

**Classification JEL: G 21, G 24****BLOCKCHAIN - A TOOL FOR DIGITAL TRANSFORMATION OF BUSINESS MODELS INTO VALUE CREATION****Pisaniuc M.***Ph.D. Associate prof.**ORCID ID 0000-0002-8084-7484**Center of Innovation Business Research and Consultation**Academy of Economic Studies of Moldova (ASEM)*

Abstract. Blockchain was recently recognized as one of the top 10 emerging technologies by the World Economic Forum (2016). Prior to this remarkable recognition, The Economist published several articles about the "trust machine" and therefore introduced this remarkable new technology to a wider audience. Prior to these developments, information science and business had already begun to explore the vast potential of blockchain technology with numerous evidence and concepts besides its origin - the development of cryptocurrencies, a decentralized and tamper-proof ledger technology that is expected to have many more use cases than digital technology with bitcoin as the most important mainstream application

To understand the advancement of blockchain technology and its current state, investigating these under-researched aspects of blockchain technology operations is crucial. In this vein, it is important to differentiate between theoretical blockchain applications and their commercial applications in order to assess the potential disruption of existing business models by blockchain technology. The digital transformation of business models makes it necessary for companies to develop a strategy to manage (radical) change in terms of value creation. Digital transformation strategies: which will contribute to changes in value creation, such as structural changes and financial issues.

The given study aims to map the existing blockchain activities and analyze how they are used in different industries and regions, as a result, we will get a better understanding of the disruptive potential of blockchain technology, apart from purely conceptual considerations and evaluate the potential of this technology, in case of their application in the global economy.

Keywords: blockchain mining, technology, bitcoin, innovation structure, disruptive technology

Introduction

Bitcoin mining technology, blockchain, has recently emerged as a disruptive technology. At the same time blockchain, can be seen as an innovation with a wide range of applications, potentially capable of redesigning some models in business, and at the same time with possibilities and political consequences that will influence society at large.

Although academic interest in this topic is growing, however, this theme is little reflected specifically] in terms of, analysing the impact of blockchain applications from the perspective of business models.

This paper aims to fill this gap and analyse the key points of decentralised governance based on blockchain, which often provoke repulsion on different categories of traditional actors: state authorities, citizens. And at the same time, analyse blockchain technology as a new business method from a value creation perspective.

The emergence of the technology, or rather the first product, was mentioned in a white paper published in November 2008, Satoshi Nakamoto proposed Bitcoin as the first electronic payment system, based on a decentralised peer-to-peer network,



without the need for a trusted third party. The blockchain can be defined as a database containing all transactions ever executed on the Bitcoin network. It consists of a permanent, distributed, tamper-proof digital ledger collectively made by everyone, forming the nodes of the system.

The tremendous innovation introduced by this technology is that the network is open and participants do not have to know or trust each other to interact. Electronic transactions can be verified and recorded automatically by the network nodes using cryptographic algorithms, without human intervention, central authority, point of control or third party (e.g. governments, banks, financial institutions or other organisations).

Even if some nodes are insecure, dishonest or malicious, the network is able to correct, correctly verify transactions and protect the ledger from tampering via a mathematical proof-of-work system. And all this makes human intervention or control authority unnecessary.

The rationale for decentralized trust or trust by computation "a shift from trust in humans to trust in mathematics" (Antonopoulos, 2014), with applicability far beyond the creation of decentralized digital currencies. It can also be used as a repository of irreversible and inviolable public records for documents, contracts, property and assets.

The blockchain can also be used to embed information and instructions, with a wide range of applications, smart contracts. Namely automated and self-executing actions in agreements between two or more parties; multi-signature transactions that require the consent of multiple parties for their execution; smart properties.

We would like to note that the applications of blockchain technology are still at a defining stage and represent an extremely fast evolving field with little established theory, few recognised experts, and the scientific debate on the subject is still in its infancy and is mainly dominated by the technical, financial and legal aspects of Bitcoin.

However, to understand the advancement of blockchain technology and its current state, investigating these under-researched aspects of blockchain technology operations is crucial. In this vein, it is important to differentiate between theoretical blockchain applications and their commercial applications in order to assess the disruptive potential of existing business models by blockchain technology.

I. Paradigm of Blockchain technology application

The areas of application of the blockchain paradigm are an unidentified potential, as it enables "the disintermediation and decentralization of all transactions of any kind between all parties globally" (Swan 2015, p. x), "with the potential to reshape all human activity as pervasively as the web has" (Swan 2015, p. vii).

Broadly speaking, proponents of decentralisation tend to share the same 'dissociative' attitude towards centralised institutions and the state in particular, 'failing to see its value-adding contribution' (Paquet & Wilson 2015, p. 21).

The dominant discourse has emerged mostly through the media and is generally dominated by IT specialists and financial operators, seeing governments "as something of a burden - too slow, too corrupt, too lacking in innovation and benefiting too few" (Paquet & Wilson 2015, p. 21).



It is important to note, however, that there is some variety of positions towards the role of the state in decentralised government, and the lines between disintermediation of government services, free markets and even anarchism are often blurred.

First, by applying the concept of public and private keys, the blockchain, bitcoin ensures the authenticity of participants sending transactions into the system. Public keys, first introduced by Diffie and Hellman, are used to correctly identify accounts (e.g. bitcoin accounts), and private keys to authenticate the user or bitcoin holder, respectively.

This concept is also found in the case of encrypted communications on websites such as HTTPS (deployment grows, middle box and antivirus products are increasingly intercepting). The private site in the bitcoin protocol is used to sign the instruction to transfer bitcoin from the owner's account to another account; therefore, it provides assurance that the transaction originally originated from the original owner of the bitcoin. It is clear that this innovation is already widely recognised and applied. This fact we can prove, by its effects.

Rogers (1971) defines five attributes for diffusion of innovation: relative advantage, compatibility, complexity, testability, observability. The higher the degree of these attributes, the greater the possibility of a high adoption rate, Rogers, for example, drew attention to the following attributes:

Relative Advantage, the degree to which an innovation is perceived to be is better than the idea it replaces.

Compatibility being the degree to which an innovation is perceived to be consistent with the existing innovation, existing values, past experiences and the needs of potential adopters.

Complexity being the degree to which an innovation is perceived as relatively difficult to understand and use.

Testability being the degree to which an innovation can be experimented with over a limited period of time on a limited basis.

Observability being the degree to which the results of an innovation are visible to others.

The digital transformation of business models makes it necessary for companies to develop a strategy for managing (radical) change in terms of value creation. However, blockchain technology affects the first two of these dimensions, as the technology can be used to bypass intermediaries in the value creation process and reduce friction within systems.

It therefore has the potential to be disruptive. In its original context, disruption describes a development in which a smaller company - initially focused on the lower and less profitable segment of the market - rises to challenge a challenger to the incumbents in the highly profitable customer segment.

Blockchain technology serves as a ledger for fast transactions, providing trust within a system of unknown users. While some dispute the cost-effectiveness of the bitcoin protocol, the World Economic Forum recently highlighted the potential in the banking industry through its report on the future of banking and financial infrastructure.



UniCredit Bank has published its views on the impact of blockchain technology in the banking industry, stating that it impacts payments, know-your-customer processes, trade finance and post-trading. As similar result comes from Deutsche Bank Research, which sees the greatest potential in real-time money transfer, cryptocurrencies and settlement. Insurance, another part of financial services, also holds potential for blockchain technology applications. In a recent study, McKinsey identifies the following applications: among others, automation through smart contract systems, easier fraud detection and reduced administrative costs. In financial services, therefore, there are many possible applications for blockchain.

Blockchain technology could enable entrepreneurs to harness this potential. Apart from financial applications, a distributed ledger system has potential for use in other industries.

In their book, *The Blockchain Revolution*, D. Tapscott and A. Tapscott assess a large number of other applications beyond the financial services industry, creating a "blockchain utopia" by predicting their pure peer-to-peer economy and the return of data ownership to users.

They identify application potential particularly in public services, another prominent industry area in terms of ledgers. The UK Government Office for Science published a recent report on the potential of blockchain technology in government services.

The report identifies use cases in critical infrastructure protection, labour and pensions departments, as well as possibilities in the area of improving international aid systems and potentially in the area of taxation.

A recent study by Verbraucherzentrale Nordrhein-Westfalen (NRW) and PwC assesses the potential of blockchain technology in the energy sector. A controlled, decentralised energy trading and supply system could be a possible use case. In addition, a smart contracts system could be applied to other contracts and document management

With a share of 42.4%, the Finance and Insurance sector accounts for the largest share of blockchain applications. The second largest group of startups operates in the information and communications sector with a share of 36.5%, which underlines the origin of the technology in data and information. Professional services such as (e.g. business consulting, lawyers, coaching, auditing) occupy the third highest share of 4%. As blockchain technology is a new and complex technology, providing professional services is necessary for companies that have little or no.

Table No. 1 Number of blockchain-based start-ups by domain

The sectors	Nr. de start-ups
Entertainment, recreation	38
Finance, assurance	483
Information telecommunications	416
Profesional service	46
Media industry	30
Service profesional	31
Retail, consume	22

Source: based on PWC report "Time for trust: How blockchain will transform business and the economy"



If we analyse by geographical distribution, most are in North America - 397, in Europe a total of 300 start-ups using bitcoin technology. Among the countries with the most start-ups in this field are the USA, the UK, Switzerland, Canada, the Netherlands, China and Singapore. The industry is also highly developed in Israel. Among the countries in Eastern Europe, Poland and Estonia.

The relentless development of information technology, increasing digitization and the ubiquitous nature of connectivity have been an additional catalyst for governance. The removal of the barrier of communication costs and the use of a system architecture with multi-directional connections between all nodes, the internet and cyberspace has enabled the emergence of the 'networked public sphere' (Benkler 2006, p. 212) as a great facilitator of freedom of expression.

As never before in history, citizens have the opportunity to intensify interactions between interest groups and social movements at local and transnational levels; to express their grievances through non-institutional channels; to engage in new collaborative processes; and to experiment with alternative models of alternative governance, in a climate of growing political awareness, but also growing distrust of government actors.

This, in turn, has provoked a further erosion of the old concepts of the Westphalian nation-state and territory-based governance, with its traditional functions of sovereignty, authority and national borders increasingly called into question.

The blockchain-based governance system can be considered as the final stage of this process of decentralization and disengagement of institutions, as far as:

- it proclaims the social benefits of a bottom-up approach to politics, focusing on consensual forms of self-government and direct citizen participation in decision-making, in a similar way to deliberative democracy (and other alternative models of governance);

- fails to see any added value in central coordination and promotes the primacy of economics over politics, following a logic of privatization of government services, such as driven by the New Public Governance.

- relies on global peer-to-peer networks and online interest groups, which aim to decentralize hierarchical structures, to be as independent as possible of government powers and to challenge their agenda.

If fully distributed, permission less blockchain, such as Bitcoin, have their own inherent limitations, permissioned blockchain could instead represent a valid solution for online government systems. Although multiple researches in the field note the utopianism of using this technology.

I would like to express a completely different opinion, any innovation at the first stage of implementation encounters more rejecters than supporters. This, if we look historically, happens for two reasons: the first is fear of the new, fear of not fitting into a new structure, society. Secondly, laziness to accommodate, adapt, learn in some cases to restructure.

Conclusion: any innovation leads to development, although it can often be rejected, neglected, disregarded. At the same time, from the moment of mass applicability it becomes appreciated, it makes things easier, it changes mentality, it leads to progress.



Blockchain technology in our view is obviously a disruptive technology, which will be applied in the coming years, and the degree of applicability will increase in arithmetic progression. This technology will in many cases solve the need to replace bureaucratic, corrupt, inefficient state structures. It will lead to new services and create added value for 80% of the world's population.

At the same time, it will not allow the 20% of the global elite, through various instruments, to use the institution of the state to their own advantage, or that of their group interests. Another idea, blockchain technology, like other innovations, will contribute to the establishment of a global state, which is vehemently criticized.

In this context, I would like to say that the global state that the phenomenon of globalization envisages is nothing other than the return of mankind to a state like the one that has existed since the beginning of human existence, as confirmed in the Bible.

A state in which there will be no national, political, cultural, religious, etc. discrimination, because human happiness is based on peace, well-being and equality, principles that are not currently guaranteed by nation states around the world.

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