

## The Application of Blockchain Technology in Real-Time Governance: The Case of India

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### Abstract

The most recent distributed ledger technology, blockchain, has just brought about a paradigm shift in how people transact and communicate. All worldwide arenas, sectors, and organisations have been impacted by technology. The application of distributed ledger technology to digital currency recently astounded the international community. Therefore, it has been frequently analysed how technology is applied, perceived, risked, and anticipated. The authors of this article make sporadic attempts to comprehend the potential scope, complexity, and legal dynamics of blockchain in the context of India. Primary sources include documents and reports from NITI Aayog, working papers from the Ministry of Information and Technology, and reports from the Finance Ministry. Additionally, in order to understand the convulsion of blockchain in the Indian context critically, 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.

**Keywords:** transaction, communication, distributed ledger, digital money

### Background

The twenty-first century is distinguished by the knowledge economy, information and technological revolutions, and transmission and communication advances. The traditional roles of sharing information and products and exchanging goods have undergone significant shifts in recent years. The introduction of cutting-edge technology has brought about a sea change in the ways in which individuals and organisations can have faith in one another. Throughout history, organisations such as the state have traditionally assumed the role of a mediator to facilitate the trade of goods and monetary resources between individuals and groups. The relationship between individuals and those who mediate disputes has been completely transformed as a result of new technologies. There are a lot of advantages that come with conducting business and exchanging information and goods online. They were able to connect everyone stationed in any part of the world to the rest of the world. The path to easy and quick exchange and connectivity was paved by globalisation, a new model of the Industrial Revolution, and the advancement of information and technology. They have also brought about whole new difficulties.

The United Kingdom Police Department has detected a swindle involving crypto currency, which resulted in the recovery of 22 million dollars. People from all around the world, not just in the UK, were taken advantage of financially and made victims of the scam. Following the discovery of a global fraud scheme, the authorities in the United Kingdom have been able to seize cryptocurrencies to the value of around \$22.2 million (165 crores). They have discovered USB sticks that contain substantial

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The Application of Blockchain Technology in Real-Time Governance: The Case of India

Dr. Mahendra

amounts of Ethereum, which is the second most popular cryptocurrency in the world after Bitcoin. The rights to privacy and transparency are being tested in novel ways all across the world. Several prominent politicians believe that multinational businesses are responsible for undermining state sovereignty.

In today's world, the role of states as the sole authority is gradually diminishing, which seems to indicate that the concept of supra-states is becoming a reality.

Every nation and business on the planet is eager to comprehend the potential and capability that it will possess in the not too distant future. Exceptional amounts of argument and discussion are taking place on the relevance of the blockchain technology, as well as its applicability and intricacy. As of right now, the economy of knowledge has emerged as the dominant force in the world. E-governance and other technical breakthroughs have had a profound impact on the way in which countries operate and how people communicate on a global scale. To gain an understanding of the breadth and depth of blockchain technology's potential applications in India, a comprehensive literature research needs to be carried out. The government of India, along with that of other states and many corporate and public organisations, has a tendency to take use of newly developed technologies. Some of the primary areas that Indian states are focusing their attention on include the great potential offered by distributed ledger technology, particularly in the fields of financial transactions, supply chains, data storage, protection, and monitoring.

#### **The Technology behind Blockchain**

The latest iteration of ledger technology is called blockchain, and it functions as a decentralised database that stores information and data in blocks and enables transactions and communication between users. Because of the way this technology was developed, the role of a mediator is becoming increasingly obsolete. Every single person, entity, and group is virtually connected to one another in a block, and all communication and transactions are completely open to view.

The block chain technology is a decentralised distributed ledger that stores data in encrypted blocks and connects every node to the hash value of the block that came before it. Because of this, the data is immutable and no one can alter the data base. The fundamental ideas that underpin the technology known as block chain are known as Blocks, Hash value, Miners, and Nodes. Miners add new blocks to the chain and are financially rewarded for doing so. Lastly, a decentralised approach of nodes, which can be any type of electronic device on the network that maintains copies of the blockchain and the network algorithmically accepts newly mined blocks. Each block consists of three basic elements: the data in the block, a 32-bit whole number nonce value, and a 256-bit hash value.

Throughout history, individuals, institutions, and the state have all worked together to keep each other's trust in order to successfully govern society. The trust was preserved throughout all stages, from the prehistoric to the current state, as well as throughout the evolution of information and the most recent technologies. The modern institution of bureaucracy is responsible for maintaining the public's faith in society by ensuring compliance with societal norms, such as laws and regulations. Throughout the course of history, broadly speaking, three distinct types of trust machines have developed, which has ultimately ensured trust in society. This category includes the institutions that make up the reputation system, as well as the government and bureaucracy, as well as the blockchain

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### **The Application of Blockchain Technology in Real-Time Governance: The Case of India**

*Dr. Mahendra*

technology.

Blockchain is a revolutionary distributed ledger technology that was initially implemented by Satoshi Nakamoto in the design and development of the cryptocurrency Bitcoin in 2009.

The distributed ledger technology known as blockchain is a compilation of innovations that has obvious practical applications. Blockchain technology makes it possible for multiple parties participating in a commercial transaction to collaborate on a single ledger, which will serve as an authoritative source of information. Because there is no requirement for a central body to validate the transactions, blockchain has eliminated that necessity. Because it is built on peer-to-peer networks, rather than depending on a centralised authority to validate transactions, all nodes will participate in the process of doing so. The data structure that is utilised in Blockchain Technology contributes to the upkeep of a chronologically ordered and immutable record of the transactions that have taken place. Therefore, Blockchain Technology enhances elements of transparency, immutability, and efficiency, which distinguishes it from other technologies due to its potential utilisation in a wide variety of application fields.

In addition, the National Institution for Transforming India (NITI) Aayog, a central institution that collaborates with the states on the identification of national development priorities, sectors, and strategies, is conducting pilot projects throughout the nation to investigate the potential applications of blockchain technology and the ways in which it could be used. According to what it states, "blockchains can be broadly defined as a new type of network infrastructure (a way to organise how information and value moves around on the internet) that creates "trust" in networks by introducing distributed verifiability, auditability, and consensus."

There are three different applications for blockchain technology that could be employed in the public sector. To begin, it has the potential to lower the costs associated with transactions while simultaneously ensuring the security of data, and as a result, it has the potential to assist in the development of trust on a global scale. The majority of countries around the world, particularly those in the public sector, are making significant investments in the construction of infrastructure to simplify business and virtual transactions. As a result, this has led to a variety of applications in the fields of supply chain management, identity management, payment processing, secure data exchange, and many other areas in both the public and commercial sectors. As a result, a global pilot programme utilising blockchain technology is currently under way to facilitate a speedy and transparent exchange.

### **The Significance of the Technology behind Blockchain**

It's possible that the significances that are described below are absolutely necessary for the widespread adoption of this new technology.

#### **Establishing Credibility with Local Residents**

In its early stages, various states are making efforts to capitalise on the potential applications of blockchain technology within their borders. For example, "the governments of Sweden, Estonia, and Georgia are experimenting with blockchain-based land registries, which enable multiple parties to securely hold copies of the registry." This statement refers to the use of land registries in Sweden,

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## **The Application of Blockchain Technology in Real-Time Governance: The Case of India**

*Dr. Mahendra*

Estonia, and Georgia. The West African nation of Sierra Leone became the first nation in the world to experiment with a voting system based on blockchain technology.

#### **Maintaining the Confidentiality of Private and Sensitive Information**

In today's world, protecting the personal data of citizens is becoming an increasingly important concern. The Blockchain Technology provides the safest possible platform for the distributed archiving of data in a cryptographic chain. As a result, ensuring the availability of data while also protecting its privacy is simple. In addition, because of the immutability nature of blockchain technology, it is an effective solution for Know Your Customer (KYC) and biometric authentic verification. Some people believe that in the future, blockchain technology will be able to safeguard and protect all types of data.

#### **Bringing Down Expenses While Increasing Productivity**

In today's increasingly globalised world, conducting transactions, particularly international ones, is not a simple task. When the Block Chain technology is fully operational, it will lessen the need for intermediaries, which will eventually result in a decrease in the cost of conducting transactions. The use of blockchain technology makes it easier to track the origin of goods that are traded, as well as helping to shorten transaction times and improve operational security.

#### **The Most Important Applications of Blockchain**

Building trust among citizens is made easier by measures that increase transparency, accountability, and the use of decentralised mechanisms. The above-mentioned characteristics of blockchain technology hold the promise of giving citizens more autonomy. As a result, it would contribute to making life easier for people everywhere to have it implemented. It has been hypothesised that blockchain technology could also contribute to making business operations and government administration simpler across all industries.

The Bit Coin currency is a type of encrypted virtual currency that has recently garnered a lot of attention in the field of online transactions. It is a common misunderstanding that the cryptocurrency known as Bit Coin is comparable to Block Chain. There is a tendency to use the terms blockchain and bit coin, which both refer to crypto currencies, interchangeably. Bitcoin, on the other hand, was one of the first applications of the blockchain technology. Therefore, the first implementation of blockchain technology was Bitcoin.

#### **Technology Based on Blockchain in India**

The blockchain is an exciting new technology that has the potential to impact virtually every industry on the planet. Many different stakeholders, as well as academic circles in India, have been actively engaged in a great deal of deliberation and discussion regarding the potential application of technology, not only in the financial sector but also in other industries, in the not too distant future.

NITI Aayog elaborates on the following in the draught of its discussion paper:

Proof of Concepts (PoCs) have been conducted by NITI Aayog in four different domains as part of an effort to evaluate the potential of blockchain technology to deliver improved efficiency and gain a better understanding of potential obstacles that may arise during implementation.

These include:

1. "Tracking and tracing" of medications throughout the supply chain of pharmaceuticals;
2. The approval and verification of claims prior to the distribution of fertiliser subsidies;
3. The validation of degrees from accredited institutions; and
4. The transfer of records pertaining to land.

NITI Aayog has conducted case studies across the entirety of India and investigated a variety of industries to identify potential future applications for blockchain technology. For example, it could be useful in the creation of a new system to manage land record transfer and ownership, in the supply chain for pharmaceutical drugs, and in the "self-regulation" of the industry, which would allow for the prevention of fraudulent activity. NITI Aayog investigated a variety of other applications for the Immunization Supply Chain, including the following: Building a New Immunization Infrastructure for India that is Unified and Enhanced by Blockchain Chit Funds: A Blockchain-based model to enhance trust and unlock value creation in the insurance industry (including medical, automotive, and more), electric vehicle battery swapping, organic farming, and energy trading throughout India.

"The Ministry of Electronics and Information Technology (MeitY) has prepared a draught framework for the use of Blockchain technology in government services. MeitY intends to use it in the areas of property record keeping, digital certificates, power distribution, health records, as well as supply chain management."

#### **Blockchain technology and the opportunities it presents in India**

The current government of India has implemented a number of stringent and contentious policies in an effort to combat the widespread problem of corruption in the country. A number of long-awaited policies, such as Demonetisation, the Unique Identification Authority of India (UIDAI), and the Goods and Service Tax Bill, have been put into effect by the government that is currently led by Narendra Modi in recent years. Both the process of digitization and the improvement of the country's governance were made easier by these measures. In addition, the government's initiatives, such as the Pradhan Mantri Jan Dhan Yojana and Zero Balance Saving Accounts, assisted a significant portion of the country's populace in gaining access to the fundamental capability of conducting financial transactions. As a result of the aforementioned actions, the door has been opened for the storage and maintenance of data, both of which have the potential to assist the blockchain technology in the country. The Indian state of Andhra Pradesh was the first to implement blockchain technology for the purpose of managing land records. Additionally, it has conducted pilot projects to establish a Blockchain Center of Excellence, and as a result, the state has become the first Blockchain state in India. Karnataka, Kerala, Maharashtra, and Rajasthan are some of the states that are following Rajasthan's lead.

The scope of blockchain's application has consequently broadened, and the technology offers numerous advantages in a variety of contexts, including decentralisation, anonymity, permanency, and auditability. The scope of applications for blockchain technology has expanded to include not only public and social services but also financial services, risk management, cryptocurrencies, and Internet of Things (IoT) applications.

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### **The Application of Blockchain Technology in Real-Time Governance: The Case of India**

*Dr. Mahendra*

**State-Level Initiatives in Blockchain Technology across India**

**The state of Maharashtra**, which serves as the country's economic hub, possesses a tremendous amount of untapped potential for commercialising and streamlining blockchain technology. It is reasonable to assume that the state government of Maharashtra is working on a plan to publish a "State Blockchain Policy" in the very near future.

**Madhya Pradesh:** Madhya Pradesh is another pioneering state that has begun work on various projects related to the agricultural industry. The Madhya Pradesh Revenue Department's Office of the Commissioner of Land Records and Settlement is mulling over whether or not to implement Blockchain technology in order to improve the management of land records. In this regard, the office of the Commissioner of Land Records and Settlement has extended an invitation to organisations to demonstrate their capabilities in Blockchain technology as well as their comprehension of how it can be applied to the administration of land records by giving a presentation.

**Karnataka:** The government of the state of Karnataka is working to incorporate blockchain technology into online property documentation. In Bangalore, it has hosted a conclave to discuss the prospects for blockchain technology in the state.

In addition to all of the states that have already been mentioned, a number of other states and union territories are also developing blockchain technology and investigating its potential applications. In their respective states, Delhi, Rajasthan, Sikkim, and West Bengal have developed infrastructure that is conducive to the development of future technologies.

**The Blockchain Technology: Obstacles and Opportunities**

Alexander Savelyev makes an effort to bring attention to the problems and difficulties associated with copyright in blockchain technology. He first recognises issues and then makes an effort to find solutions to them. According to the author, one of the most significant problems facing online content is piracy. As the block chain system develops in tandem with an increase in global demand across a variety of industries, organisations will face a growing number of potential challenges. These challenges include a lack of awareness and understanding of the core technology, as well as the need for standardisation, an increase in processing speed, increased privacy, and inadequate regulation. In addition, the situation in India is unusual because there is always cause for concern regarding the management of basic infrastructure. The newer and more antiquated system would be entirely rendered obsolete by the implementation of blockchain technology. As a result, there is a great deal of misunderstanding and confusion regarding the technology, which has slowed down the process of its widespread adoption. Nevertheless, numerous pilot projects are being conducted in a variety of fields by a number of different states. The Indian establishment is making slow but steady progress toward establishing the fundamental framework necessary for the technology known as blockchain in the country. In addition, the only viable path forward for its early adoption is to have it regulated, along with massive awareness campaigns and purposeful use cases.

**Conclusion**

The technology known as blockchain has recently emerged as a potentially game-changing approach in a variety of processes used by both the public and private sectors. The block chain technology, also

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**The Application of Blockchain Technology in Real-Time Governance: The Case of India**

*Dr. Mahendra*

known as DLT, is built on a peer-to-peer network architecture and utilises encrypted blocks that are stored in a decentralised fashion. In contrast to more conventional forms of technological development, it consists of a shared digital data base that can store a large quantity of data, as well as human interaction and technological institutions. Despite the fact that the technology is still in its infant stage, it has a bright future ahead of it in both the public and private sectors. There is no doubt that the technology behind block chains will contribute a significant amount of additional value to the e-governance citizen-centric service delivery. This technology would increase trust, transparency, accountability, and instantaneous transaction interest in public and private sectors all over the world. [Citation needed] The seamless exchange of data between departments and intra-departmental integration can be tracked using smart contracts and distributed ledger transactions, which will further ensure the delivery of the maximum amount of services possible using a whole-of-government approach. Concerns have been voiced on a global scale in response to the unbridled proliferation and decentralised nature of the applications for Bitcoin and other cryptocurrencies. As more time passes, governments in a variety of countries will eventually be able to capitalise on the opportunities presented by the technology. The government of India is also becoming increasingly interested in the potentially transformative applications of blockchain technology.

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