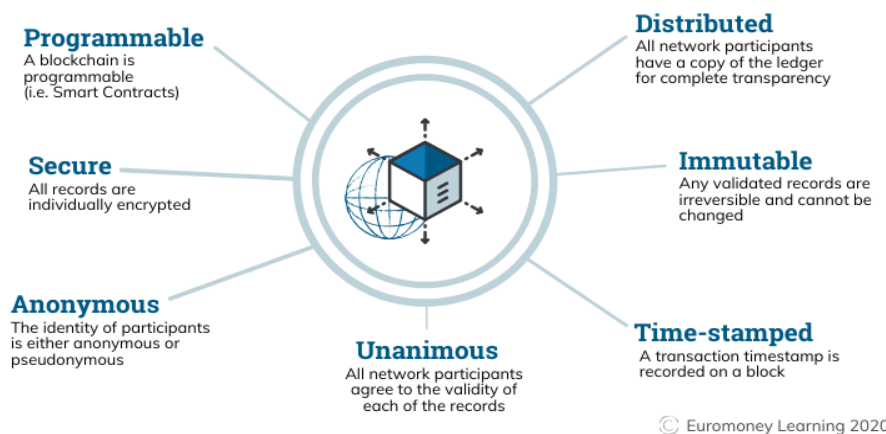


Figure 1: The Properties of DLT (Ray, 2021)

Blockchain in Banking:

“Blockchain introduces a decentralized ledger and stores complete transaction history in a bank, across dozens of controlled-access computers, which replicate a breadcrumb trail of banking activities” (Ray, 2021). It is not possible to delete or change the activity history.

Blockchain “performs many of the core workflows in finance and banking including records keeping and cybersecurity to currencies, debts, and equity management” (Friedlmaier et al., 2018). In the banking system, blockchain technology entered digital currency such as bitcoin, controversial yet revolutionary. Banks, however, did not immediately start the open-ledger system and the recent developments have reinstated this technology as a source to solve many of the financial industry’s most pressing pain points. In 2015, the NASDAQ conducted its blockchain shares trade using its proprietary platform, Linq. “It opened the floodgates for banking blockchain mania. It resulted in saving the banks’ significant administrative time and money, approximately reducing operational costs by more than a quarter” (Evans, 2015). Today, the biggest names in banking are embracing blockchain technology quite effectively. Some of them are as under:

- i. **JP Morgan Chase:** they have a dedicated division for blockchain R & D, named Quorum. It is “JP Morgan Chase’s proprietary distributed ledger that handles a wide range of transaction-recording services” (Friedlmaier et al., 2018). Smart contracting and share trading are also performed through it.
- ii. **Goldman Sachs:** Circle project of this company aims “to explore blockchain technology and digital currency distribution” (Friedlmaier et al., 2018). It works to decrease the “current volatility and controversy around cryptocurrency” (Evans, 2021). Moreover, it works as a completely “digital block chain-crypto trading branch of the company” (Friedlmaier et al., 2018).
- iii. **Bank of America:** It is one of the US’ largest banks with a single, blockchain-centered network to house banking records. It automatically authenticates business and personal data. Its data platform emphasizes permission of blockchain, i.e. “only authorized persons can access the ledger and have their entries recorded” (Friedlmaier et al., 2018).

Usefulness of Blockchain:

Blockchain uses digital money twice to prevent double-spending. It means charge given per transaction will also be charged in 100 transactions. In 2016, hackers stole \$100 M from the central bank via its accounts with the Federal Reserve Bank of New York. In case of blockchain, this will never occur. Blockchain-based businesses are very useful developing countries like Bangladesh because it decreases the charges of corruption (Labrinidis & Jagadiish, 2016).

All branches of a bank have a large ledger which records transactions. In banking software, the records are maintained in database through every valid transaction. This data is open but encrypted and it can be seen but not altered. Still no one can know “whose money went to whom” as it only goes through the specific address without identity of the recipient or the donor (Zheng, et al., 2017).

Blockchain in Transaction:

It is almost impossible to delete the data or alter it. “Every single block in a complete blockchain has basically three parts- Data, Hash, and Hash of its previous block” (Zheng, et al., 2017). Hash is an identifier and each block in the chain has its own hash which is specific to everyone. Two different blocks never have the same hash just as a human has fingerprints. “The hashes are created according to the data stored in each block. That means if the data in a block is

changed the hash of the block will also be changed” (Hiswai, 2018). This is why “each block has a hash of its previous block” (Hiswai, 2018). So no one can easily change or delete the data and another reason behind a secured blockchain is that its network is distributed. It creates peer to peer network. Blockchain is a transformative technology that empowers individuals to trade information through peer-to-peer transactions and lowers the use of intermediaries like large banks. Trust among peers is made possible through cryptography and a reliable network of computers that adhere to a set of well-defined rules, or protocols. “When a new person registers on this blockchain network he or she will get a new copy of all blocks and he or she can verify each block and can ensure that each and every data in the block is still valid” (Hiswai, 2018).

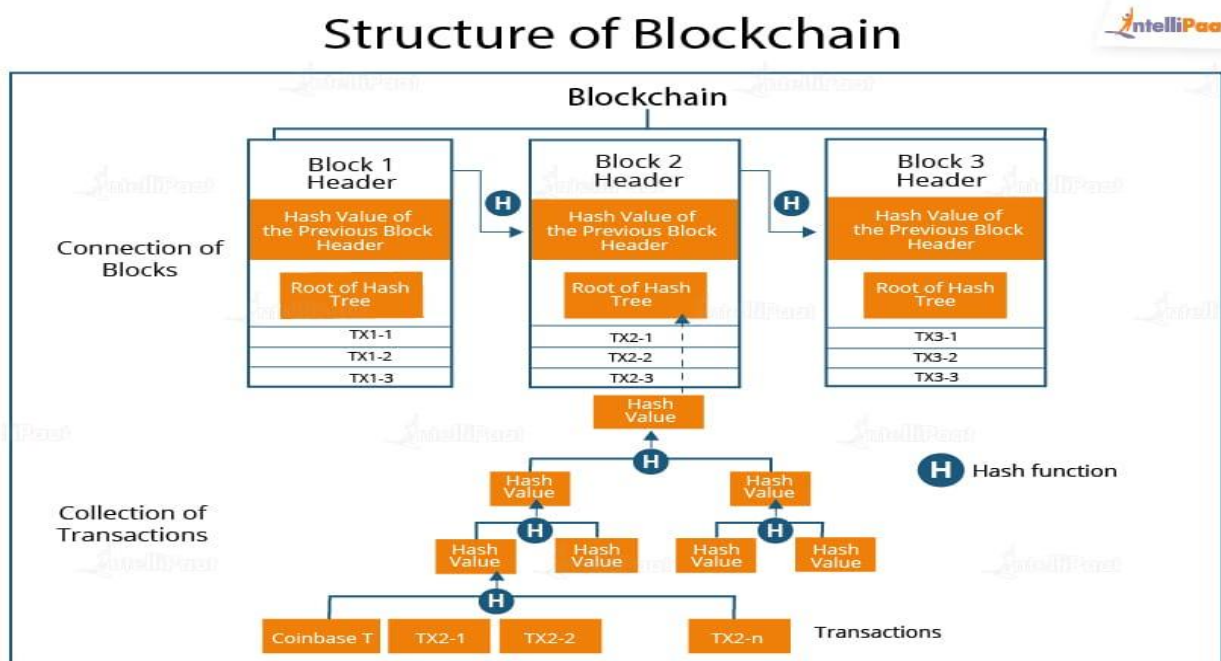


Figure 2: The Structure of Blockchain (Hiswai, 2018).

Hurdles to effective use of Blockchain:

Blockchain applications need to be able to roll out efficiently in order to attain extensive industry and user-level acceptance.

- i. Lack of user-friendliness is a major problem for blockchain technology as most of the currently used interfaces for blockchain ledgers are difficult to adopt.
- ii. Some features like “user experience, system efficiency, and the lack of formal blockchain protocols” (Hiswai, 2018) need further improvement.
- iii. If the users do not trust and understand the technology, the technology is difficult to adopt.
- iv. If the challenges are not addressed, there is less possibility that blockchain would sufficiently raise capital up to the desired scale.
- v. Blockchain must be able to handle a large number of users. It should “rapidly process large numbers of transactions otherwise it could limit its adoption in

- global decentralized energy systems” (Hiswai, 2018). For example, “Bitcoin and Ethereum can handle only 3-30 transactions per second in comparison with visa circuits which can handle approximately 60,000” (Hiswai, 2018).
- vi. The complex cryptography and the distributed nature make blockchain hacker-proof. However, like other IT systems, it is also subject to cybersecurity risks.
 - vii. “Blockchain ledgers share more data with other participants than traditional centralized databases” (Hiswai, 2018) often equally, among multiple peers. However, companies do not “expose private data for legal or competitive reasons” (Hiswai, 2018). To overcome this issue, access to the blockchain ledgers requires both public and private keys. This is the strength of the system. A hacker needs to obtain “the right keys to access the data” (Hiswai, 2018) and protecting the keys is dependent on the user who stores and processes the keys. The users, who are inexperienced with the technology, may face difficulties with the systems.

Recommendations for integrating blockchain technology into existing systems:

Since blockchain is integrated with other IT systems, it creates a challenge. It is obvious from the early stages of blockchain development that there are no concrete standards. The “interoperability between platforms and with other IT systems” is presently either limited or absent. There is a requirement of setting up “suitable data models and blockchain-enabled business processes” which could incorporate “authentication and communication protocols,” which although would be costly and complex.

All stakeholders need to consider the economy and society while considering the changes, in addition to “wider trust issues regarding data privacy and security.” For this purpose multi-stakeholder dialogues are required for piloting “high levels of expected change,” building trust, and identifying and managing consequences. The “companies and developers” need to actively inform the “regulatory landscape” and help to “shape standards for blockchain usage.” They need to work together via industry bodies for a harmonized set of standards and practices for the cryptocurrency space. Crypto-relevant industry bodies also need to “embed sustainability considerations into the emerging industry code of conduct.”

In the case of Bangladesh, which is one of the top five fastest-growing economies, blockchain can act as an accelerator for sustainable growth. The country has enjoyed a staggering 6.0 percent average annual growth since the last decade reaching up to 7.85 percent recently. Its biggest export sector is readymade garments, which holds the second position in the world, after China. Keeping an eye on the advancement of blockchain technology and adapting quickly to it can prove beneficial for the sustainable growth of Bangladeshi exports. Already some private financial organizations are assessing blockchain implications at a small scale. This is a good sign. Being an emerging economy Bangladesh should utilize opportunities emerging out of blockchain research being conducted in countries like the USA, China, Australia, Japan, UK, and India.

At the micro-level, a properly planned approach is required to leverage the maximum benefits of blockchain technology. While investing in it, organizations must consider their strategic alignment with transformation. Otherwise, unstructured implementation can lead to failures. Therefore it is recommended that companies evaluate at the user-case level to determine whether the implemented application can be useful for them with blockchain technology. The impact analysis should also be done rigorously to monitor progress at regular intervals.

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