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Blockchain Technology for Effective Organizational Governance: A Review

Urmila Karale

M.Com., M.B.A.(Finance), M.A.(Eng.)

Assist. Professor, Business Admin Campus, Modern College of Arts, Science and Commerce (Autonomous) Shivajinagar, Pune 411005.

Abstract:

If you are a true techno-enthusiast, you must have heard news like Dubai becoming the World's first blockchain-powered government, news about Telangana government's decision to set up India's first blockchain district in Hyderabad, also, news about Jharkhand becoming the first state in the nation to distribute seeds utilizing the blockchain technology and many more.

Recently, we have witnessed how a variety of transactions are enforced autonomously without any intermediary in between. The remarkable use of Blockchain technology in cryptocurrency or digital currency was just the beginning. This technology has transformed the way we ensure corporate governance and security. This disruptive technology has great potential to change business models to enhance security. Such innovation that promotes the existence of decentralized autonomous organizations (DAOs) with the required decision-making, regulatory, accountability and incentive framework looks so fascinating. You cannot deny the fact that these decentralized ledger records, smart contracts to automate the processes and continuous auditing procedures can control system manipulations to a great extent.

This technology can provide the necessary foundation and infrastructure needed for the Web3 iteration of the World Wide Web (WWW). Let's understand how Web3 and blockchain together may help minimize the power and control of Big Tech giants by providing more transparent and distributed sharing options.

The present research study highlights the tremendous potential that blockchain technology has in solving day to day issues that are encountered in governance. It tries to address the root causes behind it rather than controlling them superficially. This technology, surely, helps organizations and the government in controlling the scope of manipulations in the system.

Keywords: blockchain technology, business innovations, corporate governance, e-governance, open-source control systems, organizational governance, smart contracts, web3 technology.

Introduction:

Blockchain technology can alter most of the things the way they work presently. The revolutionary power of web3 and blockchain can create wonders. The great synergy effect can be seen with rapid decentralization. It becomes easy to predict the future of the digital universe with more personalization and participation in the system. This will surely result in more open and transparent data with higher safety than the cloud. Its usage in smart contracts in real estate is admirable. Here, history of real estate (asset) buying selling is traceable and can be of great help in dealing with ownership issues of such properties. Use of this technology in hospital management for storing patients record, pathology records and healthcare records is a great revolution in keeping records more private and safer. In the education system, it can prove to be of great help for verification of marksheets and records, if it is uploaded using blockchain technology. Here, you can refer, but can't tamper records, since it is stored at different computers. So, research shows, how it is useful in management of property records, government records, crowdfunding by increasing safety and trust. Some of the examples talk about its usage in election voting system where manipulation is impossible with (used in Africa) blockchain technology featuring decentralized record. Its encryption feature assists to protect data and trace it logically & systematically using 'hash'.

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tracing feature of this technology makes it very easy to locate and correct quality issues in the supply chain.

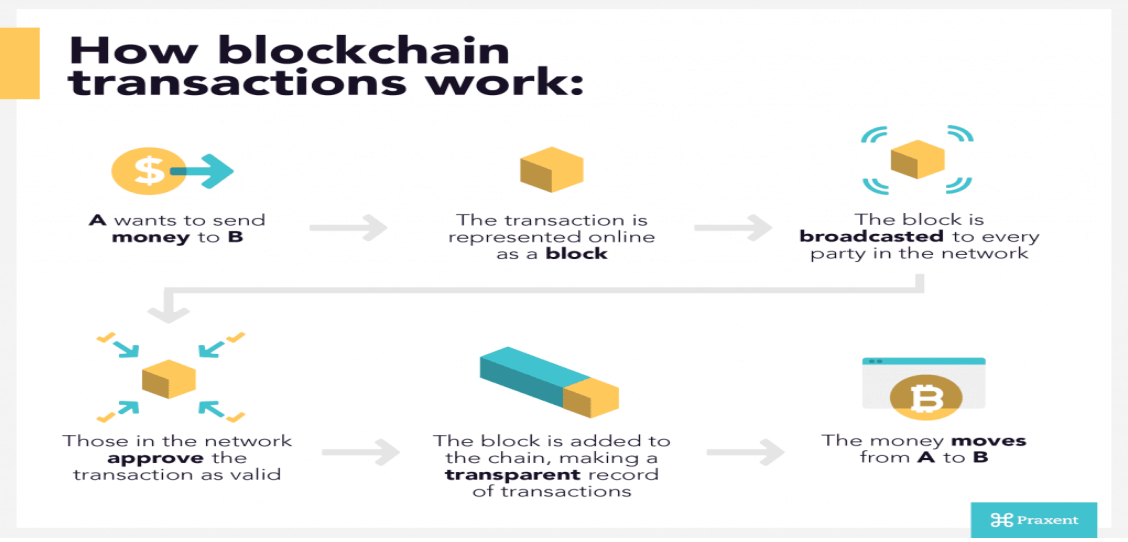

Figure 1.1 | Source: www.praxent.com/blog/explain-bitcoin-grandparents

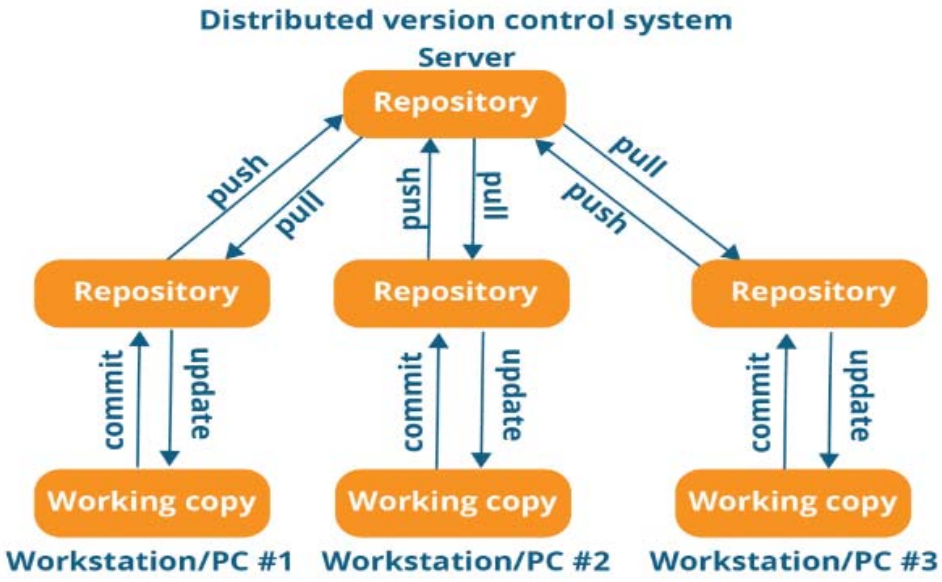

Figure 1.2 | Source: www.devopsschool.com/blog/top-5-open-source-code-management-tools

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Statement of Problem:

Management Problem:

1. How to ensure and improve organizational governance?
2. What role technology can play into ensuring effective and efficient governance?

Research Problem:

In Web2 which we are using today, data is stored and controlled by Big Tech giants like Google, Amazon, Apple, Meta, Microsoft, YouTube. It's an internet dominated by companies providing services in exchange for the user's personal data. This data is most of the times, used for monetization by compromising safety. This Web2 technology no longer is able to cater to the changing requirements of the infrastructure needed for data security.

Figure 1.3 | Source: How To Transition From Web2 To Web3 (theafrica.co.za)

This research investigates into the evolving blockchain technology and its usage in ensuring the development of Web3.0 technology infrastructure that can provide personalized space and privacy for everyone.

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The 2020 Insider Threat Report talks about threat of risky insiders than nasty outsiders. This report mainly talks about 68% of the threat of security attack by insiders where privileged IT users/admins weigh to 63%. In addition to this, sensing the insider threat attack is rather tougher. Hence, mitigating the risk of such insider attack is quite possible with blockchain technology

Relevance of the Study: the web development went as follows:

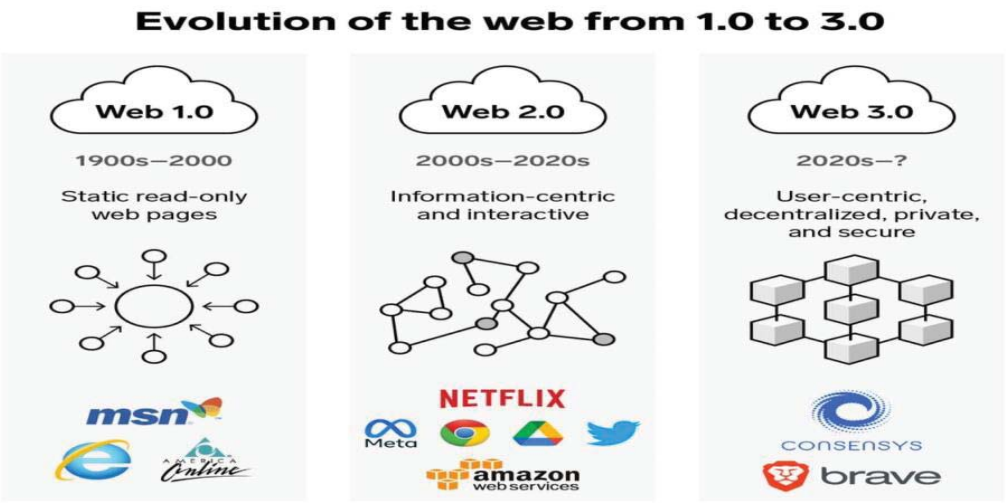

Figure 1.4 | Source: Web3 - Everything You Need To Know About Web3.0 (theinsaneapp.com)

Web1.0: (1990s & early 2000s) Static; information put on board consisting of read-only web pages

Web2.0: (2000s to 2020s) Use of internet for social media platforms and so many utilities, Instagram, display to interaction with people, information exchange

Web3.0: (2020s onwards) Now, needed Web3.0: more privacy, private data, improved security, user friendly providing personalized space for everyone

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Literature Review:

The past few years witnessed lots of innovations as a result of emergence of disruptive technology like internet of things, cloud technology, automation, 3D printing, artificial intelligence.

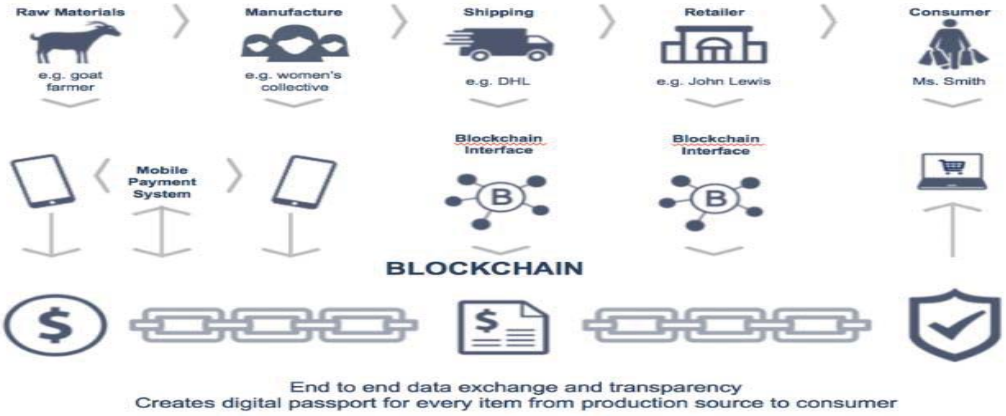

Figure 1.5 | Source: www.pinterest.com/pin/482800022548576615

Web3.0 is in its evolving phase, which makes use of decentralized apps that run on blockchain technology and token-based economics ensuring more transaction security and authenticity. Figure 1.5 elaborates on how blockchain works and provides much needed foundational framework for successful implementation of Web3.

1. D'Cunha, S.D. (2017) talked about Dubai to become the first blockchain powered government. Since, the government realized the benefits of using blockchain to improve the efficiency of government services like visa application, license renewals etc. the research talked about the huge amount of savings that this technology will result into because of paperless speedy transactions. This article also elaborates on use of the technology in settling real estate transactions. Also, the government launched its cryptocurrency.

2. Prof. Shivendu, S. (December 2019) in National Strategy for Blockchain put his views about National Institute for Smart Government's (NISG's) "Draft National Strategy on Blockchain". He talks about value creation using blockchain for the Indian Economy. This

draft elaborates on a variety of areas where blockchain technology can prove to be effective in enhancing operations right from issue of educational certificates, management of digital identify, healthcare, marketplaces to its usage in improvement of supply chain quality. This technology with enhanced infrastructure can be a gamechanger provided we are able to work on enhancement of technical skills and infrastructure support.

3. Kuberkar, Sachin Vijay (2023) in their thesis on 'Adoption Intention of Artificial Intelligence and Blockchain Technologies in e-Governance Services by Smart City Citizens' talked about the usage of blockchain technology in providing various citizen services in the smart city. In their study, they try to develop the conceptual model for providing faster services to the citizens using the blockchain. This study talks about the capability of AI and blockchain to revolutionize the e-governance by increasing security and transparent in Web3.

4. Ajay Uday Barve (2021) in his studies on 'Application of a blockchain model for effective e governance in the university system' tried to focus on the revolutionary power of current blockchain technology that can result in changes in business and organizational systems to make them foolproof. He also talked the way technology stores the data in a decentralized fashion making data crash is impossible. He explained how this technology usage in university ensures transparency by providing metadata in addition to the copy of data. However, he considered it as time consuming implementation affair involving lot much cost for development of infrastructure.

5. Vishwakarma, Santosh (2023) in his studies on 'Enhancement of healthcare services via blockchain and federated learning' advocated use of blockchain for safety and privacy of medical data. This research focused on how the technology can protect data from breach and unauthorized access to medical records of the patients. Storing medical data on the cloud is cost effective, however, storing such data centrally, sometimes, results in chances of data leakage or unauthorized access. Role of administrator remains critical in this regard. Central storage, single authority reliance, insider threat etc. remain big concerns in data storage.

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6. IBM Blockchain use-cases talks about the use of blockchain technology into improving safety, tracing quality, its usage in the field of banking, insurance, critical health care services, advertising, cryptocurrency and what not. These cases also talk about how blockchain can trace and correct quality issues accurately. This technology not only increases trust and transparency but also makes data recording faster and more secure without any third-party intermediation.

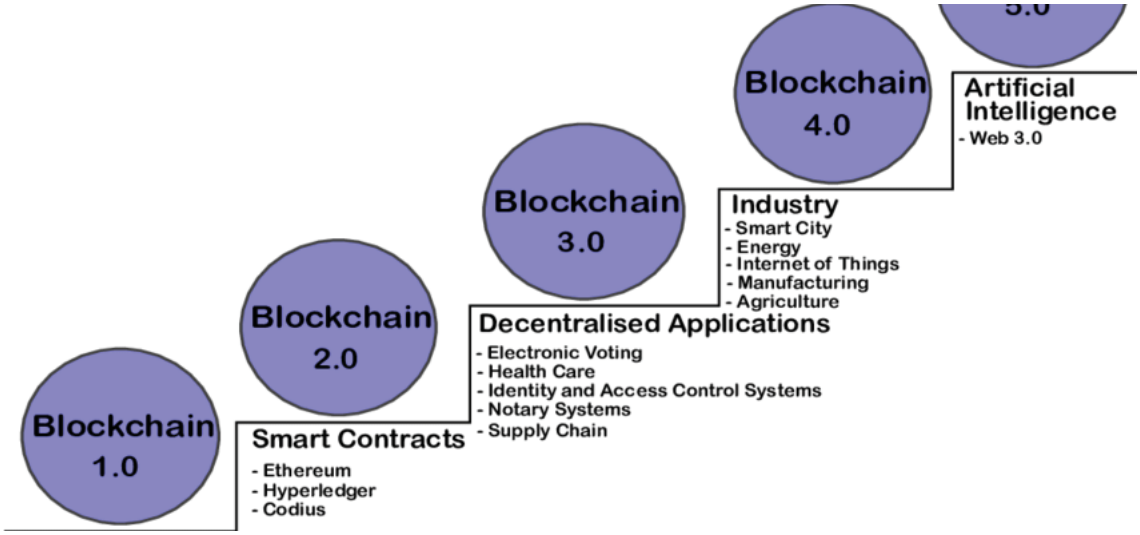

Figure 1.6 | Source: Blockchain Evolution | Download Scientific Diagram (researchgate.net)

7. Nam Vu, Abhijeet Ghadge & Michael Bourlakis (2023) talked about 'Blockchain adoption in food supply chains' as a project development and operations management. Here, traceability feature of the technology can help detect and solve quality issues linked with perishable food products so easily; further, it will be really useful in establishing accountability of intermediaries involved. Since it helps to trace movement, custody, quality along the supply chain, it provides the necessary transparency & visibility.

The use of encryption, public and private key, decentralized or public distributed ledger records, unique data storage system, traceability mechanism, reference to sequential happenings, hash usage and linkage, no mediator like accountants, banks, government, no or rare chance of hacking data makes this technology very unique and safe.

Thus, blockchain technology can provide role-based access control and validation of transactions using smart contracts. This can not only make data storage faster but also improves scalability of records. This extraordinary safety is the need of the time. An application based improvision is quite possible with use of blockchain technology to scale up operations with enhanced safety and privacy.

Scope of the Study:

The proposed study covers recent research articles and references on the blockchain technology. Few references and successful case studies help to explore features of blockchain, which makes it very unique and safe framework. This is something that all are looking for the strong foundation of Web3.0 development.

Limitations of the Study:

- Duration of the study is limited to the specific time span
- Study is limited to selected blockchain case studies

Objectives of Study:

This research aims at explaining use of blockchain technology into managing organizational governance through decentralized open-source control systems and how to make the best use of technology for business innovations.

1. To study the concept of blockchain technology and Web3.0
2. To understand the role of blockchain technology in the development of Web3.0
3. To study how blockchain (disruptive technology) can revolutionize organizational governance practices (change in business models)
4. To explore how blockchain technology is used in managing supply chain effectively and efficiently.
5. To identify the challenges in implementing blockchain for organizational governance

The research highlights the critical role of blockchain technology and emphasizes its importance in improving organizational governance to make it foolproof.

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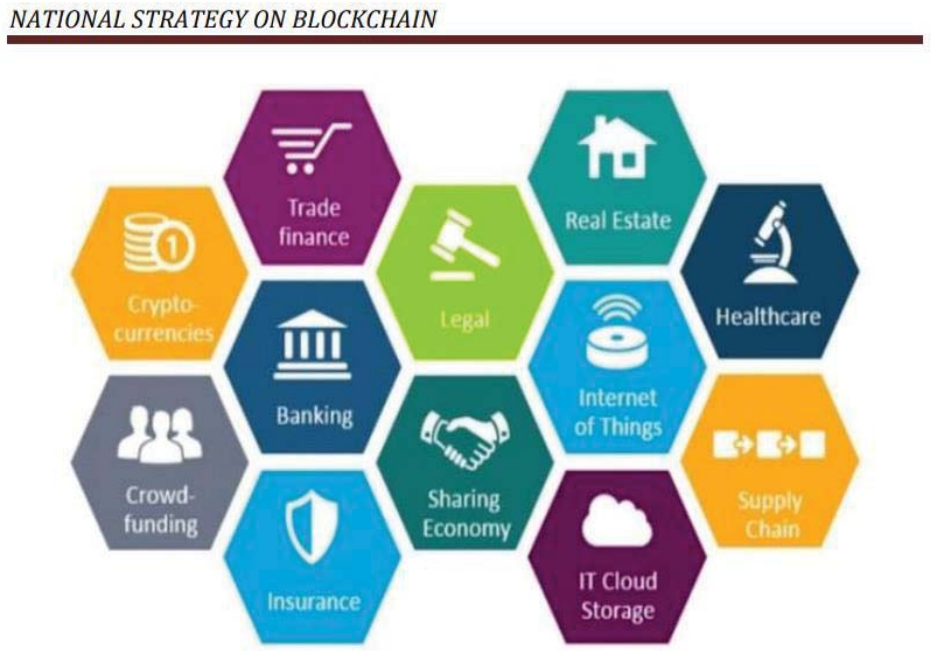

Figure 1.7 | Source: Applications of Blockchain Technology | NATIONAL STRATEGY ON BLOCKCHAIN (meity.gov.in)

Statement of Hypothesis:

1. **H1:** Blockchain technology improves performance of an organization

2. **H1:** Blockchain results in major changes in organizational governance practices

3. **H_1** Blockchain improves performance of supply chain management

Research Methodology:

Type of Data and Sources of Data Collection: Research study focuses on the collection of secondary data; the following secondary data sources are used for data collection for research study.

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Secondary Data Sources:

- Reference Books
- Websites
- Reputed Journals & articles (academic and professional)
- Case studies

Results:

The recent research and blockchain technology case studies loudly speak about the high positive correlation between use of blockchain technology and improved organizational governance.

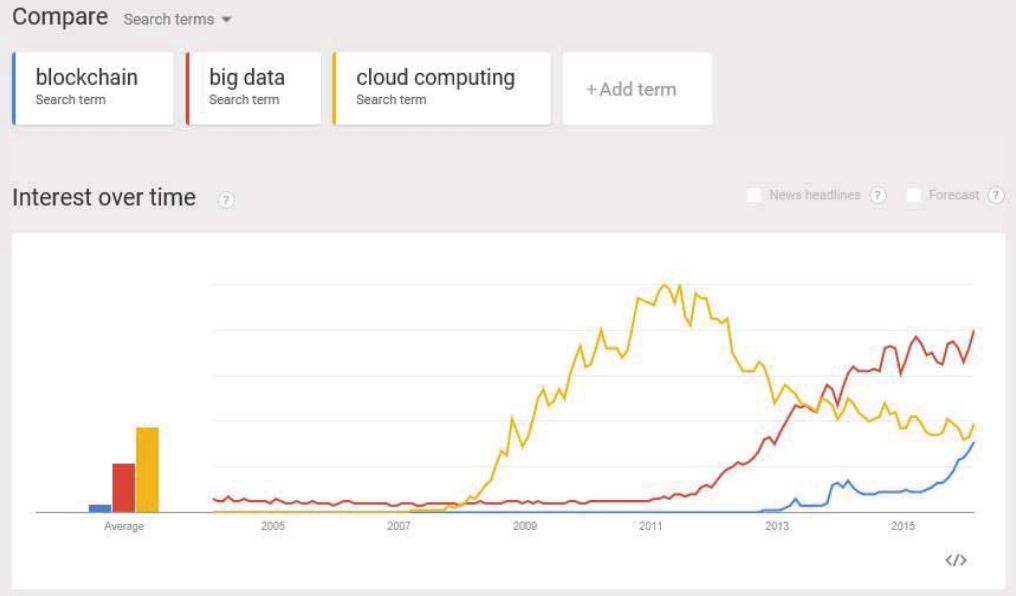

Figure 1.8 Source: https://usercontent.one/wp/www.distlytics.com/wp-content/uploads/2016/02/Google-Trends-Blockchain-vs-Cloud-Computing-768x445.jpg

The key features enhancing the security include use of decentralized ledger records, storage and role-based access controls, use of token-based economics, traceability, quality issues monitoring and control in the supply chain.

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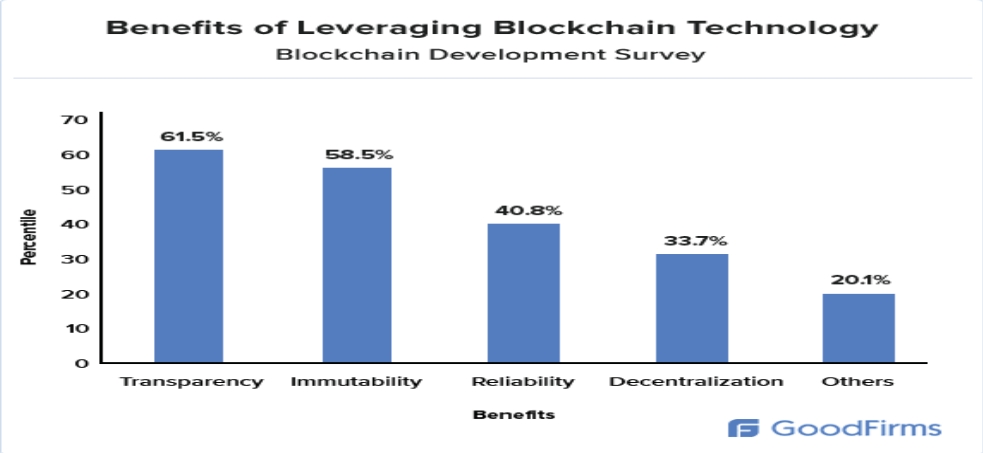

Figure 1.9 Source: https://assets.goodfirms.co/images/blockchain-development-research-benefits.png

Definitely, incorporating this technology demands certain changes into business model, however, considering the benefits, it is worth switching for. Collective ownership, monitoring, regulating and controlling data remain some of the major challenges. However, we can definitely overcome them by increasing the investment in the technology framework.

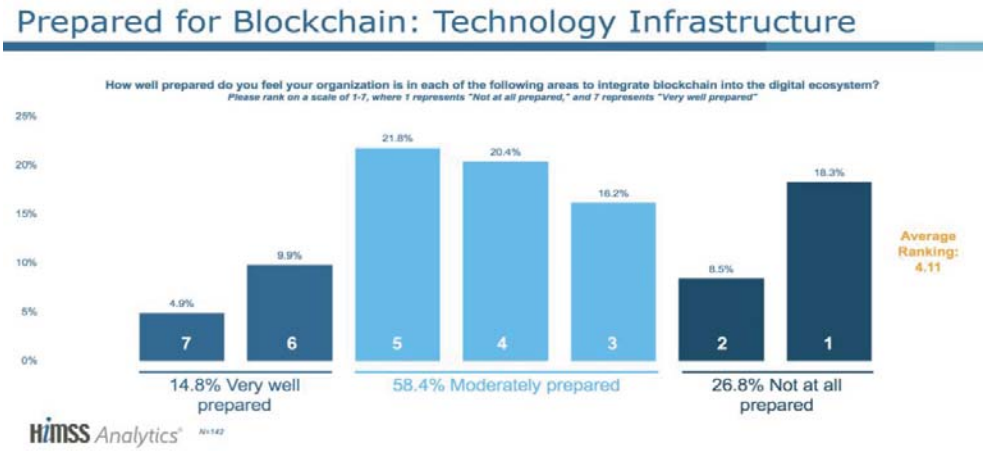

Figure 1.10 Source: https://www.healthcareitnews.com/sites/default/files/u2556/Screen%-20Shot%202018-12-03%20at%2010.31.59%20AM.png

Conclusion:

Summary of Findings: Though research shows there's high positive correlation in use of blockchain technology and improvement in organizational governance, there are certain challenges that this technology adoption poses. Its widespread implementation in present times is a key challenge. Lack of regulatory structure and interoperability can be few more obstacles. However, we cannot deny the fact how successful this technology can become with well incorporated collaborative solutions.

Implications for Practice or Policy: We cannot stop innovations to happen; they are inevitable and are likely to change the way the business was carried out in the past. Sooner or later, successful implementation of the technology in larger area removes numerous challenges by answering numerous doubts of the people. It just needs time to develop and build strong infrastructure needed to support its operations, nothing else.

To conclude, continuous efforts of mankind to simplify the things have resulted in so many advancements in so shorter time span. These disruptive innovations based on technology can surely make our lives easier than never before. May be, we will not have to wait so long (when government supports such technologies) to see more such great miracles in the time to come. Already there is lot of research studies available showing how it is useful in building transparent and efficient supply chains, blockchain in healthcare, blockchain in banking, more sustainable supply chain in agriculture, launch of Central Bank Digital Currency (CBDC) by RBI, blockchain electoral voting system used in Africa, digital academic records maintenance and management (for validation required for studying abroad).

Working Definitions of Terms Used:

The major terms are defined for the purpose of the study are as follows:

Blockchain Technology: blockchain is shared, immutable ledger that facilitates transaction recording process by tracking business assets (tracking of ownership of tangible or intangible assets)

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Web3.0: Web3.0 talks about internet technology iteration of WWW which works on the foundation of decentralization, blockchain and token-based economics.

Organizational Governance: organizational governance is responsible, accountable, transparent and effective management of an organization for long term success of the enterprise. It aims at discipline, transparency and accountability for success.

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