

Study of Blockchain Technology and Its Applications in Governance of India: A Case Study

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ABSTRACT:

Blockchain, the newest shared database technology, has recently brought about a paradigm change in how people do business and interact. Technology has an influence on all global spheres, industries, and organisations. Recently, the worldwide community was startled by the use of distributed ledger technology in digital money. As a result, the use, perception, danger, and anticipation of technology have often been studied. In this essay, the writers sporadically make an effort to understand the potential breadth, complexity, and legal dynamics of blockchain in the context of India. The Ministry of Information and Technology's working papers, the Finance Ministry's publications, and NITI Aayog's documents and reports are examples of primary sources. In addition, the Reserve Bank of India's guidelines and press releases, numerous judgements of the Indian Supreme Court, ministers' statements in the Indian Parliament, and various state initiatives have all been consulted in order to critically understand the convolution of blockchain in the Indian context.

Keywords: Communication, Transaction, Distributed ledger, and Digital currency

Background

The knowledge economy, information and technical revolutions, and advancements in transmission and communication are what set the twenty-first century apart. The conventional responsibilities of trading commodities and knowledge as well as sharing products have changed significantly in recent years. The manner in which people and organisations may have trust in one another have undergone a radical transformation as a result of the advent of cutting-edge technology. Organizations like the state have often played the function of a mediator throughout history to enable the exchange of commodities and financial resources between people and groups. New technologies have drastically changed the connection between people and those who settle conflicts. The benefits of doing business and exchanging information and things online are many. They were able to establish connections between every stationed person and the rest of the globe. Globalization, a revised version of the Industrial Revolution, and the development of information and technology prepared the way for simple and speedy trade and communication. They have also created whole new challenges.

22 million dollars were recovered after a scam utilising cryptocurrency was discovered by the United Kingdom Police Department. Financially vulnerable individuals from all around the world—not only

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those in the UK—were duped and made victims of the fraud. The United Kingdom's officials have been able to collect cryptocurrency worth around \$22.2 million after learning about a massive fraud operation (165 crores). The second-most popular cryptocurrency in the world after Bitcoin, Ethereum, has been found on USB sticks in significant quantities. All throughout the globe, new challenges are being presented to the rights to privacy and openness. Several well-known politicians think that the erosion of state sovereignty is the fault of transnational corporations.

The idea of supra-states seems to be approaching reality in the modern world as the function of states as the exclusive authority steadily declines.

Every country and company in the world is keen to understand the potential and capacity that it will have in the not-too-distant future. There is a great deal of debate and discussion about the usefulness, complexity, and usability of blockchain technology. The information economy has become the dominating force in the globe as of late. E-governance and other technological innovations have significantly changed how nations run and how people connect on a global scale. A thorough literature search must be conducted in order to comprehend the breadth and depth of blockchain technology's potential applications in India. The Indian government, as well as governments in other countries, as well as several private and public organisations, often utilise recently created technology. The enormous potential provided by distributed ledger technology, notably in the realms of financial transactions, supply chains, data storage, protection, and monitoring, is one of the main areas on which Indian authorities are concentrating their attention.

THE UNDERLYING TECHNOLOGY OF BLOCKCHAIN

Blockchain is the most recent version of ledger technology. It works as a decentralised database that stores information and data in blocks and enables user transactions and communication. The mediator's job is becoming less and less necessary as a result of how this technology was created. All communication and transactions are entirely transparent, and every single person, thing, and organisation is practically linked to every other in a block.

The block chain technology is a decentralised distributed ledger that links each node to the hash value of the block that came before it and stores data in encrypted blocks. As a result, the data is unchangeable and cannot be changed. The concepts of Blocks, Hash value, Miners, and Nodes form the basis of the system known as block chain. New blocks are added to the network by miners, who are paid for their work. Last but not least, there is the decentralised method of nodes, which may be any form of electronic device on the network and keep copies of the blockchain and accept freshly mined blocks algorithmically. The data in the block, a 32-bit whole integer nonce value, and a 256-bit hash value are the three fundamental components of each block.

In order to effectively administer society throughout history, people, institutions, and the state have all collaborated to uphold one another's trust. The trust has survived all eras, from the ancient to the modern, as well as the development of knowledge and cutting-edge technology. By assuring adherence to cultural standards like rules and regulations, the contemporary institution of bureaucracy is in charge of preserving the public's confidence in society. In general, three different

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kinds of trust machines have evolved throughout history, which has eventually secured trust in society. The organisations that make up the reputation system, the government and bureaucracy, as well as blockchain technology, all fall under this category.

Blockchain is a ground-breaking distributed ledger technology that Satoshi Nakamoto first used in the creation of the cryptocurrency Bitcoin in 2009.

Blockchain is a collection of developments in distributed ledger technology that clearly has practical uses. With the use of blockchain technology, several parties involved in a business transaction may work together on a single ledger that will operate as a reliable source of information. Blockchain has done away with the need for a central authority to verify the transactions. Since it is based on peer-to-peer networks, all nodes will take part in the transaction validation process rather than relying on a centralised authority to do so. The data structure used in Blockchain Technology helps to maintain an unchangeable, chronological record of all transactions that have ever occurred. Because of its potential use in a broad range of application domains, blockchain technology adds features of transparency, immutability, and efficiency, setting it apart from previous technologies.

In addition, the National Institution for Transforming India (NITI) Aayog, a central organisation that works with the states to identify the sectors, priorities, and strategies for national development, is carrying out pilot projects across the country to look into the potential uses of blockchain technology. "Blockchains may be roughly characterised as a new sort of network architecture (a mechanism to organise how information and value flow around on the internet) that introduces distributed verifiability, auditability, and consensus to generate "trust" in networks," it reads.

There are three main blockchain applications that the public sector might make use of. To start, it has the ability to reduce transaction costs while still assuring data security; as a consequence, it has the potential to contribute to the growth of trust on a worldwide scale. The majority of nations in the globe, especially those in the public sector, are spending a lot of money on infrastructure to make business and online transactions easier. Because of this, there are now numerous applications in both the public and private sectors for secure data interchange, payment processing, identity management, supply chain management, and many other areas. In order to allow a quick and transparent exchange, a worldwide pilot programme using blockchain technology is presently underway.

THE IMPORTANCE OF THE BLOCKCHAIN TECHNOLOGY

It's probable that for this new technology to be widely adopted, the implications that are discussed below are extremely essential.

Building Credibility with the Community

Several governments are attempting to take advantage of the potential blockchain uses inside their boundaries at this nascent stage. For instance, "the governments of Sweden, Estonia, and Georgia are testing land registers based on blockchain technology, allowing different parties to securely maintain copies of the registration." The usage of land registries in Sweden, Estonia, and Georgia is mentioned

in this sentence. The first country to test a voting system based on blockchain technology was Sierra Leone, a country in West Africa.

Respecting the Privacy and Sensitive Information's Confidentiality

The protection of persons' personal information is a growing issue in the modern world. The distributed preservation of data in a cryptographic chain is made possible by the Blockchain Technology, which offers the safest platform conceivable. As a consequence, it is easy to guarantee data availability while still safeguarding its privacy. Additionally, blockchain technology is a useful tool for Know Your Customer (KYC) and biometric authentic authentication due to its immutability. Some individuals think blockchain technology will eventually be able to secure and protect all kinds of data.

Increasing Productivity While Reducing Costs

Conducting transactions, especially international ones, is not an easy undertaking in today's increasingly globalised society. The need for intermediaries will decline once Block Chain technology is fully functional, which will ultimately lead to a reduction in transaction costs. Blockchain technology is used to speed up transactions, increase operational security, and make it simpler to trace the provenance of traded commodities.

The Most Important Blockchain Applications

Increased accountability, openness, and the use of decentralised processes all help to strengthen public confidence. The properties of blockchain technology outlined above have the potential to increase citizen autonomy. Its implementation would thus help to making life simpler for people worldwide. According to some theories, blockchain technology might also help streamline government and commercial processes in all sectors of the economy.

An encrypted virtual currency known as Bit Coin has lately attracted a lot of interest in the world of online commerce. It's a popular misconception that Bit Coin, a kind of cryptocurrency, is equivalent to Block Chain. The phrases blockchain and bit coin, which both relate to crypto currencies, are sometimes used synonymously. On the other hand, one of the earliest uses of the blockchain technology was in Bitcoin. Bitcoin was therefore the first use of blockchain technology.

Blockchain-based technology in India

An innovative new technology called the blockchain has the potential to have an influence on almost all sectors of the global economy. The potential use of technology, not just in the financial sector but also in other sectors, has been the subject of much debate and discussion among a wide range of stakeholders and academic circles in India.

The following are other details provided by NITI Aayog in the discussion paper's draught:

In an attempt to assess the potential of blockchain technology to bring greater efficiency and get a better knowledge of any barriers that may develop during deployment, NITI Aayog has carried out Proof of Concepts (PoCs) in four distinct fields.

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These consist of:

1. "Tracking and tracing" of drugs throughout the pharmaceutical supply chain; 2. approval and verification of claims prior to fertiliser subsidy distribution;
3. authentication of degrees from reputable schools; and
4. transfer of land record information.

In order to find possible future uses for blockchain technology, NITI Aayog has researched a number of sectors and performed case studies throughout the whole of India. For instance, it may be helpful in the development of a new system to handle land record transfer and ownership, in the pharmaceutical medication supply chain, and in the industry's "self-regulation," which would enable the avertance of fraudulent behaviour. The following are some of the other uses for the Immunization Supply Chain that NITI Aayog looked into: Building an Improved and Unified Blockchain Chit Fund Immunization Infrastructure for India: An Indian-based blockchain-based model to boost trust and enable value creation in the insurance sector (including medical, automotive, and more), battery swapping for electric vehicles, organic farming, and energy trading "A draught framework for integrating Blockchain technology into government services has been created by the Ministry of Electronics and Information Technology (MeitY). MeitY plans to utilise it for supply chain management, electricity distribution, digital certifications, and health data in addition to property record keeping."

OPPORTUNITIES THAT BLOCKCHAIN TECHNOLOGY BRINGS FOR INDIA

In an attempt to tackle the pervasive issue of corruption in the nation, the present administration of India has put in place a variety of strict and divisive laws. The administration now headed by Narendra Modi has recently implemented a number of long-awaited initiatives, including Demonetisation, the Unique Identification Authority of India (UIDAI), and the Goods and Service Tax Bill. These steps facilitated the digitalization process as well as the enhancement of the nation's government. Additionally, programmes from the government like the Pradhan Mantri Jan Dhan Yojana and Zero Balance Saving Accounts helped a sizable section of the population of the nation acquire access to the basic capacity to perform financial transactions. The aforementioned activities have made it possible to store and maintain data, which both have the potential to help the country's use of blockchain technology. The blockchain technology was originally used to manage land records in the Indian state of Andhra Pradesh. In addition, it has carried out research initiatives to create a Blockchain Center of Excellence, and as a consequence, the state has emerged as India's first Blockchain state. Some of the states that are imitating Rajasthan include Karnataka, Kerala, Maharashtra, and Rajasthan.

As a result, the use of blockchain has expanded, and the technology now has several benefits in a range of settings, including decentralisation, anonymity, permanence, and auditability. In addition to public and social services, financial services, risk management, cryptocurrencies, and Internet of Things (IoT) applications are now included in the range of uses for blockchain technology.

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STATE-LEVEL BLOCKCHAIN TECHNOLOGY INITIATIVES IN INDIA

There is a significant amount of untapped potential for commercialising and simplifying blockchain technology in **Maharashtra**, which is the economic centre of the nation. It is plausible to believe that the Maharashtra state government is developing a strategy to release a "State Blockchain Policy" very soon.

Madhya Pradesh: This innovative state has started working on a number of initiatives pertaining to the agriculture sector. The Commissioner of Land Records and Settlement Office of the Madhya Pradesh Revenue Department is debating whether or not to use Blockchain technology to enhance the administration of land records. In this context, the office of the Commissioner of Property Records and Settlement has issued an invitation to organisations to provide a presentation showcasing their knowledge of Blockchain technology and how it may be used to manage land records.

The state of Karnataka's administration is attempting to use blockchain technology for online property recording. It has held a summit in Bangalore to talk about the possibilities for blockchain technology in the state.

Several more states and union territories are also exploring blockchain technology and looking into its possible uses, in addition to all of the previously stated states. Delhi, Rajasthan, Sikkim, and West Bengal have each created infrastructure in their respective states that is suited to the growth of new technology.

BLOCKCHAIN TECHNOLOGY: CHALLENGES AND POSSIBILITIES

In an attempt to raise awareness of the issues and challenges related to copyright in blockchain technology, Alexander Savelyev He initially acknowledges problems before attempting to resolve them. The author claims that piracy is one of the biggest issues with internet material. Organizations will confront a rising number of possible issues as the block chain system evolves in line with a growth in global demand across a range of sectors. These difficulties include the requirement for standardisation, a rise in processing speed, improved privacy, and insufficient regulation, as well as a lack of knowledge and comprehension of the underlying technology. The situation in India is also different since the management of the country's fundamental infrastructure is a constant source of worry. The use of blockchain technology would completely make the more recent and outmoded system obsolete. This has caused a lot of misinformation and ambiguity about the technology, which has slowed down the process of its mainstream acceptance. However, a number of different states are doing several pilot projects in a range of disciplines. The Indian government is slowly but surely putting in place the key structure required for the country's adoption of the blockchain technology. Furthermore, regulation is the only practical way to ensure its early acceptance, together with extensive awareness efforts and useful use cases.

Conclusion

A potentially game-changing method in a number of procedures employed by both the public and commercial sectors has lately emerged as blockchain technology. The peer-to-peer network architecture of the block chain technology, also known as DLT, uses encrypted blocks that are stored

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in a decentralised manner. It includes human contact, technology institutions, and a shared digital data base that can hold a lot of data, in contrast to more traditional types of technological progress. The technology has a promising future in both the public and commercial sectors, despite the fact that it is still in its infancy. Without a doubt, the technology behind block chains will significantly increase the value of the services provided by e-governance to citizens. The global public and commercial sectors would become more interested in instantaneous transactions, trust, transparency, and accountability as a result of this technology. [Reference required] Smart contracts and distributed ledger transactions may be used to monitor the smooth flow of data between departments and intra-departmental integration, which will further assure the delivery of the greatest number of services feasible utilising a whole-of-government approach. Globally, concerns have been expressed in reaction to the unchecked growth and decentralised nature of the uses for Bitcoin and other cryptocurrencies. Governments from different nations will ultimately be able to take use of the chances provided by the technology as more time goes by. The potential transformational uses of blockchain technology are also piquing the attention of the Indian government.

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