

Blockchain solutions for corporate governance:

Russian experience

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Abstract: Blockchain technology allows to consider corporate governance problems in a new way. The known advantages of blockchain technology, such as decentralization, transparency and constancy of transactions, can significantly improve the reliability and efficiency of traditional corporate procedures in the field of register keeping, voting at General meetings, corporate control and audit. The authors come to the conclusion that the registrars system in Russia contradicts the idea of blockchain. Nevertheless, blockchain platforms can be successfully applied to arrange the voting of shareholders, but the greatest advantages they have in the sphere of introducing a public blockchain, not a private one. Private blockchain is more appropriate for arranging of corporate control and audit.

Keywords: blockchain, public and private blockchain, corporate governance, shareholders register, general meeting of shareholders, electronic voting.

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1. Introduction

The importance of corporate governance was clearly demonstrated during the global financial crisis of 2008. The inefficiency of large corporations was listed as its one of the main reasons. According to OECD report «Corporate Governance and the Financial Crisis. Key Findings And Main Messages»¹ there are four most vulnerable fields of corporate governance such as remuneration system, risk management, management's activities and realization of shareholders' rights. Even though global financial crisis occurred 10 years ago, none of these

¹ OECD. 2009. Corporate Governance And The Financial Crisis. Key Findings And Main Messages. OECD, June 2009. <https://www.oecd.org/corporate/ca/corporategovernanceprinciples/43056196.pdf> (date of reference 30.01.2019)

problems in corporate governance were solved. This is proved not only by the researches of economist but also by lawyers.

In the United States in the literature on corporate governance special attention is paid to the increase of agency costs in corporations. The definition of agency costs derives from the agency theory of the corporation, which states that company's managers act as agents of the principal shareholders and their relationship is based on the agency agreement.

According to this theory, A. Berle and D. Minz (Berle & Means, 1932) pointed out to the conflicting aims among managers and shareholders, also reasoned the need to develop management mechanisms that could mitigate selfish or too risky behavior of the agent². Proving the Agency theory, M. Jensen and W. Meckling predicted the increase of agency costs, showing that during transfer of authority to manage the Corporation to managers fewer decisions aimed at maximizing the value of the corporation are made, as hired managers are not guided in their actions solely by the interests of shareholders³.

Current research confirms this conclusion: «Agency costs are, indeed, higher among firms that are not 100 percent owned by their managers, and these costs increase as the equity share of the owner-manager declines. Hence, agency costs increase with a reduction in managerial ownership»⁴. Traditionally, it is considered, that the possibility of reducing agency costs is in enhancing of control over the activities of management. However, there are no any positive effect from changing corporate governance both from inside through the implementation of corporate governance principles and standards, and through outside institutions, such as stricter auditing and the introduction of behavioral supervising on financial markets. Blockchain enthusiasts offer a radical solution to the agency problem in the application in corporate governance of distributed register technology, in particular, blockchain⁵.

The agency problem is only a part of the general problem of members' separation from the corporation, which is noticed not only in the USA, but also in other countries. As S. van der Elst, A. Lafarre points out rightly «Current shareholder engagement systems face large classical inefficiencies. First of all, due to the large chains of intermediaries in the current securities models, transaction costs are high and shareholder votes and other information are not always

²See.: Eisenhardt, Kathleen M. Agency theory: An assessment and review // Academy of management review, 1989, № 14.1 C. 57-74.

³ See for details: Jensen M.C., Meckling W.H. Theory of the firm: Managerial behavior, agency costs and ownership structure // Journal of financial economics. 1976. №3(4). P.305-360; Jensen M.C. Agency costs of free cash flow, corporate finance, and takeovers // The American economic review. 1986. №76(2). P.323-329.

⁴ Ang J.S., Cole R.A., Lin J.W. Agency costs and ownership structure // The Journal of Finance. 2000. №55(1). P.3.

⁵ Lafarre A. and Van der Elst C. Blockchain Technology for Corporate Governance and Shareholder Activism. 2018. https://ecgi.global/sites/default/files/working_papers/documents/finallafarrevanderelst.pdf (дата обращения 30.01.2019)

correctly transmitted between shareholders and issuers»⁶. The solution to this problem which is global for corporate governance also lies in the use of blockchain.

Generally the blockchain is a decentralized database which is protected by cryptographic algorithms. The operation of this database is supported by computers that have the appropriate software installed, they are also called nodes. Information is entered into the database by making transactions. A new transaction record is a block that is added to the chain of blocks after the transaction is confirmed by the majority of blockchain participants. Unauthorized amendment of any blockchain is so complicated technically that it is considered almost impossible. Technical characteristics of the blockchain provide transparency and immutability of transactions, as well as their traceability, which stipulates trust to the data stored in the blockchain.

These advantages of blockchain technology can be used in corporate governance to improve its efficiency.

Decentralization allows to exclude such an intermediary as a hired Manager from a number of processes in corporate governance (such as keeping a corporate register, holding a General meeting, etc.), and, consequently, members get more opportunities to participate in the management of the Corporation. The full potential of decentralization is revealed in decentralized autonomous organizations (DAO), which management is fully automated.

Transparency and immutability of transactions in the blockchain provides an opportunity to improve the accounting of shares, enhance control over the transfer of shares, eliminates abuses by the company's management

Currently, the greatest prospects for the introduction of blockchain technology exist in three areas of corporate governance: keeping the register of shareholders; holding annual general meeting (AGM) of shareholders; corporate control and audit.

2. Private and public blockchains: pros and cons

The sole distinction between public and private blockchain is related to who is allowed to participate in the network, execute the consensus protocol and maintain the shared ledger. In this regard, we believe it is not quite correct of Russian lawyers to use the ability to control the record of transactions in the register, and, accordingly, selecting of controlled and uncontrolled registers as a criterion of differentiation⁷.

⁶ Van der Elst C., Lafarre A. Blockchain Technology for Modernizing the Shareholder Dialogue. Working paper. June 2018. URL: https://www.tilburguniversity.edu/upload/1413437f-2ccb-4fe9-bc01-60aa0c7ec657_BlockchaintechnologyformodernizingshareholderdialogueWP.pdf (дата обращения 30.01.2019)

⁷ See.: Novoselova L., Medvedeva T. Blockchain for voting shareholders. // Economy and law. 2017. No. 10 (Новоселова Л., Медведева Т. Блокчейн для голосования акционеров. // Хозяйство и право. 2017. № 10.)

The public blockchain network is fully accessible and anyone can join it by installing the appropriate software. Bitcoin is the best example of public blockchain. As a rule, researchers describe public blockchain as providing maximum trust of users due to being accessible and transparency of transactions. Any user can see the entire history of transactions and their content carry out its transactions through smart contracts.

Private blockchain involves a limited number of identified users, i.e. access is allowed only to a certain number of persons, so it is also called permissioned. Accordingly, the use of private blockchain ensures the confidentiality of data stored in the registry. Private blockchain has a number of other advantages. Thus, transactions' speed in private registers is significantly higher than in public ones. The use of a private registry complies with the KYC ("know your customer") requirement, which is especially important for the financial sector. These advantages of the private blockchain caused its popularity in the corporate sphere.

However, many researchers question the attribution of private decentralized registries to the blockchain. This is not because of technical characteristics, but rather of ideological reasons. Both blockchain enthusiasts and blockchain pessimists agree on this.

A well-known economist, blockchain pessimist, Nouriel Roubini argues that «in cases where distributed-ledger technologies – so-called enterprise DLT – are actually being used, they have nothing to do with blockchain. They are private, centralized, and recorded on just a few controlled ledgers. They require permission for access, which is granted to qualified individuals. And, perhaps most important, they are based on trusted authorities that have established their credibility over time. All of which is to say, these are “blockchains” in name only»⁸.

Ethereum Creator Vitalik Buterin Also adheres to a critical attitude to private blockchains: "It may seem that closed blockchains are the best choice for financial institutions. However, even in an institutional context, open blockchains have great value, which to some extent correspond with the philosophical values that protect what is promoted by public blockchain – freedom, neutrality and openness»⁹.

Indeed, private decentralized registries do not comply with the fundamental principles of blockchain technology, which arise high social expectations o from its implementation in all spheres of public life. The main disadvantage of a private blockchain is that it can be controlled by one or more centers. This means that transactions can be "turn back", which infringes the principle of their immutability in the blockchain. In addition, the disadvantages include its lower security, since it consists of a smaller set of nodes than the public blockchain.

⁸ Roubini N. The Big Blockchain Lie. // Project Syndicate. 2018. URL: <https://www.project-syndicate.org/commentary/blockchain-big-lie-by-nouriel-roubini-2018-10?barrier=accesspaylog>

⁹ URL: <https://bits.media/stsenarii-ispolzovaniya-zakrytykh-blokcheynov-mneniya-ekspertov/>

But all these disadvantages are prevailed by such advantage as confidentiality of the private blockchain, since, according to the remark of N. Rubini, "under the sun, there are no institutions – banks, corporations, non-governmental organizations, or government agencies – that place their ledgers, transaction registers, deals, and interactions with customers and suppliers in public decentralized peer-to-peer registers, free of permits and censorship. There is no compelling reason for such closed and highly valuable information to be made available to the General public»¹⁰.

Most businessmen believe that the permissioned blockchain is necessary, as certain information should remain confidential and shareholders should be able to see how their own vote is taken into account as a result of voting, but not the entire voting process and the identity of other shareholders. However, it should be taken into account that institutional investors should publicly disclose the implementation of their participation policies, including how they used their voting rights under the new Shareholders rights Directive. For these shareholders, it may be useful that other shareholders can see their voting in the blockchain¹¹.

It seems that it is important for shareholders, especially minority ones, to have as complete information as possible about the Corporation, decision-making mechanisms, positions of majority shareholders and top management, etc. The more transparent the Corporation itself will be the higher the trust in the Corporation among shareholders will become. Full transparency of the Corporation not only for shareholders, but also for potential investors and stakeholders can be provided only by public blockchain.

With the public blockchain, each shareholder will get maximum control over their shares, since neither the management of the company nor the failure of the register will not affect the management of shares. All transactions with shares are public and traceable, so the possibility of raiding is excluded. The access to actual information about the structure of the Corporation is given not only to shareholders and regulators, but also to investors and stakeholders. It is with this approach that the potential of the blockchain can be realized and the costs of its implementation can be justified.

3. Keeping the register of shareholders on the blockchain

¹⁰ *Roubini N.* Op. cit.

¹¹ *Van der Elst C., Lafarre A.* Blockchain Technology for Modernizing the Shareholder Dialogue. Working paper. June 2018. URL: https://www.tilburguniversity.edu/upload/1413437f-2ccb-4fe9-bc01-60aa0c7ec657_BlockchaintechnologyformodernizingshareholderdialogueWP.pdf

Keeping the register of shareholders on the blockchain platform is only the first step towards the introduction of blockchain technology in the corporate governance of the company. The legislation of most countries contains the requirement of keeping the register of shareholders. This is necessary for regulators to understand the capital structure of the company, to ensure the legal purity of transactions with shares, etc. Keeping the register of shareholders is usually charged to third parties – registrars.

Using blockchain platform allows to exclude the registrar as an intermediary, and thus to reduce the company's expenses on keeping the register, as well as to increase trust between the issuer and the shareholder.

The difficulty of shares accounting by shareholders is that information on the transfer of shares is being updated for rather long period, when legal uncertainty may arise. This situation was the basis for the trial in Delaware, when the owners of 49 million shares said that they are owed a part of the revenue from the calculations, although there were only 37 million shares in circulation. The discrepancy was due to the fact that it takes three days for DTC Depository to account the transactions, so both buyers and sellers claimed to own shares¹². Transactions in the blockchain are much faster, which allows shareholders to exercise real-time control over their shares.

The ability to track transactions in the blockchain undoubtedly contributes to equal conditions for shareholders to exercise their rights, as it makes it difficult to manipulate shares. As D. Yermak notes, "activists, raiders or managers may wish to hide their transactions for the same reasons that small shareholders or fund managers might keep them"¹³.

The obvious advantages of blockchain technologies for keeping the register of shareholders induced the legislators of the state of Delaware to amend the corporate legislation of the state and allow using distributed ledger technology, in particular blockchain, for keeping the register of shareholders and entering into it any records on the movement of securities, including the issue and transfer of shares¹⁴. For Delaware such amendments were necessary to maintain the status of a state with an optimal legal environment for incorporating business, since more than half of all U.S. corporations whose shares are freely sold and bought on the market are registered here, half of them are included in the list of the largest corporations Fortune 500.

According to the provisions of §224 of article 8 of the Delaware Code¹⁵ corporate records can be kept on any storage device using one or more distributed electronic networks or

¹² URL: <https://www.ft.com/content/f5cf21f6-935a-11e7-a9e6-11d2f0ebb7f0>

¹³ *Yermak D.* Corporate Governance and Blockchains // Review of Finance. 2017. V. 21. P. 28.

¹⁴ *Strassman R.* Delaware Explicitly Legalizes Corporate Documentation via Blockchain. URL: <https://www.bu.edu/rbfl/files/2018/03/166-176.pdf>

¹⁵ See.: <http://delcode.delaware.gov/title8/c001/sc07/>

databases. As obligatory requirements to the form of the records it is stated that there must be the possibility of their conversion into easily readable paper form upon request of any person entitled to inspect such records. This possibility determines the evidentiary value of corporate records. It should also be noted that corporate records may be kept either by or on behalf of the Corporation.

In Russia blockchain technology for keeping the register of shareholders can be used not by corporations themselves, but only by registrars. According to provision 2 of Art. 149 of the civil code of the Russian Federation it is only the Registrar - the person having the corresponding license who can keep records of the rights to uncertificated securities. This strict rule was introduced by the Federal law of 02.07.2013 № 142-FZ "On amendments to subsection 3 of section I of part one of the Civil code of the Russian Federation" in connection with numerous cases on disregarding by joint stock companies the requirements to keep registers.

The largest Russian registrars are interested in blockchain technologies. So, at the end of 2016 VTB group announced the start of a project to create shareholder registers on the blockchain platform. To date, however, no such platform has been introduced. It should be emphasized that skeptics initially doubted the implementation of this project, referring to the fact that the current system of registrars is quite reliable and does not cause complaints from market participants. The Bank of Russia also did not support this initiative, saying that "there is no need for additional control over the maintenance of registers, as it is strictly and carefully regulated, and the supervision of registrars is carried out by the Central office of the Bank of Russia. In addition, official statistics show that there are rare complaints about the improper keeping of registers»¹⁶.

It seems that the question of introducing blockchain technologies by registrars requires comprehensive discussion. On the one hand, the system of registrars in Russia contradicts the idea of blockchain. The main advantage of this technology is that it excludes the intermediary and reduces costs for business. Corporations that keep records on the blockchain do not need the services of a Registrar. When the Registrar is required by the law, corporations wishing to keep a register on the blockchain will be forced to pay twice, because registrars will shift the cost of implementing the blockchain to their customers, who will also have to pay for the services of the registrars themselves as intermediaries.

On the other hand, when creating a single blockchain platform by a large Registrar, the costs of customers can be minimized because of big number of participants. However, by now the blockchain technology has not been fully studied, all possible risks have not been identified,

¹⁶ URL: <https://forklog.com/vtb-razrabotaet-blokchejn-reshenie-dlya-ucheta-reestrov-aktsionerov/>

so in case of failure of a big project, the amount of losses will also be significant. Under these conditions, market participants are not motivated to implement blockchain technologies in corporate governance.

However, the very lack of legal capacity of corporations to independently keep a register of shareholders on the blockchain platform does not contribute to the creation of a friendly environment for business in Russia and for the introduction of blockchain technologies.

It should be understood that the transfer of the register of shareholders to the blockchain is not an aim. A much greater positive effect for business development can be expected from the introduction of blockchain technologies in corporate governance, allowing shareholders to participate more actively in the management of the Corporation.

4. The annual general meeting on the blockchain

There are new opportunities for shareholders while organizing the annual general meeting (AGM) on the blockchain platform. The traditional form of AGM shareholders meeting requires personal commitment of shareholders. With the development of new ways of communication electronic voting become popular. Shareholders were able to take part in the management remotely. Voting of shareholders on the blockchain platform ensures observance of shareholders' rights, as transparency and traceability of transactions in the blockchain allows each shareholder to verify whether his vote was correctly taken into account. Decentralization and cryptographic protection methods reduce the risks of unauthorized changes in shareholder transactions during the voting procedure.

The advantages of using blockchain technology for voting in corporate governance are quite fully described by foreign researchers. Thus, in the literature it is noted, that «managers, in such a system, have less room for selfish decision-making and acting irrationally in their actions, as a result of the decentralization of their power in controlling the process of voting»¹⁷. Another important advantage is that the blockchain will prevent "empty voting" when an investor uses borrowed shares or certain combinations of derivative securities to temporarily acquire voting rights. The unfavorable consequences of such a vote is that it can lead to a violation of the rights of remaining shareholders, since it is usually used by activists to make decisions that may be

¹⁷ Avdzha A.K. The Coming Age of Blockchain Technology in Corporate Governance. Doctoral dissertation, Master's Thesis 2017, Tilburg University LLM International Business Law. URL: https://www.researchgate.net/publication/325380963_The_Coming_Age_of_Blockchain_Technology_in_Corporate_Governance (date of reference 30.01.2019)

disadvantageous to the majority of shareholders who own real economic property in the Corporation¹⁸.

There are already implemented projects on the implementation of blockchain technologies in corporate governance in practice. NASDAQ has become the first in this field and started up for the first time blockchain platform for voting shareholders in Estonia. The pilot project was started up in Singapore. In Russia, the possibility of holding General meetings on the blockchain platform is provided by the National Settlement Depository (NSD).

The voting procedure on the blockchain platform in general is as follows: before voting tokens are issued by the number of shares in the Corporation and distributed among shareholders according to the number of shares owned by them by crediting tokens to the shareholder's e-wallet. While voting shareholders by making transactions transfer their tokens to e-wallets, indicating respectively "for", "against", "abstained". All transactions are kept in the blockchain, they are transparent, which means that shareholders can be sure that their votes were taken into account correctly.

National settlement Depository used the Hyperledger Fabric blockchain platform, focused on the corporate segment and related to the private type of blockchain for the organization of General shareholders meetings held on the blockchain. Hyperledger Fabric is described by its developers as an open source platform based on distributed register technology designed for corporate use. It is the first blockchain platform that does not require smart contracts to be drawn up in domain-specific languages or based on its own cryptocurrency¹⁹.

Developers of e-voting service on the blockchain platform concentrated on confidentiality of votes as one of the main objectives, so that the shareholder could ensure that his votes were accounted correctly, but could not find out how other shareholders voted. It was solved with the help of cryptography, when "the network itself verifies how everything corresponds to mathematically probable scenarios, that is, mainly, ensures that there are no markups and the received votes do not disappear"²⁰, i.e. there is an ability to "cryptographically

¹⁸ Ringe W.G. Hedge funds and risk decoupling: The empty voting problem in the European Union. // Seattle UL Rev. 2012. № 36. P.1027-1066.; Hu H.T., Black B. Empty voting and hidden (morphable) ownership: Taxonomy, implications, and reforms. // The Business Lawyer. 2006. T.61. № 3. P.1011-1070.

¹⁹ Androulaki E, Barger A, Bortnikov V, Cachin C, Christidis K, De Caro A, Enyeart D, Ferris C, Laventman G, Manevich Y, Muralidharan S. Hyperledger fabric: a distributed operating system for permissioned blockchains. In Proceedings of the Thirteenth EuroSys Conference 2018 Apr 23. P. 30. ACM. URL: http://delivery.acm.org/10.1145/3200000/3190538/a30-androulaki.pdf?ip=109.252.20.90&id=3190538&acc=OA&key=4D4702B0C3E38B35%2E4D4702B0C3E38B35%2E4D4702B0C3E38B35%2ED8F734396A7AA47F&acm=1549310262_74fcd76f40b6ed7bea2bf269b6dfd56f

²⁰ Shareholders will be able to hold meetings on the blockchain platform (Акционеры смогут проводить собрания на блокчейн-платформе). URL: <https://vc.ru/crypto/30533-akcionery-cmogut-provodit-sobraniya-na-blokcheyn-platforme>

check the correctness of confidential information, while maintaining confidentiality of the votes»²¹.

But there is a question what are the advantages for shareholders using a private blockchain platform? According to the Deputy Chairman of the Board of NSD Maria Krasnova, "the need for reform was caused by the main drawbacks of the previous order of corporate actions ...: paper document flow and lack of access to reliable corporate information"²², i.e. in essence it is only about electronic document flow. However, electronic voting can be executed without the use of distributed registry technology. As an example, the service of electronic voting "Register-Online»²³.

It seems that using blockchain platform only for remote voting is unreasonable. Blockchain is in demand where an environment of trust is required. This environment is created, first of all, due to the openness and transparency of transactions, at least within a private blockchain, when all information on voting, and not only on the accounting of its votes, is open to the shareholder. Whether it is possible to recognize risk of incorrect calculation of shareholders votes as the main problem of trust in joint-stock companies is a question under debates.

In the meantime the introduction of NSD system of e-proxy voting on the blockchain platform Hyperledger Fabric 1.0. did not lead to a revolution in corporate governance, although many of the largest Russian corporations, such as Gazprom Neft, Moscow exchange (MICEX-RTS), Alrosa, Sberbank, etc. used this system.

NSD representatives describe the operation of the system as follows: "the owner of the security votes in the personal web office of the nominal holder portal using an electronic signature. The nominal holder records the owner's vote in the blockchain, adding its electronic signature. The nominal holder shall provide the owner with the identifier of his / her vote in the distributed register as a confirmation of the acceptance of the vote. Next, the record of the vote of the owner is signed by the nominal holders on the chain to the Central Depository. At the end of voting, the system automatically calculates the results, and NSD publishes them in the blockchain using its electronic signature. At the same time, the use of cryptographic mechanisms allows to protect intermediate results»²⁴.

²¹ Same

²² URL: <https://www.nsd.ru/ru/press/pubs/index.php?id36=633651>

²³ URL: <https://www.aoreestr.ru/shareholders/e-voting>

²⁴ URL:

http://www.tadviser.ru/index.php/%D0%9F%D1%80%D0%BE%D0%B4%D1%83%D0%BA%D1%82:%D0%9D%D0%A0%D0%94:%D0%A1%D0%B8%D1%81%D1%82%D0%B5%D0%BC%D0%B0%D1%8D%D0%BB%D0%B5%D0%BA%D1%82%D1%80%D0%BE%D0%BD%D0%BD%D0%BE%D0%B3%D0%BE%D0%B3%D0%BE%D0%BB%D0%BE%D1%81%D0%BE%D0%B2%D0%B0%D0%BD%D0%B8%D1%8F_e-proxy_voting

It must be admitted that in this case, the blockchain does not simplify voting, except for the possibility of remote access, does not eliminate intermediaries, and the advantages of its use are not obvious.

The problem of introducing blockchain technology in corporate governance is primarily in the privacy of Russian business. As Marritte B. Fox points out, "the root of all evil in Russian corporate governance is the difficulty of obtaining information about the beneficial owners of companies' shares and voting by these shares»²⁵. In Russian background it is not quite convincing thesis Western blockchain of enthusiasts²⁶ that the transparency of the Corporation provided by the use of blockchain in corporate governance can become a major competitive advantage.

Another obstacle to the use of blockchain technology is the unwillingness of Russian business to actively use new technologies. This is proved, in particular, by the practice of compliance with principle 1.1.6 of the corporate governance Code contained in "The review of corporate governance practices in Russian public companies as of year-end of 2017" prepared by the Bank of Russia. In order to fully comply with this principle, corporate governance practices must meet three criteria, one of which is for the Board of Directors to consider the application of telecommunications to provide shareholders with remote access to participate in General meetings of shareholders in the reporting period. As stated in this Review, "among the most popular reasons of non-compliance by companies are:

- absence of provisions in the memorandum of the company on the possibility of remote voting at the General meeting of shareholders;
- lack of technical capability for remote voting;
- inability to ensure the identification of shareholders;
- significant financial expenses for technical support of remote voting;
- low activity of minority shareholders in General meetings of shareholders for the last periods»²⁷.

It should be emphasized that there are no legal barriers for remote voting at the General shareholders meeting, including the use of blockchain technology. It was convincingly proved by the Russian lawyers²⁸.

²⁵ Fox M. B. Actual problems of corporate governance in Russia (*Фокс М.Б.* Актуальные проблемы корпоративного управления в России). URL: https://www2.deloitte.com/content/dam/Deloitte/ru/Documents/finance/russian/reportsandopinions/%D0%90%D0%BA%D1%82%D1%83%D0%B0%D0%BB%D1%8C%D0%BD%D1%8B%D0%B5%20%D0%BF%D1%80%D0%BE%D0%B1%D0%BB%D0%B5%D0%BC%D1%8B_%D0%9C%D0%B5%D1%80%D1%80%D0%B8%D1%82%20%D0%A4%D0%BE%D0%BA%D1%81.pdf (date of reference 30.01.2019)

²⁶ See for example.: Tapscott D., Tapscott A. Blockchain technology: what drives the financial revolution today. – Moscow: Eksmo, 2018. – 448p. (*Тапскотт Д., Тапскотт А.* Технология блокчейн: то, что движет финансовой революцией сегодня. – М.: Эксмо, 2018. – 448с.)

²⁷ URL: https://www.cbr.ru/Content/Document/File/57470/Review_04122018.pdf (date of reference 30.01.2019)

5. Corporate control and audit on the blockchain

It seems that nowadays in Russia the greatest prospects for the introduction of blockchain technologies are in the field of corporate control and audit. It is here that the use of private or permissioned blockchain can be reasoned.

As noted by Max Kordek, CEO of Lisk Company: "the greatest benefit of private blockchain comparing with central databases is in the cryptographic test and known identifiers. Data can't be faked and errors can be tracked. Compared to the open blockchain, the closed one is much faster, cheaper and respects the company's confidentiality. Finally, it is better to rely on a closed blockchain than on none at all. It has advantages and promotes blockchain technology in the corporate world; thereby facilitate the development of open blockchains in the future»²⁹.

Blockchain can provide real-time financial and accounting services. This, according to D. Yermak, opens up great opportunities to improve the reliability of the information received and trust to it: "Instead of relying on the audit industry, which itself is exposed to moral risk and agency problems ... each user could without any cost to create his own financial report based on blockchain data for any period of time that he wish»³⁰.

In our opinion, there are prospects for the transfer of certain corporate procedures to the blockchain, for example, the process of approval of major transactions and related party transactions, which will significantly improve the control over the disposal of property in the Corporation, prevent possible abuses by the management of the company. Decisions on these transactions are made in accordance with the legislation on joint stock companies and limited liability companies by the Board of Directors.

However, according to practicing lawyers, "the current legislation does not provide for any opportunity for members of the Board of Directors to vote using blockchain technology»³¹. This conclusion is based on the fact that the laws on joint stock companies and limited liability

²⁸ See for example.: Novoselova L., Medvedeva T. Blockchain for shareholders voting. // Economy and law. 2017. No. 10 (*Новоселова Л., Медведева Т. Блокчейн для голосования акционеров. // Хозяйство и право. 2017. № 10; Markov A., Tsykalo Yu., Bazin D. Blockchain in corporate governance: is it possible to use this technology for voting at General meetings now? // Corporate strategy. 2018. No43 (9759). URL: <https://www.eg-online.ru/article/384162/> (*Марков А., Цыкало Ю., Базин Д. Блокчейн в корпоративном управлении: можно ли использовать эту технологию для голосования на общих собраниях уже сейчас? // Корпоративные стратегии. 2018. №43 (9759)*)*

²⁹ URL: <https://bits.media/stsenarii-ispolzovaniya-zakrytykh-blokcheynov-mneniya-ekspertov/> (date of reference 30.01.2019)

³⁰ Yermack D. Corporate Governance and Blockchains.

³¹ Markov A., Tsykalo Yu., Bazin D. Blockchain in corporate governance: is it possible to use this technology for voting at General meetings now? // Corporate strategy. 2018. No43 (9759) (*Марков А., Цыкало Ю., Базин Д. Блокчейн в корпоративном управлении: можно ли использовать эту технологию для голосования на общих собраниях уже сейчас? // Корпоративные стратегии. 2018. №43 (9759)*).

companies do not specify the possibility of voting by members of the Board of Directors by filling out an electronic document on the website in the Internet.

It is difficult to agree with this statement. The absence in the legislation of the possibility to execute an action does not mean an automatic prohibition on it due to the general principle of private law “everything that is not prohibited is allowed”. The legitimacy of this approach is confirmed by the position of the Bank of Russia, reflected in the letter from 15.09.2016 No IN-015-52/66 "On the regulations about the Board of Directors and committees of the Board of Directors of public joint stock company»³². The Bank of Russia, in particular, allows to take into account the written opinion of a member of the Board of Directors who is absent on a meeting of the Board held in person, both to determine a quorum and to take into account the results of voting. Moreover, a written opinion can be sent to the Secretary of the Board of Directors in any way to ensure proper identification of the person who sent it, in particular by telephone and electronic communication. Moreover, the absent person is given the right to participate in the discussion of the agenda and vote remotely through conference and video conference.

Thus, the absence of formal requirements to the procedure of decision-making or voting by members of the Board of Directors in the legislation cannot be an obstacle to the use of blockchain technologies. On the contrary, it can contribute to the implementation of blockchain in corporate governance and further promotion of this technology.

6. Smart contracts and Decentralized Autonomous Organizations

One of the popular fields blockchain use for corporate governance is the incorporation of Decentralized Autonomous Organizations (DAO), which have fundamentally different management structure. In traditional corporations, management is based on the principles of hierarchy, establishing vertical structure. In DAO the management structure is horizontal, since there is no single or collective separate management body. All DAO members have not only equal rights to manage the company and access to information, but also equal opportunities provided by the blockchain.

The essence of the blockchain lies in its decentralization, so DAO is a decentralized organization in which the decision is made not by the management body, but by consensus achieved during the implementation of smart contracts. Various smart contracts within DAO regulate relations associated with membership and management of the organization: membership, voting, distribution of funds, etc. Therefore, smart contracts constitute both

³² Bulletin Of The Bank Of Russia, 2016, No 8 (Вестник Банка России, 2016, № 85).

technical and legal nature of DAO. According to Yu. Yu. Se, «the resulting DAOs have the ability to replace centralized intermediaries in other applications requiring complex coordination such as asset ownership tracking, trade financing, digital identity provision, supply chain traceability, and more»³³.

No DAO has been incorporated in Russia yet, although the idea is widely discussed in the literature.

It should also be noted that the reputation of DAO has been significantly damaged by the unsuccessful experience of the DAO project which was a decentralized venture fund created on the Ethereum blockchain. A mistake made in the code of the program led to stealing of almost a third of the company's capital. To prevent property damage Ethereum developers implemented a hard fork, i.e. the cancellation of transactions that led to the illegal withdrawal of money. However, this decision, despite its positive effect when the property rights of participants were restored was ambiguously taken by the part of the participants. The principle of immutability of transactions in the blockchain was considered to be relative, which damage the credibility of the organization itself.

It is obvious that technical errors in smart contracts are possible to the same extent as in traditional contracts. This risk should be sufficiently assessed by both lawyers and other specialists (programmers, economists, etc.) during implementation of business projects based on a system of smart contracts.

The smart contract is a small program inside a block in the blockchain. The first blockchain which was bitcoin blockchain allowed including only a short transaction record into the block. Some years ago new blockchains, that contain programs which can define not only transactions but also terms for their performance, appeared. "To execute such a command in case of such terms" is a smart contract. Since a smart contract is a program without any restrictions on the data and conditions entered into it, there are a lot of variations of how to fulfill it. For example, a smart contract can be drafted that will set a rule, that one user transfers money (cryptocurrency) to another only after a certain period of time. Another example is the use of open source data to describe the terms of a transaction. Then, for example, GPS data can provide information about the location of the transaction's object and allow or prohibit any actions with it³⁴. Thus, the smart contract is a program that verifies whether all the terms are met, and only after that the transaction is confirmed and the assets are exchanged.

³³ Hsieh Y. Y. The Rise of Decentralized Autonomous Organizations: Coordination and Growth within Cryptocurrencies. – 2018. <https://ir.lib.uwo.ca/cgi/viewcontent.cgi?article=7386&context=etd>

³⁴ Belousov P. Program of the blockchain: what are the barriers to mass introduction of smart contracts // <http://www.forbes.ru/tehnologii/343843-programmy-blokcheyna-cto-prepyatstvuuet-massovomu-vnedreniyu-smart-kontraktov> (Белусов П. Программы блокчейна: что препятствует массовому внедрению смарт-контрактов)

A smart contract as a computer program is transmitted in the form of a program code and stored in the blockchain on all computers of the blockchain network at once. As an element of the blockchain a smart contract guarantees transparency (all parties to the contract can see the details of operations), irreversibility (program actions cannot be canceled, unless otherwise laid down in the code) and traceability of transactions. The smart contract is encrypted and stored distributed, which guarantees protection against loss or unauthorized modification.

The smart contract of the first type, selected by us for legal analysis, describing the transfer of digital assets in circulation, is closest to the form of a civil contract. According to article 420 of the Civil code of the Russian Federation the agreement between two or more persons on establishment, amendment or termination of civil rights and duties shall mean the Contract. In this sense, the definition of the contract in the Anglo-Saxon system of law as "a set of promises approved at the "meeting of minds" which is a traditional way of formalizing the relationship"³⁵ was taken as a reference point for the creation of smart contracts by N. Sabo³⁶. According to the programmer, a smart contract can be defined as a set of promises specified in digital form, including protocols under which the parties fulfill these promises. In his research work N. Sabo define that a smart contract is a new way of formalizing relationships.

In this sense, a smart contract can be considered as a way to fulfill an obligation, as a transaction, as well as a form of transaction. With a smart contract, parties can exchange various digital assets. As it is properly noted in literature, the smart contract is a digital equivalent of an agreement that allows to track all the phases of its functioning (from the moment of making to the moment of full execution)³⁷. Application of the algorithm allows nullifying the influence of the subject on the execution of the made agreement. However, in reality, the automation of contract execution (the simplest smart contract provides for the transfer of a token in exchange for a cryptocurrency) is not the only feature of a smart contract. At the same time, it is necessary to have a digital asset as a special subject of the contract. It is impossible to perform a smart contract without cryptocurrency and tokens. It exists and is performed in the virtual world.

As a form of deal a smart contract tends to be in writing. A remarkable feature of electronic form of the contract is that it is made with the use of electronic means of communication with the participation of information intermediaries (service providers) through

³⁵ ELEMENTS OF A CONTRACT // <http://jec.unm.edu/education/online-training/contract-law-tutorial/contract-fundamentals-part-2>

³⁶ Smart Contracts: Building Blocks for Digital Markets/Copyright (c) 1996 by Nick Szabo//

³⁷ Zakirov R. F. the Use of modern IT-technologies as a means of achieving the main objectives of the proceedings. Vestnik of civil procedure. 2018. No 1. P. 211 – 219. (Закиров Р.Ф. Использование современных IT-технологий как средство достижения основных задач судопроизводства // Вестник гражданского процесса. 2018. N 1. С. 211 – 219).

the exchange of electronic information excluding a direct interaction between the parties³⁸. The element of a smart contract as a software code is an electronic signature, which confirms the will of the parties to the transaction, starts the smart contract algorithms while making the contract.

Entering an electronic signature while making a smart contract generates a number of transactions, which constitutes the legal relationship of the participants of the turnover in respect to the execution of the smart contract, like obligations in a traditional contract? As we consider, in this case transactions conducted within the algorithm can be qualified as transactions which are independent legally significant actions. These are willful acts of information transfer aimed at achieving legal consequences (disposal of token, cryptocurrency, etc.)³⁹.

The self-fulfillment of the smart contract is associated with the possibility of pre - algorithmization of the decision on the performance of obligations under the contract upon the certain conditions, for example, automatically transferring of funds from the counterparty's account or termination of the lease agreement in case of late lease payment.

Thus, smart contract as an algorithm is really applicable in some cases to realise contractual relations, including in the corporate sphere.

7. Conclusions

According to the research, the introduction of blockchain technologies opens up broad prospects for both corporation members and the economy. Members of the corporation can obtain almost unlimited access to information within the corporation, control over its management, as well as technical opportunities for more active participation in its management. Such involvement of corporation members in its management will contribute to the increase of trust to the Corporation and stimulate investment, which finally will have a beneficial effect on the economy development. DAO can become the most attractive form of business organization for investment.

There is no doubt that new technologies offer not only new opportunities, but also new risks and threats. The most obvious for everyone is the threat of technical vulnerability. Today the blockchain is a rather new technology, insufficiently tested. Therefore, it is natural that the developed blockchain platforms contain technical errors and vulnerabilities that can be used by attackers. Their use in business processes threatens large losses. Another equally well-known

³⁸ Kulik T. Yu. Features of legal regulation of contracts concluded in electronic form: Dis. ... PhD in law. . M., 2007. P. 49. (Кулик Т.Ю. Особенности правового регулирования договоров, заключаемых в электронной форме: Дис. ... канд. юрид. наук. М., 2007. С. 49).

³⁹ See more: Sannikova L. V., Kharitonov Yu. D. the Legal nature of the transactions in the system of distributed registries// Economy and law. 2019. №. 1 (Санникова Л.В., Харитонов Ю.С. Юридическая сущность транзакции в системе распределенных реестров// Хозяйство и право. 2019. № 1).

threat to the introduction of blockchain technology in corporate governance lies in the complexity of scaling. The larger the Corporation, the more complex it will experience when using blockchain platforms in corporate governance. Many users of blockchain platform Hyperledger Fabric, focused on corporate segment, have noticed it already⁴⁰.

Nevertheless, in Russia, as in other leading foreign countries, business is actively trying to use blockchain technology in corporate governance. At the same time, the current corporate legislation in Russia regarding the shareholders register keeping does not allow to reduce costs and eliminate an intermediary in the form of a registrar if the blockchain technology is introduced by the Corporation, which reduces the motivation of the business community to use this technology in corporate governance. The use of blockchain technology for voting of shareholders at General meetings has better chances, since there are no legislative obstacles for this. However, blockchain technology will be more in demand in the field of corporate control and audit.

⁴⁰ See: Popjoy S. IBM's Hyperledger isn't a real blockchain — here's why.
<https://thenextweb.com/podium/2019/05/05/ibms-hyperledger-isnt-a-real-blockchain-heres-why/amp/>