

INTEGRATION OF BLOCKCHAIN TECHNOLOGY IN CORPORATE GOVERNANCE: IMPLICATIONS AND APPLICATIONS

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ABSTRACT

Blockchain is receiving a lot of attention in almost every industry, including the corporate world, and is attracting significant investments worldwide. Blockchain in its bare form is a sort of ledger which is in the public domain. It has garnered attention for huge returns on minimal investments in the cryptocurrency realm, however, there are multiple applications of the technology that will ease the overwhelming burden of data that they need to store and organize in every field, including corporate governance.

Blockchain technology can revolutionize the way companies are handled and how they work. It is a framework that provides stakeholders with greater decentralization and greater capacity for active and accurate decision-making and will be crucial to modern corporate governance. Stakeholders can be highly benefitted from the transparency, permanence, and efficiency that blockchain technology holds. Even organizing the data in a way that it is not easily altered, or easily accessible would significantly improve the efficiency by which any corporate would work. This paper aims to study the implications of the application of Blockchain technology in the corporate governance world. The paper will attempt to describe Blockchain in a non-technical language and will compare the implication with the three major theories of corporate governance. The authors will then delve into its potential application in the current corporate world; we will also highlight the potential challenges with its implementation in order to provide a holistic study. The paper will ultimately conclude with a short note on the future of Blockchain technology.

Keywords: Blockchain Technology, Corporate Governance, Cryptocurrency.

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I. INTRODUCTION

Cryptocurrency has been a much-debated issue in the past several years, and most of the time, it has been on the wrong side of the law. Even in India, the Cryptocurrency and Regulation of Official Digital Currency Bill, 2021,¹ which may be presented before the parliament in the monsoon session, proposes restricting all private cryptocurrencies in India and providing a facilitative framework for Reserve Bank India's official digital cryptocurrency. However, within all the chaos around the legality of cryptocurrencies, it is high time to recognise the revolutionary potential of cryptocurrency's underlying technology, *i.e.*, **Blockchain technology**.

To reap the numerous benefits ranging from transparency to immunity of Blockchain Technology, the Ministry of Electronics and Information Technology of India (*hereinafter* referred to as “**MeitY**”) has already released its draft on “Strategy for Level Blockchain Framework”.² It acknowledges the fact that Blockchain technology will significantly change the governance models in the field of finance, healthcare, education, legal, and so on.

¹ PARLIAMENT OF IND., LOK SABHA BULLETIN PART – II, NO. 1989-2025 (2021), <http://loksabhadocs.nic.in/bull2mk/2021/29012021.pdf>.

² MINISTRY ELECTRONICS & INFO. TECH., GOV'T OF IND., STRATEGY FOR LEVEL BLOCKCHAIN FRAMEWORK (2021), https://www.meity.gov.in/writereaddata/files/NationalStrategyBCT_%20Jan2021_final.pdf.

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As seen in the last few decades, there has been an increase in corporate frauds and corporate governance failures. Whether the cause is inefficiency or distressful economic conditions in the country,³ a better framework is always suggested in the corporate governance model. It is believed that these three combined forces: inadequacy of existing record-keeping systems, rampant corruption, and ineffective market regulators will lead to early adoption of Blockchain technology in developing countries.⁴

The inclusion of blockchain technology could revolutionise the way things are governed. It would eliminate the need of a third party to validate data and bring a system of a “peer-to-peer” network that can itself execute the protocol by consensus.⁵ Even though, at this juncture, such self-executing agreements does not have the backing of a law, their functionality of tracking, monitoring, and implementing the data is equivalent to a legal contract which promise enforcement due to the backing of law.⁶

Seeing the self-executing nature of data, a new form of corporate governance structure has been developed, wherein a blockchain-based system is established in a decentralised model and it is governed by self-executing codes. This form of blockchain integrated corporate

³ Press Trust of India, *Improve Corporate Governance to Lift Economic Efficiency: RBI to India Inc*, BUS. STANDARD (Dec. 27, 2019) https://www.business-standard.com/article/pti-stories/das-asks-cos-banks-to-improve-corporate-governance-to-help-lift-efficiency-of-economy-119122701022_1.html.

⁴ David Yermack, *Corporate Governance and Blockchains*, 21(1) REV. FIN. 7 (2017).

⁵ Abdelkader Derbali et al., *How Will Blockchain Change Corporate Governance?*, 2(1) INT’L J. BUS. & RISK MGMT. 16, (2019).

⁶ Florian Möslein, *Blockchain Applications and Company Law*, OXFORD BUS. L. BLOG (Feb. 23, 2021) <https://www.law.ox.ac.uk/business-law-blog/blog/2021/02/blockchain-applications-and-company-law>.

governance model is commonly known as “The Decentralized Autonomous Organization (*hereinafter* referred to as “**DAO**”)”.⁷

Globally, some corporations have already started experimenting with Blockchain technology in corporate governance, with the DAO form of framework based on Ethereum Blockchain,⁸ which essentially provides shareholders or token holders with algorithm certainty of smart contracts which allows them to take a vote on proposals and automatically executes it with complete transparency.⁹

While Blockchain technology has countless applications, the objective of the article will be an attempt to analyse and explore its potential in the corporate governance world. Part I of the paper will provide a basic description of how blockchain technology works and attempt to compare its implication with the broadly categorised corporate governance theories. Part II of the paper will deal with the potential of application that Blockchain technology may have in corporate governance. Part III of the paper will study the potential challenges associated with the implication of blockchain technology.

II. BLOCKCHAIN TECHNOLOGY VIS-À-VIS CORPORATE GOVERNANCE

Blockchain, or it can be aptly said “a[n] [open] distributed ledger”, is a decentralised database that can record various entries through linked blocks (as a chain). This chain of blocks operates on a peer-to-peer network, and each block stores all previous records in a public ledger (un-permissioned) or a private ledger (permissioned).

⁷ Samer Hassan, *Decentralized Autonomous Organization*, 10(2) INTERNET POL'Y REV. (2021).

⁸ L. Liu et al., *From Technology to Society: An Overview of Blockchain-Based DAO*, 2(1) IEEE OPEN J. COMPUTER SOC'Y 204 (2021).

⁹ Spencer J. Nord, *Blockchain Plumbing: A Potential Solution for Shareholder Voting?*, 21(3) U. PA. J. BUS. L. 706 (2019).

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Instead of depending on intermediaries, it uses cryptography and hash function, which encrypts the input data by condensing them into secure output data in a block formed. Later, this block in a chain is verified through other computers on the networks as a collective chain unit. Thus, the most distinct feature is that it can track and validate entries with complete accuracy without any intermediary with almost to perfect immutability. Even if a hacker tries to modify any record, they will have every block on the chain to do so, which is impossible without a highly powerful computer. Therefore, while considering the applicability of Blockchain technology, the focus should be placed on its three key features, i.e., security, traceability, and transparency.

Another key application of Blockchain is “smart contracts” that could significantly affect how contracts and agreements are executed in the corporate world. Smart contracts are Blockchain protocols that run when predetermined conditions are met without any intermediary's involvement. Agency connections in smart contracts operate exactly as programmed, with no chance of the agent engaging in opportunistic conduct. All contractual conditions are available to the public and are completely transparent to check.

The Blockchain's potential to enhance corporate governance is quite indicative from its core features of de-centralisation, traceability, and transparency which will be beneficial for having strong corporate. Features of Blockchain will ensure the fulfilment of four pillars of corporate governance: “*Transparency, Accountability, Fairness, and Responsibility*”.¹⁰ Additionally, many international scholars have considered these core functions of Blockchain technology as a possible innovation that can significantly change the corporate governance landscape.¹¹ Even

¹⁰ DR. PRIYANKA KAUSHIK SHARMA, CORPORATE GOVERNANCE PRACTICES IN INDIA - A SYNTHESIS OF THEORIES, PRACTICES, AND CASES (2015).

¹¹ *Supra* note 4; Wulf A. Kaal, *Blockchain-Based Corporate Governance*, STAN. J. BLOCKCHAIN L. & POL'Y. (2021) <https://stanford-jblp.pubpub.org/pub/blockchain-corporate-governance/release/1>. [hereinafter Kaal].

the state of Delaware, USA, has already amended its corporate code to replace the paper and electronic stock ledger with Blockchain technology for efficient record-keeping.¹²

While the primary objectives of good corporate governance are about promoting fairness, transparency, and accountability in a company,¹³ the current models fail to ensure every factor to its fullest. To attain maximum level of cooperate governance, a “peer-to-peer” or “community-driven forms of corporate organisation and governance” could be adopted, wherein technology will allow authoritative decision making in the absence of a centrally defined authority that makes and enforces these decisions by the stakeholders of the company.¹⁴ Such technological models will disrupt the existing traditional hierarchical model structure of the companies.

To further analyse the potential of Blockchain, it is pertinent to identify and compare the implications of the new Blockchain technology model with the three broadly categorised theories of corporate governance:

A. AGENCY THEORY

This theory is based on the notion of separation of ownership and authority; however, this delegation of authority given to the managers or board of directors (agents) by the shareholders (principal) leads to the fulfilment of self-interested goals of the agents.¹⁵ Thus, in contrast, it is advocated that the key factor for good corporate governance is to protect

¹² John C. Kelly & Maximilian J. Mescall, *Taking Stock of the Block: Blockchain, Corporate Stock Ledgers, and Delaware General Corporation Law: Part I*, 1(3) J. ROBOTICS, ARTIFICIAL INTELLIGENCE & L. 145 (2018).

¹³ J. Wolfenshon, *Definition of corporate governance*, FIN. TIMES, June 21, 1999.

¹⁴ Mark Fenwick & Erik P. M. Vermeulen, *Technology and Corporate Governance: Blockchain, Crypto, and Artificial Intelligence* (Eur. Corporate Governance Inst., Working Paper No. 424/2018), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3263222.

¹⁵ ADOLF A. BERLE & GARDINER MEANS, *THE MODERN CORPORATION AND PRIVATE PROPERTY* (1932).

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and work towards stakeholders' interests.¹⁶ The main aim is to enhance the conceptual structure that governs the relationship between the principal and the agents.

However, the existing corporate governance against unavoidable agency issues falls short of achieving the quality and stability required for good governance.¹⁷ Even though the Indian Government has responded by implementing numerous compliances, one at times manages to slip under the radar.¹⁸

Blockchain holds numerous benefits for agency issues. Firstly, principals can examine all transactions by agents or the system itself and flag anomalies or inconsistencies. Secondly, by obviating the requirement for a central delegated authority, Blockchain technology has the potential to eliminate agency expenses in the business context. It substantially decreases agency expenses by providing decentralised artificial intelligence with the monitoring of agents. In addition, a smart contract allows for the public', a fully transparent, secure, and completely networked exchange between the principal and agents, disallowing any sort of alteration of data.¹⁹

¹⁶ David E.M. Sappington, *Incentives in Principal-Agent Relationships*, 5 J. ECON. PERSP., 45 (1991).

¹⁷ Kaal, *supra* note 11.

¹⁸ Aarati Krishnan, *All you wanted to know about conflict of interest*, BUS. LINE (Apr. 16, 2018) <https://www.thehindubusinessline.com/opinion/columns/slate/all-you-wanted-to-know-about-conflict-of-interest/article23563094.ece>.

¹⁹ Wulf A. Kaal, *Blockchain Solutions for Agency Problems in Corporate Governance*, COLUM. L. SCH. BLOG CORPORATIONS & CAP. MKT. (May 05, 2019) <https://clsbluesky.law.columbia.edu/2019/05/23/Blockchain-solutions-for-agency-problems-in-corporate-governance>.

B. STEWARDSHIP THEORY

According to this theory,²⁰ managers are trustworthy and unlikely to defraud investors of their cash. Managers place a high premium on their individual reputations. Stewardship theory asserts that when managers are left to their own devices, they will act responsibly as stewards of the assets under their supervision. This is in contrast to agency theory, which assumes managers operate in their own self-interest at the expense of shareholders. These stewards think that by working toward organisational, communal goals, they can meet personal needs and match their interests with those of the business and its owners. As a result, a steward is motivated to optimise organisational performance in order to fulfil shareholders' interests.

With the implementation of Blockchain technology, it would eliminate the knowledge disparity about the organisation, and shareholders will have the opportunity to become a value creator, thereby increasing the incentives and profit opportunities for stakeholders. Users with greater ownership/power have the opportunity to act as managers and promote platform innovation. Steem²¹ is an example of a Blockchain network that rewards stewardship.²²

C. STAKEHOLDER THEORY

Stakeholder theory advocates the enhancement of stakeholders' interests (rather than shareholders' interest) to achieve long-term sustainable development.²³ Apart from shareholders, stakeholders majorly include customers, board members, employees, and the community. Due

²⁰ James H. Davis et al., *Towards a Stewardship Theory of Management*, 22(1) ACAD. MGMT. REV. 20 (1997).

²¹ See Steem, <https://steem.com/> (last visited Oct. 19, 2021).

²² Giulio Caldarelli, *Exploiting Corporate Governance to Evaluate Blockchain Applications: A Comprehensive Framework*, 8(4) INT'L. J. ECON. & BUS. ADMIN. 166 (2020).

²³ James H. Davis et al., *Towards a Stewardship Theory of Management*, 22(1) ACAD. MGMT. REV. 20 (1997).

to the diverse set of interests among the stakeholders, it gets difficult to quantify and balance everyone's interests.

Countless corporate scams occurred in the past as due to alteration of the information by the managers, which has affected stakeholders at large.²⁴ However, with the implementation of Blockchain, such incidents could be avoided, as the transactional data and records would be available to everyone and can easily be scrutinised without the risk of any alteration. Thus, Blockchain technology would reflect as a source of trust, integrity, and auditability among the stakeholders.

To inculcate the interest of its stakeholders, two blockchain projects, EOS and TEZOS, provides its token holders the right to vote over various proposals. Initially, even the alleged founder(s) of the bitcoin had some discussion with the online community to discuss about the governance structure of the project.²⁵

III. APPLICATION OF BLOCKCHAIN TECHNOLOGY IN CORPORATE GOVERNANCE

We will begin with an example to understand how structures that look over or manage some large-scale activity require blockchain technology to be implemented in the first place. Let us say there is a water board set up in any of the metropolitan cities of India, which provides water to the houses. This single-board overlooks different functions such as pumping water from the source itself and making it useable for household uses, estimates the cost, manage how the water is supplied to the houses, also

²⁴ *Satyam scam: All you need to know about India's biggest accounting fraud*, HINDUSTAN TIMES (Apr. 09, 2015) <https://www.hindustantimes.com/business/satyam-scam-all-you-need-to-know-about-india-s-biggest-accounting-fraud/storyYTfHTZy9K6NvsW8PxIEEYL.html>.

²⁵ Darcy W. E. Allen & Chris Berg, *Blockchain Governance: What can we Learn from the Economics of Corporate Governance?*, J. BRIT. BLOCKCHAIN ASS'N. (Mar. 30, 2020) <https://jbba.scholasticahq.com/article/12455-blockchain-governance-what-we-can-learn-from-the-economics-of-corporate-governance>.

takes precautions in case there is some failure in the chain, undertake repairing work and also manages the distribution of water during times of peak demand.

Now, add one more variable, that an individual can store water via rainwater harvesting, and use that for their households or even supply to other households, if it is excess. Blockchain technology can come into play to manage this for a whole city, wherein the information regarding metrics, requirements, and usage is stored securely and updated regularly. This system can be set up for the entire city by some other authority, for which an individual will incur a nominal fee. Since you have the authority over the water stored by you, you have a say on how it is managed and how you want it to be allotted to others. Some of the significant issues in the system include how the price for the water is calculated, how it is channelled in times when the supply is high or vice versa, who has the authority on up-gradation of such system, or who would be held liable by law in case there has been some wrongdoing. These are the issues that blockchain technology aims to respond to.

India does not have any law or set of regulations to govern Blockchain or Distributed Ledger Technology (*hereinafter* referred to as “**DLT**”), although it heavily discusses about implementation and application of blockchain technology in the recent MeitY's draft on “Strategy for Level Blockchain Framework”.²⁶ Moreover, since the technology has been gaining attention in recent years, several houses of the Government Authorities have shown a positive stance towards implementing the same. We will be talking about some of the examples in more detail underneath.

In spite of the fact that many scholars have advocated for its application, there has not been any full-fledged application of global

²⁶ MINISTRY ELECTRONIC & INFO. TECH., GOV'T OF IND., STRATEGY FOR LEVEL BLOCKCHAIN FRAMEWORK (2021), https://www.meity.gov.in/writereaddata/files/NationalStrategyBCT_%20Jan2021_final.pdf.

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regulations that have been adopted as such. According to Yermack (2017),²⁷ among other benefits, the adoption of Blockchain Technology in Corporate Governance would result in increased liquidity, lower costs, accurate recordkeeping, and transparent ownership, to name a few examples. Researchers such as Catalini and Gans (2016)²⁸ assert that the integration of multiple bank ledgers via Blockchain would speed up processes while also lowering expenses for the banks. In their paper, Abadi and Brunnermeier (2018)²⁹ express concerns about the ability of Blockchains to maintain cost-effectiveness, decentralization, and accuracy at the same time while also being decentralized. Jayasuriya and Sims (2019)³⁰ state that blockchain-based financial applications have a wide range of application in accounting, including triple-entry accounting, reduced earnings management, real-time auditing, and real-time settlement of accounts. Since the server is not owned by any particular entity, it also offers greater liquidity and accountability to the consumers.

To experiment with the benefits of blockchain technology, JP Morgan in 2020, developed an in-house system which was based on Blockchain named as “Onyx Blockchain Platform”, to initiate and settle repurchase agreements between the United States Treasury Bonds and JP Morgan's own digital currency known as JPM Coin. It found that using Blockchain Technology helped them settle the transaction significantly faster than the conventional system.³¹

²⁷ *Supra* note 4.

²⁸ Christian Catalini., Some Simple Economics of the Blockchain (Rotman Sch. Mgmt, Working Paper No. 2874598, MIT Sloan Research Paper No. 5191-16), <https://ssrn.com/abstract=2874598>.

²⁹ Joseph Abadi & Markus Brunnermeier, Blockchain Economics, (Nat'l Bureau Econ. Res., Working Paper no. 25407), <https://www.nber.org/papers/w25407>.

³⁰ Jayasuriya D. Dulani, & Alexandra Sims, *From the Abacus to Enterprise Resource Planning: Is Blockchain the Next Big Accounting Technology?*, INT'L. J. FIN. STUD. (2019) <https://www.mdpi.com/2227-7072/8/2/36/pdf>.

³¹ Darren Sinden, *JP Morgan uses blockchain to create intraday liquidity*, FIN. FEEDS (Dec. 14, 2020) <https://financefeeds.com/jp-morgan-uses-blockchain-create-intraday-liquidity/>.

What the conventional method does in several days, the Blockchain Platform did it in a mere few hours and showed the enormous potential it holds. Thus, we will now look into the major applications and how implementing the technology can significantly ease the working of the corporate governance sector.

A. SHAREHOLDER VOTING

Even though the corporates employ countless people, cater to the mass via their products or services, and sometimes even influence the national environment, they are still answerable to their shareholders' votes. In today's world, shareholder voting has become a liability for corporate governance. Due to the fact that certain shareholders cast varied numbers of votes and that some clever investors take advantage of the traditional system of ownership, even the recordkeeping task of ownership is time-consuming.³²

Blockchain technology, if implemented, has the potential to provide intelligent solutions for inefficiencies in traditional corporate governance, particularly in the interaction between shareholders and the corporation.

Organizations would benefit from blockchain-based shareholder voting as it will offer them a secure and immutable digital copy of the voting opinions expressed by shareholders during annual general meetings. It will ensure that voters may exercise their rights in a safe and transparent manner, as well as promoting cross-border investment opportunities. If regulators require access to voter data, they can do so using the private blockchain network. The voting instructions can be checked and traced because all records are accessible to every member, and they cannot be tampered with because all records are visible to everyone.

³² Alexander Daniels, *Blockchain & Shareholder voting: a hard fork for 21st-century corporate governance*, 21(2) J. BUS. L., 405 (2018).

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Due to improvements in ownership identification, some voting behaviours, such as over voting and hedging, may be rendered obsolete as a result of these advancements. In the future, it is possible that vote counts will become more exact, precise, and verifiable. At the very least, the legitimacy of corporate governance would be partially restored.

Moreover, according to the present framework, the board of directors have a significant influence over the corporate's decision making, however, the advocates for shareholder empowerment have a better stand with the implementation of Blockchain technology as the products built on Blockchain technology shall allow shareholders to engage with firms in whole new ways if and when they are produced. Additionally, new tools of networking and engaging via the chain will help the shareholders participate more in the decision-making scenario by removing conventional structural hurdles.³³

B. RECORD KEEPING

A records management system (*hereinafter* referred to as “**RMS**”) is a system that allows an organisation to manage its records over a long tenure. It is the responsibility of this management to maintain systematic and efficient control over the creation, maintenance, and destruction of records, as well as over the business transactions that are related to those records. Record management is regarded as a critical component of operational efficiency since it increases the value of an organization's information assets.³⁴ Records have been defined by the International Records Management Standard (ISO 15489-1:2016) as “*information created,*

³³ Christoph Van der Elst & Anne Lafarre, *Blockchain and Smart Contracting for the Shareholder Community*, 20 EUR. BUS. ORG. L. REV. 111 (2019) <https://doi.org/10.1007/s40804-019-00136-0>.

³⁴ *Records Management System (RMS)*, TECHOPEDIA, <https://www.techopedia.com/definition/30667/records-management-system-rms> (last visited Oct. 10, 2021).

*received and maintained as evidence and as an asset by an organization or person, in pursuance of legal obligations or in the transaction of business”.*³⁵

In order to sign every transaction (for e.g., the transfer of assets from one person to another) with a unique digital signature belonging to the user who initiated the transaction, blockchain technology offers services under the realm of cryptography. These signatures are kept confidentially, but they are verifiable in the public domain, which enhances the credibility of the transaction, as well as, the accountability of the user.

We refer to our waterboard example stated earlier in this section. The DLT offers a system under which records are secure and easily accessible. Moreover, the system offers less involvement of bureaucracy as these transactions won't require the approval of multiple government agencies and offices in order to be ratified, validated, and approved multiple times, but instead require the approval of only one government agency and office.

In the 2019 report, released by Ministry of Finance, the Department of Economic Affairs talks positively about how DLT's applications reduce administrative or transaction costs as well as make the data more accountable, which helps in detecting fraud as well. The report talks about several sectors where this technology could revolutionize the whole system, such as the insurance sector, banking sector, payment systems, Know Your Customer (*hereinafter* referred to as “**KYC**”), Land Registries, Assets and Commodities management etc.³⁶

³⁵ INT'L ORG. STANDARDIZATION, INFORMATION AND DOCUMENTATION - RECORDS MANAGEMENT 2 (2016), <https://static1.squarespace.com/static/5a1c710fbce17620f861bf47/t/5a45d41353450a6f05e9b138/1514525716795/ISO%2B15489-1-2016.pdf>.

³⁶ DEP'T ECON. AFFAIRS, GOV'T OF IND., REPORT OF THE COMMITTEE TO PROPOSE SPECIFIC ACTIONS TO BE TAKEN IN RELATION TO VIRTUAL CURRENCIES (2019), <https://dea.gov.in/sites/default/files/Approved%20and%20Signed%20Report%20and%20Bill%20of%20IMC%20on%20VCs%2028%20Feb%202019.pdf>.

Current records management solutions rely on a centralised collection of electronic records that have been captured and preserved within an organization's structures and systems to function properly. Some companies, for example, utilise content management systems to identify, classify, and administer collections of photographs, among other things. Blockchain transfers the duty and trust for keeping electronic records from the organization's structures and processes to a distributed network, thereby reducing the need for human intervention. A shift in the function of centralised records management systems and tools has occurred, with the blockchain itself taking on the role of validity and trust that had previously been fulfilled by records management systems and products.³⁷

Recently, even the Central Board of Secondary Education issued a statement that it would be utilizing blockchain technology so that the board exam results are documented in a linked chain structure and cannot be altered. This system would not just help the passing batches of the current year but also from the previous years. The statement also mentioned that it would be making the signed certificates available for class 10th and 12th from 2019 to 2021 and will be uploading the certificates of previous years' batches as well.³⁸

C. AUDITING

Referring back to our water board example, assume that the system is implemented for quite some time now. If all the data and transactions are listed in the public domain and doesn't have much involvement from the bureaucratic authorities, it streamlines the whole process for any auditor or rather, eases its job to a significant extent.

³⁷ Victoria L. Lemieux, *A typology of blockchain recordkeeping solutions and some reflections on their implications for the future of archival preservation*, IEEE XPLORE (Jan. 15, 2018) <https://ieeexplore.ieee.org/document/8258180>.

³⁸ Mridusmita Deka, *CBSE To Use BlockChain Technology to Document Board Exam Results*, NDTV (Sept. 22, 2021) <https://www.ndtv.com/education/cbse-use-blockchain-technology-document-board-exam-results>.

When it comes to applications, blockchain opens up new opportunities for auditors, such as the review of certain transactions and the verification of the existence of digital assets, as well as attestation of consistency between information stored on a blockchain and information stored in the physical world. Furthermore, blockchain has the potential to radically alter the auditing process. Due to the fact that a comprehensive record of transactions is recorded on a blockchain, auditors will no longer be required to seek and then wait for data and documentation from trading partners. Furthermore, blockchain will outperform the existing audit sampling approach by enabling continuous audits for any “on-chain” transactions that occur during any given period of time.³⁹

When blockchain technology is implemented, it will free up resources that were previously dedicated to evidence collection and verification. Since the whole system and its application is new, the new responsibilities might be difficult to complete, especially because there are no centralised authorities on the blockchain to guide the auditors. Auditors must draw on their knowledge of IT system audits in order to develop unique approaches of achieving strategic partners.

One of the vital factors to consider is data reliability. Since DLT acts as a new medium altogether, an auditor cannot just rely on the information but has to deal with how reliable is that data on the blockchain. One of the key factors then becomes the chances of the data on the blockchain to be altered somehow. The correctness of data on a blockchain is an extra factor to consider when evaluating the trustworthiness of data on a blockchain. According to the following statement made by a board member of the Public Company Accounting Oversight Board in response to this concern:

³⁹ Jay Schulman & Scott Wilson, *How blockchain technology will affect the audit*, RSM (Nov. 13, 2019) <https://rsmus.com/what-we-do/services/assurance/how-blockchain-technology-will-affect-the-audit.html>.

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“Blockchain does not magically make information contained within it inherently trustworthy. Events recorded in the chain are not necessarily accurate and complete. Recording a transaction on a blockchain does not alleviate the risk that the transaction is unauthorized, fraudulent or illegal. Blockchain also does not address threats that parties to a transaction are related, or that side agreements exist that are not reflected in the chain.”⁴⁰

Due to this, it is critical that the auditor understands the method by which data is submitted to a blockchain and the corresponding control processes that are involved with accurate input.

IV. SHORTCOMINGS

While implications of Blockchain technology in corporate governance looks alluring in theory, however, the technology is still at a nascent stage, and there are some shortcomings that need to be addressed before its actual applications.

A. STORAGE AND ENERGY CONSUMPTION OF BLOCKCHAIN TECHNOLOGY

Setting up a Blockchain technology requires a lot of storage space and energy consumption for running its systems and various other transaction fees,⁴¹ all these costs will be borne by stakeholders only in the form of gas fee/transaction fee. Further, the high energy consumption will harm our environment as well.

⁴⁰ Kathleen M. Hamm, *Mexican Mangos, Diamonds, Cargo Shipping Containers, Oh My! What Auditors Need to Know about Blockchain and Other Emerging Technologies: A Regulator’s Perspective*, PUB. COMPANY ACCT. OVERSIGHT BOARD (Nov. 2, 2018) https://pcaobus.org/news-events/speeches/speech-detail/mexican-mangos-diamonds-cargo-shipping-containers-oh-my!-what-auditors-need-to-know-about-blockchain-and-other-emerging-technologies-a-regulator-s-perspective_684.

⁴¹ Abdul Jabbar & Samir Dani, *Investigating the link between transaction and computational costs in a Blockchain environment*, 58 INT’L J. PRODUCTION RES. 1 (2020).

More the demand, more systems will be required; thereby, endangering the environment by increased energy consumption.⁴² The energy consumed will be used to maintain the real-time ledger. Storage capacity is a major issue because the necessary computational power of a participating system (node) rises as every Blockchain develops;⁴³ and every time a new node is created, it has to communicate with all the previous nodes to ensure transparency and this process will keep on repeating to maintain transparency and security in the blockchain. However, these actions will increase the energy consumption unnecessarily and will hamper the future growth potential of a Blockchain.

However, there are different kind of blockchain, uses different amount of energy. For instance, Solana blockchain uses less energy than Bitcoin blockchain. Therefore, blockchain of different models must be explored.

B. FULL TRANSPARENCY VS PRIVACY

Privacy concerns also arise from the use of Blockchain. All records are easily accessible in a public or semi-public type of Blockchain. However, for any reason, certain stockholders or management may choose to remain anonymous as clearly stated in Nakamoto's original white paper: *“The necessity to announce all transactions publicly precludes this method, but privacy can still be maintained by breaking the flow of information in another place: by keeping public keys anonymous.”*⁴⁴

Even in a purely permitted Blockchain with perfect anonymity, the history of active transactions gives some validators (those who verify the flow of data) and up to current information than any place else. Services

⁴² Eshani Ghosh & Baisakhi Das, *A Study on the Issue of Blockchain's Energy Consumption* in PROCEEDINGS OF INTERNATIONAL ETHICAL HACKING CONFERENCE 63 (2019).

⁴³ Zheng et al., *An Overview of Blockchain Technology: Architecture, Consensus, and Future Trends*, IEEE XPLORE (Sept. 11, 2017) <https://ieeexplore.ieee.org/document/8029379>

⁴⁴ Satoshi Nakamoto, *Bitcoin: A Peer-to-Peer Electronic Cash System*, BITCOIN (2008) <https://bitcoin.org/bitcoin.pdf>.

that specialise in de-anonymising nodes may also be developed. Alternatively, too much privacy provides anonymity that enables illegal or unlawful activity.⁴⁵ Balancing privacy and transparency is probably an unresolved problem, and it needs to be addressed.

C. BLOCKCHAIN WALLETS

To give users the decentralised autonomy, each Blockchain wallet has a public-key (or asymmetric) cryptography to allow users to store Blockchain data. It is basically a digital wallet that holds the user's data, tokens, and other digital items, and each wallet's address has a private key for each Blockchain, this private key is solely provided to the user during the time of wallet creation and it should be kept secret and safe as if it gets lost there is no chance of recovery. They also need to make sure to not share this key to anyone, else their data and funds will be at risk. Not everyone is a tech expert to handle such information, thus there is a high chance that they might misplace or lose the private key.

Furthermore, even the chance of hacking or even modifying a single piece of information, which is called to be immutable as the attacker would have to go through very expensive and complicated process of changing every chain of data. However, as Huru Hasanova and his team has laid out in their paper that there are still various cyber vulnerabilities such as 51% hack, ransomware attacks, wallet security, private forks, double spending, DDos's attack and many others that could hack or interrupt the blockchain.⁴⁶ Therefore, proper safety measures are needed to be implemented to safeguard the blockchain from such attacks.

⁴⁵ Alexander Daniels, *Blockchain & Shareholder Voting: A Hard Fork for 21st-Century Corporate Governance*, 21 J. BUS. L., 405 (2018).

⁴⁶ Huru Hasanova et al., *A Survey on Blockchain Cybersecurity Vulnerabilities and Possible Countermeasures*, 29 INT'L J. NETWORK MGMT. 219 (2019).

V. CONCLUSION

Through our research, we have found that the corporate governance issues that generally lead to massive shortcomings can be solved easily by Blockchain technology if implemented efficiently. Blockchain today can be compared to the Internet in the early 1990s in terms of functionality. Over the past two decades, we have witnessed how the “Internet of Information” has transformed our society. Now, we are entering a phase in which Blockchain has the potential to do the same by ushering in a new paradigm that includes the “Internet of Trust” and the “Internet of Value”.⁴⁷

As per the applications and examples stated, it is our conclusion that blockchain technology has the potential for a wide variety of applications which would help ameliorate the functioning of the corporate sector. However, there are some issues that exist which are yet to be decided upon, including the infamous debate if a permissioned blockchain server should be used or a public blockchain server should be used, the costs of maintenance, the vulnerability of the system, and the lack of deep research, which can only be countered by well thought legal framework behind its implementation

We have highlighted a few different potential applications, out of which the most significant implication of Blockchain technology for corporate governance is its decentralization which will immensely increase transparency in the corporate world. Corporations have been embroiled in scandals and financial crises. Specific forms of corporate governance are inefficient and ineffective. In turn, the current complexity of the investment chain may contribute to the current state of systems—the distance between two points.

⁴⁷ *Blockchain technology in India Opportunities and challenges*, DELOITTE (Apr., 2017) <https://www2.deloitte.com/content/dam/Deloitte/in/Documents/strategy/in-strategy-innovation-blockchain-technology-india-opportunities-challenges-noexp.pdf>.

Integration of Blockchain Technology in Corporate Governance: Implications and Applications

Moving ahead, we would like to highlight the fact that the number of households (money owners) and corporations (money users) have increased because of the complex financial system. There is a web of intermediaries (managers of money and providers of services). Since the invention of Blockchain technology, eliminating some forms of intermediation holds the most significant promise, as it presents a tremendous opportunity for better outcomes.

One of the first sectors to be impacted by the widespread adoption of Blockchain and its associated Distributed Ledger Technologies may be the financial services industries. The extent to which this technology will impact depends on how quickly industry players can capitalize on it and the nature of the support it receives from other stakeholders. Poor corporate governance can play a significant role in the failure of a company.

A transition from paper-based corporate records to Blockchain technology does not appear to conflict with the current regulatory framework in India, even though the Ministry of Corporate Affairs has made no official statements on the subject.

Therefore, this perspective on the potential of Blockchain technology with its various applications that could improve corporate governance would be worth exploring in greater depth.