

## **MODERN BLOCKCHAIN-PLATFORMS: ADVANTAGES AND PROSPECTS**

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### **ABSTRACT**

This article is devoted to a study of possibilities to use blockchain technologies in business by making blockchain transactions. The author has presented a view of the blockchain technologies taking into account possibility of their implementation not only in IT and financial relations in labour ones as well. A representation of blockchain technologies in Russian and foreign scientific articles has been analyzed. Possibilities and prospects to use blockchain platforms in the current context have been described. In addition, the author provides some examples of using blockchain platforms in various fields, and outlines their advantages and problematic aspects. The author has analyzed current blockchain platforms in terms of the level of their compliance with the specified parameters and provided suggestions on further development of the distributed registers system. A conclusion that no systemic solutions can be discussed at the current level of technology development has been made, which leads to the immediate necessity to determine features, required properties, and characteristics of the platform solutions in each sphere.

***Keywords:** Blockchain, smart contract, labour relations, distributed registers, costs*

### **INTRODUCTION**

A system of economic relations is dynamic and develops constantly. New elements and forms are appearing in the system, and, as a rule, these are not subject to normative regulation at the stage of implementation. It is extremely difficult to forecast the future in the context of constant changes, that is why using such stable structures that will allow the participants of economic relations to have a maximum certainty and minimum possibilities for opportunism is getting increasingly important.

A blockchain technology (a technology of using distributed registers) is one of such new elements. It represents a whole variety of possibilities to use the distributed registers system to formalize, fix and regulate transactions between subjects. The technology is developing and generating entire digital platforms based on using blockchain in various spheres of human life (finances, education, medicine, e-government, labour, document control, and others).

The states also understand the importance of blockchain-related topics for the development of digital technologies. For example, in the Passport of the national program “Digital Economy of the Russian Federation” [1], the main end-to-end digital technologies that are important for the state are presented. Among them are allocated a system of a distributed registry (blockchain).

This scientific paper is focused on the potential capacity and possibilities of using blockchain platforms at the present time. Consequently, the aim of the study is to assess the current possibilities of using blockchain platforms in different spheres of social relations and to determine directions for further development of this technology.

## **THEORETICAL GROUNDS OF THE BLOCKCHAIN TECHNOLOGY**

First of all, there is a need to formalize our perception of what a blockchain is, because this term is quite new. This technology is implemented in various fields (finances, document control, labour relations, education) but investigators have not yet come to the final decision on its basic characteristics.

From our point of view, nowadays an optimal interpretation of a blockchain is the following. Blockchain is a network designed to process transactions with a set of rules prescribed (the Trust Protocol), following which the participants can have a public ledger of transactions and set a network state at a certain moment [2].

We can also offer some other, more simple definitions. For example, blockchain is a decentralized way of keeping records that are divided among the participants and are not subject to any change. It allows the participants of transactions to add an information block to the chain after each party initiates certain algorithms. Given that specific conditions are observed and comply with the rules established by the participants, the transaction information will be approved and added to the chain. All data, encoded and unchangeable, is always up-to-date in all systems of the participants.

Blockchain technology eventually allows inserting the Trust Protocol, embodied in specific algorithms by means of information technologies, in any kind of relations.

For the last ten years, blockchain has undergone changes resulted from the search for using technologies to solve different sorts of tasks.

October 31, 2008, is considered to be a starting point. It was when a group of people disguised as Satoshi Nakamoto presented an idea to use blockchain concept in the form of Bitcoin [3].

Another important event was the emergence of Ethereum, which is an open blockchain platform allowing to create and use decentralized applications, decentralized autonomous companies, and smart contracts. The last needs to be considered in more details.

A smart contract is an electronic algorithm describing a set of conditions, the fulfilment of which results in some events in the real world or digital systems [4].

The recent years are marked by a search for and finding of problems inherent in Bitcoin and Ethereum. While all this time the sphere representatives were searching for the ways of using this technology in various fields, scientists, in their turn, ignored this topic until recently. A distribution of the number of publications on the blockchain topic in Web of Science and the Russian Science Citation Index is shown in Table 1.

*Table 1. Number of scientific papers dedicated to the blockchain technology indexed in Web of Science for the period from 2013 to 2019 (in total 2,145 records as of May 1, 2019)*

Years of publications	Number of publications in WoS	Publications, in percent	Number of publications in Russian scientific editions	Publications, in percent
2013	2	0.1%	0	0,0%
2014	7	0.3%	0	0,0%
2015	22	1.0%	11	0,3%
2016	131	6.1%	112	3,3%
2017	557	26.0%	832	24,8%
2018	1162	54.2%	2251	67,1%
2019	264	12.3%	150	4,5%

As shown in the table, in 2018, the number of papers written in Russian and indexed in the Russian Science Citation Index is even more than those appeared in Web of Science. Unfortunately, the major part of these publications is thesis statements from low-quality conferences. As early as in 2019, the data demonstrate a decreasing interest in this topic in the country. Objectively speaking, only since 2016-2017 speeches dedicated to blockchain started appearing at serious scientific conferences, particularly at those related to the IT-sphere issues. Nowadays, the majority of scientific papers published in top-level scientific editions indexed in foreign databases are made by American and Chinese authors. In comparison with authors from the above-mentioned countries, Russian scientists collectively published 13 times fewer articles.

## **PROSPECTS FOR USING BLOCKCHAIN IN THE SYSTEM OF ECONOMIC AND LABOUR RELATIONS**

According to the survey carried out by Gartner Inc. in 2019, 11% of IT directors from global companies note that they have already unfolded or are planning to unfold blockchain in their organizations within the next year. More than 3,100 IT directors from 89 countries representing the main industrial sectors took part in the survey [5].

Experts estimate that by 2021 about 25% of the largest companies will use blockchain in their practice. A forecast amount of transactions conducted with the help of this technology will amount to \$38 billion. As early as by 2030, in case of absence of real threat for the all-round blockchain implementation or appearance of substitute technologies, 20% of global economic infrastructure will use the blockchain-based systems. A potential profit that can be gained by the companies due to such implementation will amount to more than \$3 trillion per year. [6].

Gartner predicts that the key advantages of using blockchain will include in the following aspects:

- Easier communication between the companies due to the automation of transactions based on this technology (28% of the total volume of transactions conducted via blockchain).
- Performance of financial mutual settlements between subjects of economic relations (22%).
- Automation of disputes and courts, both in terms of pre-trial decisions and specific issues of resolving disputes in courts (10%).
- Automated maintenance of title and document registers (18%).

- Blockchain implementation within the company meant to automate relations between subdivisions, as well as between the company and its employees (22%).

As can be seen from the forecasts, the scope of application is not limited to financial relations. It accounts for no more than 22% of the total number of forecast transactions.

Why is this technology so important? Why do the largest companies all around the world try to develop solutions based on this technology and implement such solutions in their practice? It is actually simple. Acceleration of business development and the increasing number of transactions with contracting parties cannot but force the companies to find solutions for their automation. Thus, 36% of the largest companies from the Fortune 500 list double the number of partners and contracting parties every two years. This means that an issue of securing the relations with such partners is becoming more urgent. The same relates to the guarantees and accurateness of any transaction, even the most insignificant one. As a result, certain tools are needed to operate in the context of a constantly accelerated level of coherence and complexity of interactions between the companies. It is not enough to keep pace today. People must know how to keep up tomorrow.

The second important reason is the need for an effective way of collecting, storing and using the information. 80% of modern companies store their data in isolation so this makes it exposed to different risks of loss or distortion.

All this leads to the situation when the business has to spend its own resources to maintain effective interactions between each other or, as per the terminology of modern economists, the transaction costs of the relations increase.

At the present stage of this technology development, it is far from being easily implemented to any sphere to solve business tasks. The projects based on the technology and offered today contain too many simplifications, the major part of the business transactions is still fixed offline (100% digitalization is impossible as the world and people are not digital anyway), and blockchain solutions require a complete digitalization of transactions to fix them in the chain of distributed registers. Most of the niche solutions proposed by the market are one-time projects without any plans for their scaling up to the large business level, these are not custom-made for solving specific tasks, that makes them far from being in conformity with the established standards. Consequently, it is still difficult to foresee the all-round implementation of blockchain technology, especially in the sphere of labour relations.

Although, experts predict the majority of disputes and costs arising from such to be decreased due to the automated documentation collecting and up-to-date maintaining with subsequent automation of decision making in case of factual patterns.

Upon finalization of the review of possibilities to use the blockchain in the system of economic relations, there are some conclusions that can be made. These conclusions are controversial.

- Blockchain is actually a new technology in the market which potential capacity has not yet been studied in full, there are gaps in the subject areas related to blockchain.
- Blockchain is not that effective within the only company, it needs the presence of an ecosystem, separate platform solutions based on this technology. Changes in

the financial ecosystem due to the decrease or even disappearance of the regulator's role are expected from blockchain in the first instance.

- Business community is a foundation for successful studies of the blockchain technology. This technology has forced companies to cooperate at the stage of research and development.
- Blockchain is not only technological innovation but a combination of both innovations in technologies and new approaches in economic models.
- The biggest difficulties are related to the issues of scaling and security, because of the requirements of data protection laws [8].
- The industry is hardly prepared for using distributed registers as there are no proper regulatory measures.
- Blockchain can be implemented in the spheres not related to finances.
- This area is considered to be extremely poorly developed in terms of science that has been proved by the previously conducted literature review.

Thus, blockchain is a technology able to introduce real changes to the industry. For this to happen, however, a significant increase in the number of projects based on this technology, and involvement of business in stating problems for developers and giving them access to the information are required.

In the current circumstances, multilateral platforms seem to be the most effective tools in decreasing transaction costs. They can be used to eliminate constraints preventing the all-round implementation of blockchain in economic relations due to a great number of users, scalability of solutions and effective distribution of responsibility. Further, we will consider the currently existing solutions, those that will be relevant in the industry in the nearest future and their prospects.

## **MAIN BLOCKCHAIN PLATFORMS USED IN PRACTICE**

A multilateral platform should be understood to refer to the company that makes a profit by, first of all, ensuring direct interaction of two or more different types of affiliated groups of parties [7].

Nowadays there is a great number of such platforms in the sphere of blockchain technologies and these embody the following features:

- Growth in the number of platforms has significantly decelerated over the past year (this can be explained by the general decline in the interest in the technology), they all remain incompatible.
- Since 2017 ITU and ISO committees undertake work on recommendations. It was in 2017 when they initiated the process of standardization of this activity, first of all, regarding terminology (for example, ISO/CD 22739 Blockchain and distributed ledger technologies – Terminology standard).
- "The big three" of the most popular platforms have changed — Bitcoin (and its derivations), Ripple, HyperLedger Fabric, which attests to possibilities of future changes in the balance of power between platforms and technologies used on these platforms.
- "The big three" of active technological consultants (IBM, Microsoft, Accenture) remains unchangeable because key solutions in the sphere of blockchain are expected from these companies.

- There are some industrial solutions but these did not prove to be practical enough. A lot of news and press releases cover the cases when the technology was used in a certain way but no solution of an industrial level has appeared yet. Bitcoin still remains to be an opinion leader but this can be considered more as a negative factor preventing technology development.

The development of this sphere is compounded by the fact that no unambiguous understanding of what constitutes a blockchain platform still exists. What is more, taking a look at the platforms that the practice categorizes as blockchain ones, it can be seen that absolutely different solutions for various areas are included in this category.

A review of various platforms allows concluding that there is a great number of different solutions based on the blockchain technology, for example, some self-sufficient platforms:

- Those meant for event and transaction registration (Bitcoin, Ethereum, IOTA and others).
- Those meant for resources management (Storj, Filecoin, iExec, golem, and others).
- Platforms meant for better performance of other platforms:
- Transaction scaling (Lightning, Raiden, Plasma).
- Integrated solutions (Cosmos, PolkaDot, Gospel, services).

Cloud services for other platforms spacing (BaaS):

- Node spacing (Amazon, Microsoft Azure, IBM Cloud, and others).
- Customized solutions (IBM Blockchain, MultiChain on SAP).

Other platforms:

- Close-to-blockchain platforms: Amazon Quantum, Ripple, Corda.
- Specific projects: IBM Food Trust, Kodak One.

The major part of the solutions appears in the cryptocurrency field that is explained by the excitement for the topic after the dramatic rise of Bitcoin price.

Having analyzed the possibilities of using different blockchain platforms, we came to the following conclusion. No systemic solutions can be discussed at the current level of technology development, that is why there is already a need for determination of features, required properties, and characteristics of the platform solutions in each sphere.

Proceeding from the considered aspects the experts recommend the following:

- Preparation of framework standards (stipulating the game rules: terminology, synthesis principles, security) — 1.5-2.5 years.
- Preparation of comprehensive scientific basis for all aspects of utilized technologies in different fields (education, labour, finances, document control, and others) — 1-5 years.
- Getting of informative theoretical and practical results in the sphere — "eternally ...".

In conclusion, we can quote an expert opinion on the possibilities of using blockchain in social relations presented by Deloitte consulting company: "It is time to stop searching for more ways of how to expand the scope of blockchain and concentrate developing the blockchain technology" [6].

## CONCLUSION

Analysis of the possibilities of using current blockchain platforms has shown that at the present stage of the technology development it allows neither ensuring necessary volume, rate, and protection of transactions nor their introduction into the practice of any sphere. Currently, only separate spheres are open for such implementation, on a custom-made basis and given the support from the business that is very interested in new forms of commercial activity [9].

Unfortunately, the technology itself is quite "raw", the market is engaged in searching for opportunities to introduce it in the business processes. There is a lack of experts competent in blockchain who would be able to set the relations standards. The business itself does not fully understand how to use this technology. Developers have no opportunity to create niche products for specific clients taking into account their possibilities. Considering the dynamics of blockchain platforms development and the emergence of new ones, it is possible to forecast those platform solutions allowing the implementation of universal blockchain solutions in different spheres will not appear until 2020.

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