

Review Article

Blockchain - A Transparent Technology to Stop Corruption

Sangeeta Patel¹, Jose Chacko²

^{1,2}Research Scholar, MCA Thakur Institute of Management Studies, Career Development & Research (TIMSCDR), Mumbai, India.

I N F O

Corresponding Author:

Sangeeta Patel, MCA Thakur Institute of Management Studies, Career Development & Research (TIMSCDR), Mumbai, India.

E-mail Id:

patelsangeeta671@gmail.com

Orcid Id:

<https://orcid.org/0009-0007-1211-7926>

How to cite this article:

Patel S, Chacko J. Blockchain - A Transparent Technology to Stop Corruption. *J Adv Res Intel Sys Robot* 2024; 6(1):. 1-5.

Date of Submission: 2024-02-02

Date of Acceptance: 2024-03-04

A B S T R A C T

Blockchain technology is gaining traction in every industry because it provides security and is decentralised. Cryptocurrency is a vast realm of Blockchain Technology that is utilised for digital asset transactions. Along with that, most industries such as medicine, insurance, education, data storage, government, and so on. The suggested system in this article is about how blockchain may be utilised in the government sector, with an emphasis on eradicating corruption in many domains. Despite the fact that blockchain has been available for dozens of years, many organisations are still researching methods to apply this technology to support various activities. This paper also discusses the many areas that have incorporated blockchain technology and how they function. Other aspects such as decentralised, security, distributed ledgers, consensus, speedier settlement, and others contribute to the importance of this technology in the future. This article paints a clear image of Blockchain and how its algorithms may be utilised in government sectors to combat corruption and store data from various government organisations in a way that is transparent to the nation's residents.

Keywords: Blockchain, Consensus, Time-Stamped, Decentralised

Introduction

The digital period, in which everyone has access to information, has progressed significantly. Many new technologies have emerged in the digital age. Including the Internet in the 1960s, AI in the 1980s, smartphones in the 1990s, and many more lately. Blockchain technology entered the list of immersive technologies in 2008 when Satoshi Nakamoto presented Bitcoin. Most industries have used blockchain technology to improve their work operations. Finance, banking, education, and healthcare are just a few examples. Not just the commercial sector, but also governments from numerous nations, are eager to use blockchain technology. This study attempts to introduce several blockchain applications in the Indian government and their impact on corruption. Blockchain, which is at the heart of cryptocurrencies such as Bitcoin, is now being

examined with considerable interest in the public realm. With the growing interest in blockchain technology, its implementations in both the private and public sectors represent important areas for blockchain applications.

Blockchain has lately evolved and developed. Blockchain is believed to enhance the business process and build trust in every transaction. Several blockchain-based applications will be critical for data exchange and record management in several industries. Blockchain is a collection of immutable blocks and nodes that allows transactions to be recorded and tracked throughout the network. Currently, the government has given every citizen his/ her unique ID which we call the Aadhar card, which acts as proof in many legal procedures. Recently on January 29, 2022, an article by Times of India wrote a group of eight persons from Ghaziabad were detained for allegedly creating fraudulent

Aadhar cards for Nepalese and Bangladeshi migrants.¹ Such occurrences are extremely difficult to trace down. Because blockchain is decentralised, all of the data in the record is accessible to everyone. As a result, the likelihood of such scams is reduced

Foundations of Blockchain Technology

Blockchain securely saves massive amounts of data. This information is stored in massive databases and is easily accessible. A blockchain is a distributed ledger that contains all of the facts regarding transactions as well as their history. These ledgers function similarly to the account books used in banks, containing all transaction information. To put it another way, the passbook is the ledger, and the page of the passbook is similar to a block.

DLT is a blockchain segment that stores transactions. Any modifications made in a single block will be mirrored in every ledger spread across the network. Blockchain transactions are trustworthy and safe. It is a complete technology since it prevents fraud, lowers risk, and increases transparency between transaction blocks.

Blockchain technology is comprised of three key concepts: 1. Blocks, 2. Miners, and 3. Nodes.²

Blocks

In blockchain, every network consists of a chain that has multiple blocks. Each and Every block has three primary components: data, nonce, and hash. The transaction details in a block are referred to as data. The nonce is a 32-bit whole integer produced at random. The hash is a 256-bit number that is extremely tiny.

Miners

The mining process is where miners construct or validate new blocks on the chain. Every block in the blockchain has its nonce, hash value, and a hash pointer to the preceding block on the chain. As a result, mining a block on huge networks is a challenging task. Miners must solve a challenge to determine the nonce value contained within the block. The prize is given to the person who correctly determines the nonce value. To mine the blocks, miners must have a well-equipped infrastructure. To solve the difficult algorithms, they employ specialised software. Miners participate in the consensus layer, where they check the legitimacy of each block. Blockchain uses two consensus algorithms.

1. Proof of Stake
2. Proof of Work

Nodes

Decentralisation is a fundamental characteristic of blockchain technology, which implies that no single organisation or server may own or manage the network chain. All nodes in a

blockchain are linked to one another. Newly inserted nodes are cloned, and the network algorithmically authorises these newly mined nodes, which may be late other gadgets in the chain have faith in it. Transparency is another aspect of blockchain. Because every action is easily examined and shown in the ledger. Each blockchain user is assigned a one-of-a-kind alphanumeric identifying number. This identifying number is used to display all transactions as well as the history. Because blockchain is a highly secure network, it is practically difficult to hack or tamper with the information contained within the block. Because if any one block in the network is tampered with, its hash value changes and, it is no longer linked to any of the subsequent blocks.

Literature Review

In a paper titled 'A comparative study: Blockchain technology utilization benefits, challenges and functionalities', Ali et al. talk about the advantages, problems, and usage of Blockchain in four sectors which are Government, Financial, Manufacturing, and Healthcare.³ According to their study, trust and decentralisation are the two important blockchain characteristics. Blockchain technology is classified into three categories which are public, hybrid, and private. They have mentioned five different categories for the benefit dimension. Topics like complexity level, identity proof, and automatisation process are included under this category. Topics such as cost reduction, energy management, auditability, control of truncations, voting accuracy and transmission, etc. are included in the remaining categories of benefit dimension. They have studied different aspects of the blockchain challenges dimension which are related to organisation, environment, operations, sustainability, etc. The risk of error for complex business rules, security, privacy, computation efficiency, latency, performance, etc. aspects comes under the dimension of the challenge. Their paper concludes that this technology is still new, although its acceptance and implementation are complex within the organisation. Still, future research areas will increase its usability.

1. Treleaven et al. published a paper titled 'Blockchain Technology in Finance' which talks about how smart contracts can be helpful to make sure every transaction follows the legal agreements.⁴ Smart contracts can improve government services efficiently and transparently. Smart contracts are computer programs that run a specific function and can simplify the processes related to business by creating secure, safe, trustworthy agreements and transactions. The authors have also mentioned how blockchain technology has a huge number of other uses, for example, the management framework for private records such as medical records, private insurance, and public records including passports, certificates, etc.

2. Aste et al. wrote a paper titled 'Blockchain technologies: the foreseeable impact on society and industry' which talks about the challenges and opportunities offered by Blockchain in industry and society.⁵ The authors have studied the Blockchain's impact on Business and Regulations. Blockchain adds the timestamp to anything and provides proof of the existence of that particular digital asset. This proof-of-existence, immutability, and decentralised record-keeping provides operational efficiency.

In a paper titled 'Challenges of blockchain technology adoption for e-government: a systematic literature review', Batubara et al. studied the use of Blockchain Technologies in E-Government applications.⁶ There were 3 aspects under which various challenges were included. Technological Aspect includes challenges like security, scalability, usability, storage size, flexibility, cost-effectiveness, reliability, etc. Then comes organisational and environmental aspects which comprise acceptability, business model, risk of error for complex, trust and laws, regulation support, infrastructure, etc. respectively.

Blockchain in Indian Government

Previously, we covered how many writers conducted Research on the application of blockchain in various areas. To provide light on the primary goal of blockchain as it is employed in Indian government services.

Many countries, including Singapore, China, Venezuela, the United States, and others, are introducing various blockchain technology-based initiatives in the finance, health, and other sectors. India is not far behind, and various Indian states are now launching schemes or plans that include blockchain technology.

According to the 2019 NASSCOM Blockchain Report, 50% of states have embraced and used blockchain technology to varied degrees. Tamil Nadu will be the first Indian state to implement blockchain policies in 2020.⁷ Maharashtra has also revealed plans to use blockchain. The Maharashtra government will issue a 'State Blockchain Policy' in the near future out and give guidance to India's financial centre.⁸

Discussion

Blockchain technology offers several advantages, including the fact that it is secure, decentralised, scalable, trustworthy, and allows safe transactions since the transaction history is visible to everyone in the network, making it fraud-resistant. The causes of corruption include a lack of job opportunities, lax rules, unhealthy competition, complicated tax and licencing systems, numerous government departments that are not properly functioning and are abusing their powers,

politics in government-controlled institutions that deliver certain goods and services, and a lack of transparent laws,⁹ and in order to minimise corruption in India, structural upgrades and reforms to deliver transparent, citizen-friendly services are critical.¹⁰

This study discusses how deploying blockchain might help to prevent corruption.

My suggested approach involves adopting blockchain in the Indian government, with all government accounts essentially available on the blockchain network. This makes the transaction history connected with each account visible to everyone. This will increase transparency. Furthermore, every payment made to or for will be automatically updated on the ledger. The principle is simple and may be applied whenever citizens desire openness.

Another approach to applying blockchain in the Indian government is to utilise it in the traffic department, as the wallets of all traffic enforcers would be decentralised, ensuring that the task is completed without any errors or corruption. Many enforcers accept bribes that end up in their own accounts. However, if their accounts are accessible to everyone in the network, such offences will be straightforward to identify.

The entire procedure can be summarised in 8 steps:

- Traffic Enforcer catches a person for breaking the signal.
- The Enforcer will now ask for the information of the person and also the documents.
- Here will be the first use of blockchain as the documents can be verified if they are over the network secured using blockchain.
- Then Enforcer will charge the person for breaking the rules.
- Here it might happen that the person doesn't want to get involved and tries to bribe the cop. However, as the charged receipt is fixed and uploaded onto the network, it is not possible for the cop or the person to tamper with the transaction.
- Even the person cannot bribe the cop as the cop's ledger will be publicly visible to everyone present in that network.
- So now the person has to pay the charged amount for violating the law.
- This will make sure that no cop takes the bribe or a person provides it.

The steps given above are examples of how implementing blockchain in the Traffic department will avoid corruption.

Blockchain can also be used while issuing driving licenses in RTO. The entire procedure can be summed up. During

a pandemic, almost every sector became digital, similarly, parts government sector can be electronically turned. The steps of how you can implement blockchain in the RTO sector are given as follows:

1. An entire video of the driving test can be recorded and depending on that the test outcome can be generated.
2. The entire procedure would be automatic and wouldn't require any manual intervention.
3. The video would be uploaded on the blockchain network for anyone to view and verify.
4. The driver's test can also be taken online with a proctor right there.
5. The driving licence would be issued on the spot which could be digitally verifiable on the blockchain network.

By switching the RTO sector completely online, there won't be an issue of crowded tests, appointment scheduling, or travelling far to give your test. Remotely a person will be able to attend it.

Similarly, there are many states which are now planning to switch over to blockchain technology. To start with, the state government will be putting all the real estate documents over the secure network. Through this, it will be easy to check the authenticity and proof of every individual's document.

Another example where blockchain can be implemented in the government sector is adding all the accounts that are linked to government funds over the network. During the COVID-19 period, there have been many such governmental bodies (organisations) that were formed. Many citizens became victims of fraudulent attacks through some fake organisations that pretended to be the liable ones.

The entire procedure includes these 5 steps:

1. All the government organisations/ funds accounts should be added over a public blockchain network.
2. The account should be created for the one who donates or contributes to the fund.
3. Then every account must have its ledger and all the transactions done between the organisation should be visible in it.
4. By doing this, the individual will be able to see the transactions happening between different organisations.
5. There will not be any chance of fraud, as all the details of the transaction are public to every individual present over the network

The accounts of politicians/ government funds/ Government organisations should be made public using blockchain as it will build the trust factor between citizens and they will be sure where their money is going.

Challenges Faced

It is not very easy to make the accounts public to everyone. However, by taking small steps, the government can first go for the Funds and Organisations Accounts. Making these accounts public won't be a hassle and it will be convenient for all to access the history of transactions before investing money into them.

Conclusion

According to the statistics in the study, corruption is a serious problem that must be addressed. Considering the advantage that blockchain technology provides, adopting it in the Indian government's anti-corruption efforts will be beneficial. As state governments begin to use blockchain services in various departments, success in this sector will help to address the limitations of blockchain, such as cost, storage, and so on. This article suggests a blockchain implementation technique in which government accounts are placed on a single network and all transactions are tracked. This will aid in the development of trust and transparency between citizens and the government

References

1. Bahl A [Internet]. 8 held for making over 30k fake Aadhaar cards. The Times of India; 2022 Jan 29 [cited 2024 Feb 27]. Available from: <https://timesofindia.indiatimes.com/city/ghaziabad/8-held-for-making-over-30k-fake-aadhaar-ards/articleshow/89190027.cms>
2. Becher B [Internet]. Understanding Blockchain technology. BuiltIn; [cited 2024 Feb 27]. Available from: <https://builtin.com/blockchain>
3. Ali O, Jaradat A, Kulakli A, Abuhalimeh A. A comparative study: Blockchain technology utilization benefits, challenges and functionalities. IEEE Access. 2021;9:12730-49.
4. Treleven P, Brown RG, Yang D. Blockchain technology in finance. Computer. 2017 Sep 22;50(9):14-7.
5. Aste T, Tasca P, Di Matteo T. Blockchain technologies: the foreseeable impact on society and industry. Computer. 2017;50(9):18-28.
6. Batubara FR, Ubacht J, Janssen M. Challenges of blockchain technology adoption for e-government: a systematic literature review. Proceedings of the 19th Annual International Conference on Digital Government Research: Governance in the Data Age; 2018. p. 1-9.
7. Goled S [Internet]. Blockchain technology for better governance; 2021 [cited 2024 Feb 17]. Available from: <https://analyticsindiamag.com/blockchain-technology-for-better-governance>
8. Radhakrishna T [Internet]. Maharashtra to come out

with 'State Blockchain Policy' soon; 2022 May 1 [cited 2024 Feb 19]. Available from: <https://government.economictimes.indiatimes.com/news/technology/maharashtra-to-come-out-with-state-blockchain-policy-soon/74074086>

9. Wikipedia. Corruption in India; [cited 2024 Feb 14]. Available from: https://en.wikipedia.org/wiki/Corruption_in_India
 10. Ministry of Personnel, Public Grievances & Pensions [Internet]. Measures to combat corruption. PIB Delhi; 2021 Feb 10 [cited 2024 Feb 13]. Available from: <https://www.pib.gov.in/PressReleasePage.aspx?PRID=1696775#:~:text=Systemic%20improvements%20and%20reforms%20to,the%20Direct%20Benefit%20Transfer%20initiative>
-