BLOCKCHAIN OR NEW PARADIGMS OF INTERACTION IN THE DIGITAL WORLD

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Abstract. The rapid growth in the number of blockchain-based startups proves that this technology is in demand in the modern world; completely different sectors of the economy are influenced by blockchain technologies or are ready to accept it today. Through the blockchain, databases can be created in the form of a registry to form a digital image of an asset (real estate, intellectual property, security, etc.) and a digital trace upon the fact of completion of transactions. First of all, there are opportunities in terms of storage, transfer and change of ownership rights on digital assets. It is already becoming obvious that the introduction of blockchain-based technologies in state administration will significantly reduce both financial and time costs for the implementation of state functions or the provision of services to citizens and businesses. At the same time, it is possible to minimize risks (fraud, cyber-attacks), significantly increase asset control and ensure confidentiality. The paper shows that most financial companies are ready and willing to use blockchain technology. At the moment, Russia is a few steps behind all of its direct competitors on the world stage. The transition to digital platform technology needed to be initiated several years ago, but so far it is only in the discussion stage.

Keywords: blockchain, cryptocurrency, technology, startup, digital asset.

INTRODUCTION. The problem of the human wellbeing is one of the key in Russia today. And today we have a technology that is likely to have the greatest impact on the next few decades: and this is not a social network, this is not robotics and artificial intelligence - this is the technology underlying digital currencies such as Bitcoin, this is a chain of transaction blocks, or blockchain. In 2008, the global financial industry has collapsed and, at about in the same time, unknown to anyone Satoshi Nakamoto created a document: a protocol for a digital currency called Bitcoin and based on blockchain. This cryptocurrency provided reliability and made it possible to operate with transactions without intermediaries; this inconspicuous event was a spark that lights the worldwide technology which has made some people delighted, some have perished in terror, while others are just interested, but do not be confused: Bitcoin is an asset, it is volatile, and we are interested in its basic technology called blockchain.

At the conference IBM Think 2018 which was held in Las Vegas, Nevada, Chief Blockchain Manager at IBM Marie Vick told how the widespread distribution of this technology will give a result for the global economy in amount of 3.1 trillion dollars. She recalled the Gartner study, in which experts estimated that by 2025 the value of the blockchain economy would be slightly more than $ 176 billion, but by 2030 it would rise to 3.1 trillion.

Discussion of Russia's place in the global digital economy unexpectedly became one of the most debated and rush sessions in the Russian House at the forum in Davos, Switzerland. A participant of the event, the Head of Vnesheconombank (VEB), Sergey Gorkov, in his exclusive interview with RT compared the development of the blockchain in Russia with pole vaulting and advised not to pay attention to the price of Bitcoin and other cryptocurrencies. The head of the state corporation is confident that in 2018–2019 the country will become the leader in this technology, and innovations like artificial intelligence will provoke a new quantum revolution in Russia.

Originally known as technology thanks to which Bitcoin became possible, the blockchain is now considered as the basis for a complete change of the usual understanding in many areas of society: medicine, communication, transport, financial services, etc.

With the advent of this technology, people everywhere can trust each other and cooperate on equal terms for the first time in the history of mankind. Trust is not based on the authority of an intermediary organization, not on the authority of a person or a company, but on the cooperation between cryptography and smart code!

Today we completely rely on large intermediaries: banks, government organizations (state registry, registration chamber, etc.), and various intermediary sites [1]. They are engaged in building and servicing the entire market system: from identifying the authenticity and personal identification to creating documents and office work; in general, they cope, but there are certain difficulties:

- First, centralization: intermediary system can be hacked and it is increasingly happening in our time (for example, due to hacker attacks).
- Second, today e-mail reaches the other end of the earth in a split second, while a money transfer goes few days through the banking system within one city.
- Third, intermediaries charge for their services from 10 to 20%, for example, for transferring money to another country.

In exactly the same way as Bitcoin transactions can be stored in an unchanged form in a blockchain, this technology allows it to be used to store any other information, creating an immutable distribution register that is much more secure than in traditional databases.

Any values from money to music could be stored, moved, exchanged and managed without powerful intermediaries. Thus, we can talk about how blockchain technology can increase our well-being or improve our quality of life.

METHODS. So how does it work? All digital assets, from money to music, are not collected in one place, they are distributed over the global space and when some operation is performed using the blockchain technology (for example, buying or selling, etc.) the record appears simultaneously in millions of computers in the world, i.e.

blockchain is a protocol, an accounting ledger where all transactions are recorded, they are combined into blocks (a simplified diagram is shown in Figure 1)

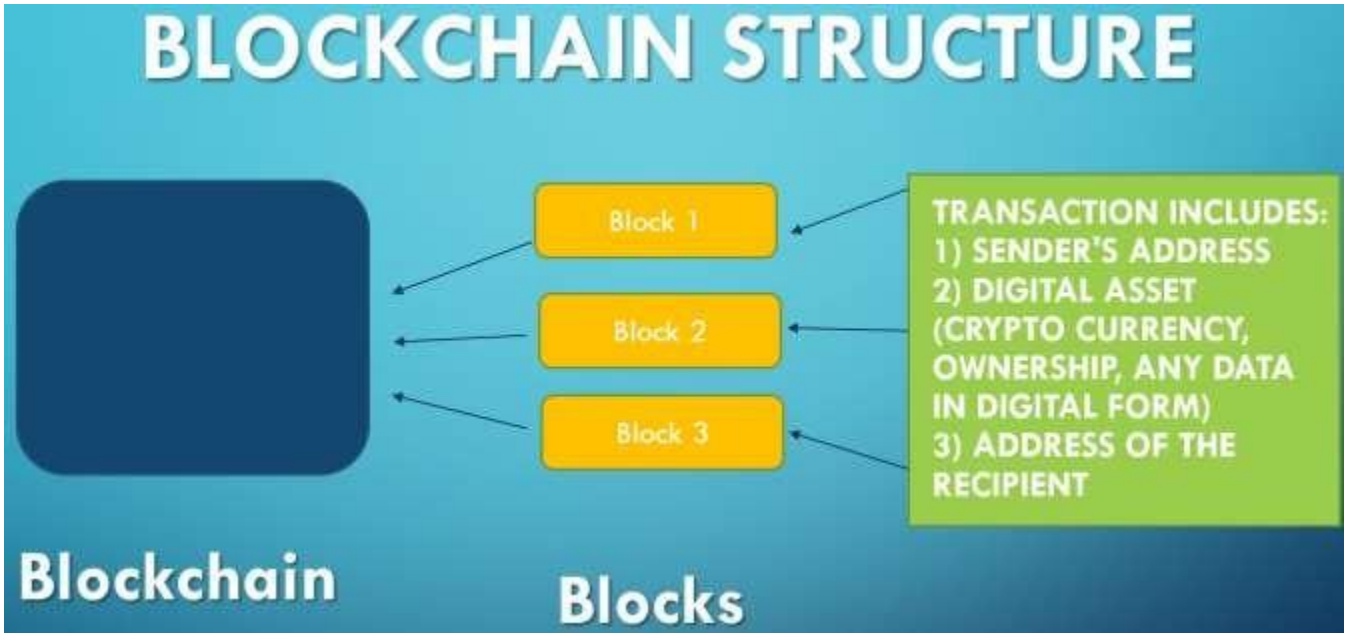

Fig. 1. Blockchain structure

A block consists of the previous block and all the included transactions, and so on; the blocks are time-referenced and it can be said that they are stapled with a digital seal. If someone wants to commit fraud, for example, to crack a block and replace information here, they will have to crack the block and all previous blocks, the entire history of commerce in this blokchain and not on a single computer, and on millions of computers in the same time, using high-level encryption. The essence of the technology lies in the fact that the blockchain is a huge distributed and shared public database [2]. So, nobody can replace the data, because everything is recorded and confirmed on millions of computers - this is blockchain, and so it works.

An important aspect of blockchain is that they also include algorithms that provide a secure digital cooperation mechanism, without relying on a central trust authority, and blockchain also has the ability to execute stand-alone scripts [3]. This is the concept of smart contracts, a data-driven code that can represent the application's checked logic and helps automate the system's rule set [4]. According to the research report, the global market for blockchain technology was estimated at 315.9 million US dollars in 2015 and is expected to reach $ 20 billion US dollars by the end of 2024. It is expected for the projected years 2016 - 2024 that the global market will grow by 58.7% of CAGR [5].

RESULTS AND DISCUSSION. The European venture capital company “Outlier Ventures” that develops blockchain start-ups monitors the blockchain start-ups throughout the world. The company recently calculated the number of blockchain startups and made an analysis of their country and industry representation. According to the data obtained, the United States dominates in the blockchain technology market: 38.9% of all blockchain startups are located in the US. The United Kingdom is in the second place – there is 16.7% of the total number of blockchain startups. The third place is occupied by Canada - 3.3%, then comes China - 3.2%, Singapore - 2.6%, Germany and Israel (slightly more than 2%) [6].

Today, start-ups based on the blockchain technology are relevant; having analyzed a large number of them, we suggest you look at Table 1 where startups are presented for the most diverse industries.

Table 1

Blockchain-based startups (supplemented by authors based on open sources)

Name	Description
1. Micelii	Now music protects its intellectual property itself: do you want to listen to a song? This is either free or cost about micro cents directed to the electronic account of its author and the artist playing it. Do you want use a song in a movie? The word changes and all rights are expressly reserved. A song becomes a business, it sells itself, it can protect its copyright - and all the money goes back to the artist, and the artist himself controls the entire industry instead of powerful intermediaries.

2. Abra	At the moment, this application works in the US and the Philippines. For example, when transferring money from the USA to the Philippines via the application from a mobile phone, money directly comes to the recipient's phone, where the interface shows employees, the recipient clicks on an employee with a high rating 10 minutes away, he comes in and gives the transferred amount in Philippine pesos; the process takes a few minutes and costs 2%.
3. Slock.it	Slock.it is a project at the intersection of the IoT and blockchain. With Slock.it, Airbnb apartments become fully automated, smart objects can be rented on demand and unused vehicles get a new lease on life. This company develops the future infrastructure of the sharing economy. It brings the benefits of the Blockchain: transparency, security, speed to real-world objects.
4. Factom	Factom stores the world's data on a decentralized system, using blockchain technology for a solution in the Mortgage Industry, IoT device integrity, digital assets and database integrity.
5. Ethereum	Ethereum is a platform and a programming language that makes it possible for any developer to build and publish next-generation decentralized applications. Ethereum can be used to codify, decentralize, secure and trade: voting, domain names, financial exchanges, crowdfunding, company governance, contracts, intellectual property, etc.
6. Ripple	Ripple is a distributed financial technology that allows banks to send real-time international payments across networks, benefiting from both the speed and security of blockchain technology. Banks around the world are partnering with Ripple to improve their cross-border payment offerings, and to join the growing, global network of financial institutions and market makers laying the foundation for the Internet of Value.
7. Chain	Chain is an infrastructure technology company that enables its partners to issue and transfer financial assets on allowed blockchain networks. It developed and maintains the Chain Open Standard, an open source blockchain protocol for high-scale financial applications. Chain is building a suite of blockchain-based tools for banks, stock exchanges, credit-card companies and other major industry participants that will enable them to move, store, trade and manage financial assets quickly, securely and with less risk to the system.
8. Smartledger	SmartLedger.io is a blockchain business designed as a Smart Ledger Technology stack that builds out verified Smart Contract Libraries for: Asset Management, Capital Markets, Insurance, Reinsurance & Trading and other markets.
9. Cryptonomex	Cryptonomex provides software development services to meet the growing demand for custom, high-performance, blockchains and related technology.
10. Alphapoint	AlphaPoint is a financial technology company that provides institutions blockchain-enabled solutions to issue, track, and trade digital assets. It is secure, scalable, and customizable platform enables customers to deploy blockchain technology to innovate, differentiate, and transform their businesses.
11. Proof of purpose	Proof of Purpose builds technology solutions using blockchain technology. This company develops end-to-end solutions for charities, NGOs, and donors to drive financial inclusion, economic empowerment, and enable transparency and efficiency across the aid sector. Product offering includes digital wallet, currency and management platform for electronic cash transfer programs for humanitarian aid and a blockchain-based microcredit app.

As can be seen from the table, many sectors of the economy are influenced by blockchain technologies. Companies like Walmart, Nestlé and Unilever have announced a partnership with IBM. These companies see the blockchain as an opportunity to maintain secure digital recordings and improve on the caching of food products that are part of the life cycle of their brands. It is reported that even Maersk, a well-known company for shipping and logistics, checked the management of their freight operations using blokchain. The system was also built in partnership with IBM [8]. Statistics of the Diagram 1 helps to present the use of blockchain technology among financial institutions around the

world in 2017. The results of the survey showed that 23% of the surveyed financial companies planned to use block for the cleaning and settlement of securities [9].

Diagram 1. Willingness of financial companies to use blockchain in the financial sector

Currently, the international money transfer system is far from ideal. Therefore, many users who have to pay a commission to banks do not like the system. In addition, the system also does not suit modern banks. For this reason, financial institutions are forced to apply a more expensive and less reliable SWIFT system (for interbank transfers). Therefore, most financial institutions (60% according to the Diagram) would like to use blockchain technology when making international money transfers.

Blockchain projects represent a large-scale effort by the banking industry aimed at full-fledged coverage and integration of blockchain technology into its current infrastructure. Industrial consumers and ordinary participants in this sphere should be delighted with how the financial industry will develop in the future. Despite the fact that many government and financial institutions are wary of technology, sooner or later they will have to recognize the advantages of the blockchain, because most companies in the market tend to solve the problems of high commissions, delays and bureaucracy in bank transfers [10]. Currently, the blockchain technology is considered to be the most significant invention after the Internet. If the latter connects people to the implementation of online business processes, the former can solve the problem of trust using a peer-to-peer network and public key cryptography [11]. However, it should be noted that the problems that appeared along with blockchain technologies still remain relevant:

- "Blockchain systems, as they develop, require more and more computing power and huge amounts of electricity.

- The absence of a legislative base also entails a lot of doubts of market participants, since to gain confidence for new technologies they must meet standards, at least, the state ones. No standards - no responsibility. It is necessary to do a lot of work from the legal side: it is necessary to introduce special provisions aimed at facilitating user confidence in BL blockchain records and their fair use of copyrighted works based on them [12, 13].

-Blockchain technology threatens to leave a huge number of people out of work. In exchange, it provides an opportunity to work without intermediaries. When considering this issue, it should be noted that technical progress has

always been aimed at maximum efficiency of labor and no danger can stop the introduction of the blockchain in most areas of human activity.

At the beginning of January 2018, in Russia there were registered 50 legal entities, the names of which include the word "blockchain". They provide a wide range of services - from additional education of children to software development. The range of estimates on the volume of the Russian blockchain technology market varies from zero to 1 billion rubles, as well as the idea of actually operating companies in this segment — from 50 to 300. At the moment, there is a lot of talk in Russia about the use of blockchain technologies, but there are fewer particular actions.

Conclusions. Blockchain eliminates the risks associated with centralization. Blockchain is a database without an owner, because it is simultaneously stored for all users. In the blockchain there is no authoritarianism and centralization. Blockchain is an experimental technology and where to apply it, is an open, creative, engineering issue. In some projects, the blockchain will take root. In others they will try to apply it, but it will not work. Blockchain is not a panacea. Probably, there is still no such project in which the blockchain and only it is obligatory to be used. And we cannot predict to what this all will result in the future. Blockchain and related technological changes will undermine the economic structure. A new industrial revolution is already bursting into the world of predictable business models based on centralization and financial capitalism. The blockchain will qualitatively change the economy. Entrepreneurs and inventors, as always, will act by trial and error. Some will go bankrupt, while others will get rich. And all this will happen even before it becomes clear what is the blockchain technology essentially and for which sector of the economy it is best suited.

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