Cornerstone Capital Group

Global Thematic Research

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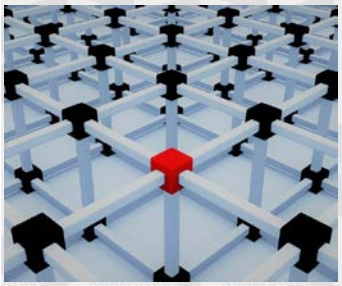
Governance and the Ungovernable: Implications of Blockchain Proliferation



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- **Theory and politics.** The blockchain and related innovations represent a new and relatively complex set of potential investment opportunities. The technology has received significant attention from a range of individuals and institutions, from computer scientists to corporations to private equity groups. We outline the theory of the technology as well as the governance implications to guide investors.

- **Disruptive opportunity.** Advocates of the blockchain believe it has tremendous potential to enable novel ways of creating, managing, and maintaining systems of fundamental rights. It is already being used to facilitate transparency and combat corruption -- for example, Kenya is piloting its use to record land ownership and transfer, historically a poorly managed and easily manipulated process[1]. The blockchain operates, by design, independently of traditional arbitrators and regulators. Its widespread adoption could remove courts, central banks, and government policy makers from financial and sociopolitical transactions, which in turn has governance implications for the economic, legal, and institutional relationships as we know them today.

- **Governance implications.** Innovation spurred by blockchain technology could result in more efficient and transparent business models. For this reason, investors should be actively assessing emerging blockchain-specific opportunities. However, in addition to understanding the basics of the technology, we believe it's important to understand the governance implications of the blockchain ecosystem. This report undertakes an assessment of the current pillars of blockchain governance and compares these pillars to current norms of corporate governance as laid out in Cornerstone Capital's proprietary framework. We see two scenarios: "A Blockchain World" and "Our World with Blockchain," each offering distinct advantages and disadvantages.

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[1] http://www.cio.co.ke/news/main-stories/kenyan-government-embraces-blockchain-technology-set-to-implement-a-blockchain-based-education-management-system

[2] Cryptoassets are a new asset class that include: cryptocurrencies (e.g. means of exchange, store of value, and units of account), cryptocommodities (e.g. cloud storage, compute cycles, and bandwidth), and cryptotokens (e.g. consumer distributed applications). https://ark-invest.com/research/big-ideas-2017

The theory and politics of blockchain technology

The blockchain is a digital trading platform for cryptoasset transactions[1] that records a time-stamped history of all transactions. Key features of blockchain technology are:

- It is a public record (called the "ledger") through which people contract with each other; and
- Validation of transactions is decentralized, meaning a single individual or institution does not control it. Instead, each user has a copy of the public record, and each user's copy must validate a transaction for it to be accepted.

Bitcoin is the first and perhaps the most famous application using blockchain technology. As a cryptocurrency, bitcoin facilitates an alternative payment process, acting as a means of exchange, store of value, and unit of account. There is a finite number of bitcoins available, which allows the value of the bitcoins to change with the demand for bitcoins as a payment source. The first bitcoins sold for 0.3 cents per token in 2010[2], and the price has since risen to over $2,000[3], though investors have called out the record price levels as a bubble.

The original developers of Bitcoin built the application with the goal of reshaping financial power structures

The original developers of Bitcoin built the application with the goal of reshaping financial power structures. Bitcoin was developed after the financial recession "as a counter-offensive against perceived political machinations, mass extortion, fiat inflation, and extensive banking fraud," and the developers were self-described "crypto-anarchists."[4] Bitcoin purists view the application as an opportunity to eliminate the need for third-party intermediaries in financial transactions.

The blockchain community suggests that the technology can correct the power disparities between institutions and individuals

However, Bitcoin is only one of many applications using blockchain technology, as the type of transaction is theoretically unlimited. For instance, blockchain technology can record the exchange of property rights or other legal agreements, or register votes. This could remove government and corporate institutions from transactions that, historically, these institutions were formed to supervise. The blockchain community suggests that the technology can correct the power disparities between institutions and individuals, indicating an objective of reforming sociopolitical relationships, not just financial relationships. We therefore focus on the blockchain to discuss the theory underlying the range of applications using the technology.

[1] Cryptoassets are a new asset class that include: cryptocurrencies (e.g. means of exchange, store of value, and units of account), cryptocommodities (e.g. cloud storage, compute cycles, and bandwidth), and cryptotokens (e.g. consumer distributed applications). https://ark-invest.com/research/big-ideas-2017
[2] https://www.wired.com/2011/11/mf_bitcoin/
[3] https://99bitcoins.com/price-chart-history/
[4] https://news.bitcoin.com/bitcoin-built-incite-peaceful-anarchy/

In examining blockchain governance, we utilize the research, writings, and opinion pieces from Ethereum[1], a nonprofit organization that supports the development of new technologies and applications and has a strong and well-known role as a blockchain technology advocate. Early examples of applications that Ethereum helped develop and run include:

- Weifund, a crowdfunding platform;
- Airlock, an application to interact with machines connected to the internet; and
- Provenance, a project to increase the transparency of supply chains.

Blockchain governance

Within Ethereum, there are two relevant pillars that we see as forming the "governance." These general pillars are:

All interactions through the blockchain platform are pre-programmed

1) Ex-ante rule setting. This means that all interactions through the blockchain platform are pre-programmed. Once an event happens or certain conditions are met, the transaction is executed as per the programming in the code, without the involvement of lawyers, financiers, or judges. Once executed, the transaction cannot be undone. The immutable nature of the code means it cannot be corrupted and users have a full understanding of the outcomes. In rare circumstances, users can migrate to new blockchain applications (a tactic called a hard fork) when a code error is discovered in the existing blockchain programming, as occurred for Ethereum in 2016[2].

Every user can see every transaction

2) Radical transparency. The public nature of the ledger allows every user to see every transaction. The use of a public ledger is not novel; public ledgers such as land registries have existed for centuries. But three elements of the blockchain make it different from existing public ledgers:

- All interactions are registered on a list that is replicated on computers across the globe;
- All interactions are continuously and automatically compared against the multiple copies to prevent corruption or fraud; and
- The ledger list is publicly and instantaneously available to all participants, rendering it "auditable" to the public, rather than to a centralized institution.

[1] For an overview and infographic of Ethereum, see https://blog.ethereum.org/2015/06/21/ethereum-messaging-masses-including-fathers-via-infographic/
[2] https://www.bloomberg.com/features/2017-the-ether-thief/

Comparisons with corporate governance

We compare the tenets of blockchain governance and corporate governance, with the goal of examining how the blockchain reflects, differs, and possibly advances current corporate trends. In our 2015 report The Networked Corporation, we outlined the catalysts transforming the industrial corporation model to a "networked" paradigm:

- Broader understanding of stakeholders, including a more assertive shareholder base;
- Higher degree of public scrutiny and engagement; and
- Growing importance of intangible assets in the valuation of companies, with 80% of corporate value now derived from intangible assets.

The networked corporation creates value through the interactions of its network members (i.e., its stakeholders)

The networked corporation creates value through the interactions of its network members (i.e., its stakeholders), an evolution from industrial corporations that saw their responsibilities as limited to satisfying shareholders. Stakeholders are now understood to include shareholders, employees, customers, regulators, and broader society. Corporations have increasingly engaged these stakeholders in dialogue and negotiation.

The blockchain replaces this negotiation and arbitration with computation

The blockchain replaces this negotiation and arbitration with computation. It pre-programs interactions that are limited to pre-identified participants, computationally executing and monitoring the interactions. This structure eliminates corruption and equalizes power across all users. However, the explicit exclusion of institutions limits the input and consideration of other stakeholders.

In addition, the blockchain doesn't reflect the intricate relationships in civil society. Blockchain proponents point to its relative simplicity as one of its strengths, but this simplicity could put blockchain-driven business models at odds with the ever-increasing complexity of broader society—in particular, with the shift toward corporations engaging with the public and organizations representing the public's interests.

The blockchain's transparency presents an opportunity to enhance corporate governance

However, the blockchain's ability to support a high level of transparency presents an opportunity to enhance corporate governance. Platforms such as Ethereum are dedicated to fostering new business models and applications using blockchain technology and cryptoassets, essentially creating a digital sandpit for software developers and investors to interact and innovate.

In sum, while blockchain governance is the antithesis of the modern, stakeholder-focused corporate governance approach, it could facilitate new approaches to improving transparency.

Two scenarios

Blockchain technology will have significant economic, legal, and sociopolitical implications as it evolves. We examine two scenarios for the evolution of blockchain governance in the context of corporate governance.

"A blockchain world"

A blockchain world entails technology replacing the roles of governments and intermediary corporations

A blockchain world entails full integration of the technology into society, with technology replacing the roles of governments and intermediary corporations. In this scenario, the blockchain is not only used to facilitate payments for goods and services, but also serves as a legal platform for exchanging contracts and as a political platform for voting. This model uses blockchain governance pillars as the basis for all transactions, as well as potentially for rules driving broader society.

Blockchain proponents state that rebuilding governance around a transparent technology could reorient society towards greater equality and efficiency. Assets such as cars and real estate could be tied to blockchain contracts, organizations could be directed by members, shareholder voting could be completely transparent, and governments could be restructured to strengthen individual rights.

Blockchain technology that facilitates reductions in information transaction costs could also reshape the structure of companies

Blockchain technology that facilitates reductions in information transaction costs could also reshape the structure of companies. Historically, decreases in information costs have caused the structure of corporations to flatten, as fewer mid-level positions are necessary to contextualize and transfer information. A blockchain world could continue this flattening, as the public ledger could cheaply and efficiently facilitate the auditing and information-collecting functions of mid-level positions. An extension of this scenario could allow for pre-programmable contracts and the trading of cryptoassets to automate high-level corporate decision-making. While this is scenario in unlikely to materialize any time soon, corporations could, in theory, operate autonomously with only a small group of people required to oversee operations and adjust for any anomalies.

Once the blockchain world is created, a new form of discrimination could also develop from the very nature of the public ledger

However, achieving this level of integration would not necessarily yield the results blockchain proponents envision. For instance, the process would inherently include breaking down the current system of institutions to the possible detriment of those reliant on these institutions, such as employees who perform bureaucratic tasks and technologically disadvantaged groups. Once the blockchain world is created, a new form of discrimination could also develop from the very nature of the public ledger, as users could potentially discriminate against other users based on previous transactions. Furthermore, power could be consolidated with individuals or institutions possessing technological capabilities, resulting in unequal power structures that the blockchain was

supposed to eliminate. Any blockchain-enabled power structure would benefit from the lack of ex-post arbitration or judgment.

In addition, a fully integrated blockchain world faces ironic concerns around privacy. Though a goal of blockchain technology is to facilitate radical transparency in transactions, the users executing the transactions may not necessarily have to be open about their identities. It is possible that users could chose aliases rather than divulge their identities, which would limit their accountability to counterparties.

"Our world with blockchain"

Our world with blockchain technology entails integrating blockchain technology into existing social structures

Our world with blockchain technology entails integrating blockchain technology into existing social structures. Systems that are increasingly more complex, deteriorating, or underdeveloped could benefit from the radical transparency that blockchain technology offers. At the same time, system transparency advances the ability of corporations to answer stakeholders' increasing demands to engage with the public. This world contradicts many of the principles of the blockchain purists, who are aiming for the radical change described in our first scenario.

Blockchain technology could provide a publicly available, auditable database to cheaply track products and services across the globe, dramatically reducing the cost of achieving transparency

Opportunities exist for the blockchain to provide value to corporations as well, particularly those that face calls for transparency on environmental impact, ethical practices, and labor rights in their supply chains. The complexity of most supply chains is increasing, with global sourcing and demand, but companies typically respond to calls for transparency by citing prohibitive expenses. Blockchain technology could provide a publicly available, auditable database to cheaply track products and services across the globe, dramatically reducing the cost of achieving transparency. For example, an identification code could be stamped onto every food item, publicly recorded on the blockchain for consumers to track as it passes through each step of the supply chain. The Ethereum application Provenance offers a platform to create a digital token for products, allowing businesses to verify their supply chain integrity and consumers to track products' histories[1].

Blockchain investment opportunities

Both scenarios of a blockchain future offer investable opportunities. The integration of blockchain technology into existing structures has already started, presenting opportunities from both blockchain technologies and companies that use blockchain technologies creatively within the current system of corporate

[1] https://www.provenance.org/

governance. We outline potential blockchain investments and highlight the range of organizations in the blockchain investment universe.

Investing in a specific blockchain application is similar to investing in a startup

Investing in a specific blockchain application is similar to investing in a startup. Investors can provide developers with capital in return for cryptocoins of the application being developed. The products facilitated by the application require the specific application's coins, and thus the coins appreciate as demand grows for the application. Like investing in a startup, investors receive the return on their invested capital from the organization going "public" and selling their coins as if in an initial public offering.

We also see a range of emerging options for investors interested in blockchain technologies:

- **Venture strategies** focused on a range of blockchain applications and cryptoassets are emerging. Venture capital funds offer an opportunity to invest in new products and services that are funded through cryptoassets or facilitated by the underlying blockchain technology.
- **Specific blockchain applications** are growing as an investable universe. Applications such as the clean technology facilitation service SolarCoin offer a platform to reward generators of solar electricity and reduce the payback period of solar installation[1].
- **Existing corporations implementing blockchain technologies** could increase efficiency and decrease information costs. Samsung recently announced a blochain platform for customers to securely access business services with a onetime authentication, initiate financial transactions, and create secure digital signatures without a need for third-party authentication[2].

Conclusion

Blockchain technology offers scope to innovate and experiment with new forms of governance. The innovation, as it currently stands, contrasts with the recent trends of corporate governance. We see a future where the blockchain allows for the transparency of systems that corporate governance is currently unable to provide, with benefits to the public at large that justify the new model of governance. However, we recognize that the future could involve significantly more blockchain integration if it can replace existing institutions and power structures.

Note: This report draws heavily on 'Governance in Blockchain Technologies & Social Contract Theories' by Wessel Reijers, Fiachra O'Brolchain and Paul Haynes, Ledger Vol 1 (2016) pg. 134-151. Available here.

[1] https://solarcoin.org/en/front-page/
[2] https://www.samsungsds.com/global/en/solutions/off/nexledger/Nexledger.html

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