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The Rise of Blockchain Technology: Overcoming Theoretical Poverty and Its Implications for Developing Countries

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The blockchain is still new and unfamiliar. But blockchain appears to shake an entire technology innovation system. Blockchain is rapidly drawing attention in that it will be able to fundamentally revolutionize industry ecosystem. While cryptocurrency transactions and market capitalization have been popular in mass media, several platform operators in non-cryptocurrency areas such as jewelry, social networks, and entertainment, are also moving to introduce blockchain technology in full swing. In this brief note, we intend to present integrated theoretical strands to summarize various prospects for blockchain technology. Further, we want to provide a reflection as to whether this new technology gives opportunities, challenges, or risks to future society. Particularly, we point out one of its alternative and promising adoption that gives way to new forms of decentralized and autonomous organizations (DAOs).

Keywords: Blockchain, society, theory, cryptocurrency, decentralized autonomous organizations, bitcoin

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Introduction

A recent survey by O'Reilly Media (Lorica & Nathan, 2019) lays out a set of most common obstacles that slow down adoption of new technologies such as AI within organizations. It is primarily lack of organizational culture that sees the need. This is filled by the capacity to identify and apply the set of appropriate business cases.

For the same reason, whenever a new technology comes out, information about use cases is flooding in. The same is true of blockchain technology. Since the blockchain is probably a newer technology than artificial intelligence, there is an extremely high demand for real world uses cases (c.f., Zago, 2018). However, such practice in introducing individual cases in a fragmental style does not allow people to see the overall landscape of blockchain technology. What is needed at this time is a theoretical framework and a systematic approach. Theoretical poverty may hinder us from properly explaining the context in which actual cases occur, ultimately making it difficult to predict the future (Modis, 1992).

Proposing four theoretical models

One of the first tasks for theorization is to set up an axis for typology. Using quadrant in Figure 1, the x-axis is the immutability, the key technical element of the blockchain, and the y-axis is tokenization, the socioeconomic aspect that the blockchain will bring about. At the opposite end of the X-axis and Y-axis, there is revertability and authentication, respectively. Figure 2 shows a matching theoretical strand for each quadrant.

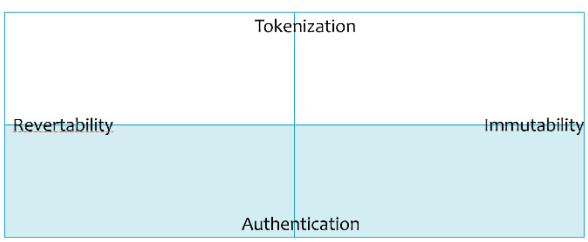

Figure 1. Setting up axis

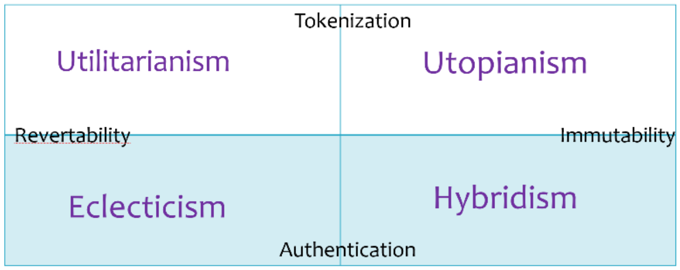

Figure 2. Four theoretical strands

First, let's list the logical arguments and examples of Utopianism. In the ideal form of its adoption is when everyone on the network records and validates every single transaction. Rewards for the network participants are financial incentives to maintain mutual recognition. Mass peer interaction can sustain owing to various coins. Who are the participants? They are people who have been called proponents of Satoshi Nakamoto (2008). In a recent publication titled "the end of trust" (Wizner, 2018), Edward Snowden stated that while blockchain is a very simple technology, for mechanically speaking, it creates a new history that can't be manipulated and generates various applications for verifiable accounting. Further, he asserted that like all new technologies, there will be confusion, disruption, and abuse. The question is whether the impact is positive or negative depending on the balance.

The second position recognizes the immutability that Utopianists' claim, but takes a reserved position on the so-called 'token economy'. It can be called 'hybridism' in that it accepts core technology of blockchain. Let us examine their arguments and examples. The issuance and distribution of tokens requires approval from the authorities. Regulators including banks are beginning to look for so-called 'authorized' 'private' or 'hybrid' models. In response, technology companies develop and sell 'certification' systems based on private blockchain where it can be publicly accessible but privately updatable.

IBM (Gupta, 2018) lets people think of blockchain as one of many operating systems, such as Microsoft Windows or MacOS, and Bitcoin. Thus, bitcoin is also regarded as only one of the many applications that can run on that operating system. IBM suggests that, like used-car transactions, the technology of the blockchain's trading is feasible in a multilateral contract, even if it is not an open chain. O'Reilly Media (Swan, 2015) also takes a similar approach to IBM, stressing that there are several blockchain applications beyond cryptocurrency.

The third theoretical strand is 'utilitarianism'. Utilitarianists think digital tokens should not be abandoned because of their usefulness. Let's look at some of their key logical bases and examples. While acknowledging monetary reward to participants, society can sustain only when we can return to the original system. They tend to advocate for community coins distributed within a smart city. They emphasize a smooth transition from social media society to blockchainziation. Nowiński and Kozma (2017) provide a good overview of blockchain that takes advantage of tokens.

The final position in the quadrant is eclecticism. They chase new trends but claim that we must return to a centralized system with a moderator present. This perspective can be referred to as ‘Politics as usual’ (Margolis & Resnick, 2000), they often hold an eclecticism by proposing ‘sandbox’ approach to new technology. Similar to the ‘rising tide theory of economics’ we must return to a centralized 'system with a moderator present. Looking at the curriculum of the blockchain strategy program recently opened by Oxford University, it illustrates their position to maximize the business effect of blockchain (c.f. https://www.sbs.ox.ac.uk/programmes/oxford-blockchain-strategy-programme).

In a recent review of blockchain research trends from 2008 to 2017, Miau and Yang reported that prior studies published during the years 2008 through 2013 dealt with the Bitcoin and cryptocurrencies. Then, from 2014 to 2015, the number of Bitcoin studies grew rapidly and, after 2016, a number of studies were related to the techniques of smart contracts. In other words, one of the key subjects sought by recent blockchain-related researchers is to properly run the blockchain platform for the popular use of the blockchain technologies. The researchers seem to pay attention to devising another ‘walled garden’ algorithm superior to credit card system. Thus, smart contract camp is moving around ‘between’ spheres.

Adding another third dimension to the theory quadrant

Meanwhile, another dimension is equalization versus reinforcement as depicted in Figure 3. The argument and examples of equalization is as follows. The social gap between mainstream and minority actors can be greatly reduced. With greater transparency in administration and marketing, corruption is reduced. Those who in the past had difficulty in banking due to high risks or costs may now receive many benefits from blockchain. Thus, the diffusion policy should be actively implemented to ensure that public organizations or private agencies can accommodate the blockchain. On the other hand, the argument and examples of reinforcement include that the efficiency of blockchain related to political and economic activity is exaggerated. After all, economically rich mainstream actors take a better position in the new blockchain world. The blockchain will be another technology of surveillance and control, not transparency. Thus, the biggest concern is the digital divide between generations, regions, or nation-states. We need a public policy of caring so that the elderly or the disadvantaged do not feel deprived (c.f. Cashless society).

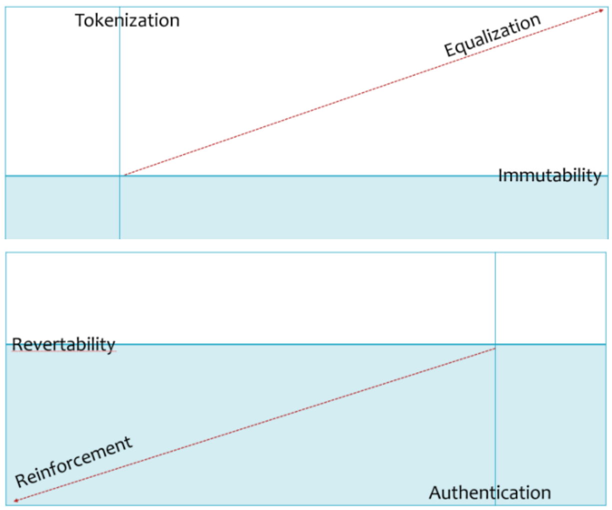

Figure 3. Three-dimensional typology

General features of blockchain

Given our discussion above, we can summarize general features of blockchain and distributed ledgers as follows:

1) Decentralization: The ledger is widely distributed among many stakeholders and maintainers.

2) Immutability: The ledger of transaction is immutable by design

3) Provenance: Transactions from the very first to the most recent are recorded in a ledger open to all participants. The transactions are verified through encrypted network consensus mechanisms. The verifiability features require a process that reduces information asymmetries.

4) Globality: Digital transactions take place across all geographic and national borders

5) Liquidity: The liquidity of value is enhanced. The fact that cryptocurrencies are not under the direct control of a sovereign, central bank or private corporation increases the flow of the value.

The flow and exchange of crypto-assets take place outside of the control of the centralized financial system. It enables a different line of thought on value and money. This new form of value systems can be embedded in currencies. Blockchain economies take place under the logic of the network where participants become codependent on multi-stakeholder networks and commons. Thus, token-based ledger economies have the potential to shift the balance of power between labor and capital. They may allow a bigger part of the added value to flow to designers and other stakeholders, reducing or eliminating domination of venture capitalists. Tokenization allows for crowdfunding or direct crowd sales. These crowdfunding campaigns, based on the sale of tokens that are open to all types of buyers, are called Initial Coin Offerings (ICO).

Participants of an ICO can acquire utility tokens which are basically a right to purchase the assets created by a blockchain project. In other cases, initial token may enable stakeholders to enjoy the surplus value realized in the market. This creates means and incentives for founders, designers, and developers to go around the centralized banking and venture capital system and create their own funding schemes more directly.

Blockchain and generative and circular economic models

Blockchain provides the possibility to change the current business models that are focused on rewards extraction towards more generative activities. This alternative version of BC adoption is aiming to create systems that are able to reward and incentivize generative practices.

The incentives in this direction are focusing on circular economy. The technical value proposition develops upon shared logistical knowledge. Use of distributed ledgers enables new forms of collaborative accounting which will allow economic actors to manage their production while recognizing positive and negative social and ecological externalities.

Blockchain and new forms of decentralized organizations

In this direction, there are ambitious deployment of smart contracts that are coined as Decentralized Autonomous Organizations (DAOs). They rely purely on blockchain code and the distribution of tokens. Smart contracts enforce rules to control decision-making and operations. The DAOs have stimulated experiments around new forms of services that take place with little or no direct human action. They provide agency to non-human subjects, including machines, objects or even natural ecosystems.

An example of this is the Fishcoin[4] project, in which the amount of coins that can be spent reflects the stock of fish that can be used without endangering the reproduction of the fish.

Blockchain and political implications

This new disruptive technology comes along with different political implications (Manski & Manski, 2018):

[4] https://fishcoin.co

1. An individualist future: where every individual is seen as a competitive entrepreneur.

2. Corporate vision, which uses ledgers for a variety of for-profit and surveillance and control uses.

3. State vision, which uses ledgers for control and surveillance.

4. Technocratic future, which claims that such technologies can become automatic and sovereign, beyond human control.

5. Cooperative future, which distributed ledgers are used for the commons. This is the vision that animates this report.

A final note for the future of the technology

Blockchain is overestimated in the short term and underestimated in the long term. Despite limitations of the current blockchain applications, the qualities and advantages that the technology has brought into the world are worth to consider in depth. The decentralized nature of the technology has promising horizons against shortcomings of centralization of big and sensitive data.

As we have seen from a recent case around Facebook, where personal information was abused, privacy infringement appears to be an inevitable choice associated with the increasing use of networked Internet technologies across various sectors of society. The current Internet, which relies on centralized servers, is not only harmful to individuals but also to communities. At the international level, a new form of 'cultural imperialism' has increasingly been voiced by critics. It is coined by the term GAFA (that stands for four companies, i.e., Google, Amazon, Facebook, and Apple). The term implies that virtually all the data from around the world are managed by a few U.S.-based platform companies.

Fully interconnected and transparent nature of an idealized blockchain technology adoption needs to reconsider data privacy. Its idealized utopian adoption foresees full transparency and immutability which may lead to a powerful tool for monitoring and surveillance. However, if blockchain technology leads to a technology adoption that maintains its decentralized nature while assuring data privacy, we may witness a shift from Western-based monopolized control to a multi-polar decentralization, a desirable direction of a truly networked technology.

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