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Perspective of Blockchain Technology Application in Corporate Governance: Recent Trands

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ABSTRACT

The subject of the present paper is the perspective of blockchain technology application based on the experience of the Russian and foreign companies, financial institutions, and public authorities. The purpose of the article is to study trends, identify areas of application, and analyze the risks and benefits of blockchain technology application in corporate governance. The author used the methods of generalization, synthesis, comparative analysis of the approaches applied to determine the role played by blockchain in corporate governance, studied appropriate recent scientific publications, and also conducted the comparative analysis of the corporate governance goals and key characteristics of the above technology. The author has exhaustively analyzed the prospects of blockchain technology implementation in corporate governance taking into account the spread of the COVID-19 pandemic, which forms the novelty of the present paper. The author proposes to follow the below recommendations pertaining to certain issues of implementing blockchain technology into entity's operations: to include the issue of suitability of blockchain technology integration into the entity's operations in the meeting of the Board of Directors' agenda, develop and approve at the Board level in-house documents to regulate the technology application within the entity as well as the strategy of its using to be followed by its integration into the entity's general business strategy, approve the entity's risk-appetite to use the technology within the frameworks of the overall entity's risk management strategy, analyze the impact it may cause on the entity's activities at the Board level and also ensure improving the employees' training and competencies with respect to using blockchain technology. The author concludes that nowadays blockchain technology will be most intensively used in areas where it is a more effective alternative to existing systems in their current state. The conclusions and results obtained may be used in the course of developing Russian corporate governance practice as well as in the analytical and practical work performed by the public authorities and the business community.

Keywords: corporate governance; digitalization; digital assets; blockchain; general meeting of shareholders; e-voting; smart contracts

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ОРИГИНАЛЬНАЯ СТАТЬЯ

Перспективы использования технологии блокчейн в корпоративном управлении: последние тенденции

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АННОТАЦИЯ

Предметом исследования являются перспективы и способы применения технологии блокчейн в корпоративном управлении с учетом опыта российских и зарубежных компаний, финансовых организаций и органов государственной власти. Цель статьи — исследование тенденций, выявление областей применения, анализ рисков и преимуществ использования данной технологии в корпоративном управлении. В работе применялись методы обобщения, синтеза,

сравнительного анализа подходов к определению роли блокчейна в корпоративном управлении, изучена актуальная научная литература в указанной области, а также проведен сопоставительный анализ целей корпоративного управления и основных свойств технологии. Новизной исследования является то, что автором проанализированы перспективы внедрения блокчейн-технологии в корпоративную практику с учетом распространения пандемии COVID-19. Автор предлагает следовать следующим рекомендациям по вопросу внедрения технологии блокчейн в деятельность организации: включать вопрос о целесообразности интеграции технологии блокчейн в повестку дня совета директоров, разрабатывать и утверждать на данном уровне внутренние документы, регулирующие использование технологии в организации, а также стратегию ее использования с последующей интеграцией в общую бизнес-стратегию, утверждать риск — аппетит компании в отношении использования технологии в рамках общей стратегии риск-менеджмента, анализировать эффективность использования технологии и ее влияние на деятельность организации на уровне совета директоров, а также обеспечивать повышение уровня подготовки и компетенций работников по вопросам использования блокчейн. Сделан вывод, что в настоящее время активное использование блокчейн-технологии будет происходить в областях, в которых она может предложить более эффективную альтернативу существующим системам в их текущем состоянии. Полученные выводы и результаты могут быть использованы при дальнейшем развитии российской практики корпоративного управления, а также в аналитической и практической работе органов государственной власти и бизнеса.

Ключевые слова: корпоративное управление; цифровизация; цифровые активы; блокчейн; общее собрание акционеров; электронное голосование; смарт-контракты

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Introduction

As the COVID-19 pandemic caused the world community to adjust to new challenges in 2020, digital technologies were used more actively in corporate governance. Accelerated rates of their introduction, including blockchain based, were determined by the challenges of preventing infection spread and necessity of business continuity maintenance together with entity's effective interaction with all stakeholders.

In practice use of new technologies is intended to eliminate uncertainties in some of the entity's potential results. A measurable competitive advantage will be awarded to those who pioneers implementing such technologies. Therefore, the key entity's aim is to change and adjust to the new market realities.

The new technologies have a significant ability to change entity's traditional business models and also suggest solutions to any matter arising in the area of corporate governance. The quicker the board of directors improves their level of understanding of the advanced technological processes, associated risks, their potential impact on the entity's operations and, in general, on the economy, the better it will be ready to develop the business strategy which meets the modern challenges and also to control such strategy implementation.

Currently corporate governance is evidently shifting towards a long-term value creation for different groups of stakeholders.[1] Expenses [1] and operating costs will evidently grow as the entity undertakes measures to control the agent and mediators. The opportunistic behavior of the parties may lead to the negative consequences, including the loss of the entity's value. So, the key decision here may be ensuring greater transparency of interaction between the stakeholders [2]. In the circumstances when trust-based relations do not exist between the parties, information is asymmetrical and associated risks continue to grow — blockchain technology may become a tool to resolve the above matters. Considering today the world is exposed to serious risks related to information security (data leak, hacker's attacks, unauthorized use of private information, etc.), and dependence of humankind on information technologies prompted to look for more secure data storage and transmission, certain experts believe that the ever — growing popularity of blockchain technology is a response to the above challenges.[2] So, the goal of the present paper is to

[1] OECD. G20/OECD Principles of corporate governance. URL: https://www.oecd-ilibrary.org/docserver/9789264252035-ru.pdf?expires=1566227217&id=id&accname=guest&checksum=6B 41575E 2752CE 29BD 7C 4E 65A675023F (accessed on 10.02.2021).

[2] OECD. Blockchain technology and corporate governance: Technology, markets, regulation and corporate governance DAF/CA/CG/RD(2018)1/REV1. P. 4. URL: https://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=D

activate the discussion of the prospects for blockchain technology application in corporate practice.

Main blockchain applications

Blockchain is a decentralized data base, cryptographically defended and intended for storage and confirmation of the information reliability. Essentially, this digital distributed ledger contains a timestamp ledger of the transactions, which were recorded by a peer-to-peer[3] computer network [3]. Blockchain has the potential to improve efficiency of the transactions and assets recording and allows for creating certainty of the rights, obligations and origin of the records, which in its turn add possibility to analyze the economic assumptions of the transactions made.[4] The key benefits of blockchain are based on interest between the transacting parties to raise the level of trust, decrease the number of frauds and transactions time as well as to exclude the effect which the corruption and human factors may have on decision making.

Decentralized coordination of individual transactions which does not need a centralized service to check and store information is possible due to technology of inseparable blocks and required confirmation by all users of a distributed chain of blocks, while altering the ledger retrospectively as well as recording transaction more than once is impossible. Inalterability of technology to keying and external effects allows to state the benefits blockchain technology has in comparison to the traditional data bases. In addition, as the data about the transactions processed appear on all ledgers there is no need for any mediators to confirm reliability of the transactions [4]. At the same time, massive implementation of technology currently has certain limitations such as high power consumption requirements, regulatory aspects and certification, scalability, management, audit of a blockchain system, confidentiality of the data used, no trust between the system participants, users' identification, high cost of implementation and return, incompatibility of different blockchain systems, slow transactions processing, personnel search and training.

It was in 2008 when blockchain technology appeared on the market 2008 [4] as a tool to confirm the title right to a virtual currency, the so-called bitcoin. Currently, business models based on blockchain technology are tested in different sectors of economy (public health, agriculture, power, public administration, etc.). The most commonly used spheres are as follows:

- virtual currencies;
- digital records storage;
- digital assets exchange;
- certification of legally meaningful actions;
- automated smart-contracts execution [5];
- e-voting arrangement;
- decentralized autonomous organizations (DAOs) [6, 7].[5]

In accordance with the federal project "Digital Technologies" of the national project "Digital Economy", blockchain (distributed ledger) relates to one out of nine pivotal digital technologies that are required to ensure technological independence of the Russian Federation and technological development of Russian companies. Currently, its use is under active testing. For example, starting from 2016 the first certified in Russia blockchain network "Masterchain"[6] which uses the national instruments of cryptographic defense of information is being developed. In the late 2020, the first Russian digital bank guarantee was issued on the platform launched by PJSC "VTB" for PJSC "MTS".[7] During COVID-19 pandemic Federal Tax Service of Russia launched a blockchain platform to issue interest free credits to small and medium businesses.[8] The first Russian issuer of obligations to be settled using blockchain technology was PJSC "MegaFon". National Settlement Depository (NSD) provided a platform to issue ruble — denominated obligations of the

AF/CA/CG/RD(2018)1/REV1&docLanguage=En (accessed on 15.02.2021).

[3] A peer-to-peer network means the existence of equal rights for access to information in the network and the absence of any participant in a computer network with unique rights to administer information in the network.

[4] Institute of Chartered Accountants in England and Wales IT Faculty. Blockchain and the future of accountancy. P. 1. URL: https://www.icaew.com/-/media/corporate/files/technical/information-technology/thought-leadership/blockchain-and-the-future-of-accountancy.ashx (accessed on 12.02.2021).

[5] Blockchain: Trust economy, tech trends 2017. Deloitte Insights. 2017. URL: https://www2.deloitte.com/insights/us/en/focus/tech-trends/2017/blockchain-trust-economy.html (accessed on 08.02.2021).

[6] Masterchain. URL: http://masterchain.rbc.ru (accessed on 01.02.2021).

[7] PJSC "VTB" URL: https://www.vtb.ru/o-banke/press-centr/novosti-i-press-relizy/2020/12/2020–12–16-vtb-i-mts-pervymi-proveli-sdelku-po-vydache-bankovskoy-garantii-cherez-rossiyskuyu-blokch (accessed on 08.02.2021).

[8] Federal Tax Council of Russia. URL: https://www.nalog.ru/rn77/about_fts/interaction_other/digital_platform_fns/ (accessed on 11.02.2021).

company to the amount of RUB 500 million, which were organized and bought by JSC "Raiffeizenbank". The offering of the obligations was approved by the Board of Directors of PJSC "MegaFon".[9] In the nearest, the implementation of technology into the economic life of the state and entities will be continued which allows to perform a comprehensive assessment of the results of blockchain application in corporate governance.

According to Gartner blockchain is going to generate $ 3.1 trillion in new business value by 2030, but with the technology set to be ready for more mainstream adoption through 2023,[10] organizations should be exploring the technology already now. This case is especially actual because large multinational corporations and digital giants are looking to capture wider market shares by implementing blockchain components like specifically distributed ledger technology to reinforce a centralized approach to business.

The range of possible blockchain technology application in practice is evidently expanding due to the development of new technologies (computer-assisted instruction, artificial intelligence, robotics, Internet of things, etc.). One believes that its application may be appropriate in cases of no trust between the parties, transaction costs are to be decreased and the ledger containing the records of all transactions occurred is maintained.[11] Thus, the use of technology to achieve the entity's goals and tasks is a new field calling for further analysis and study.

Searching for balance between the benefits and risks of blockchain technology

In present times reliability and accuracy of the information and the data depend not only on the technological changes but also on the new mechanisms of trust [8] in an economic system.[12] Blockchain has the potential to be an effective tool to exercise effective collecting, storage, recording and transfer of information and the data assuming that potential value of technology considerably depends on the security advantages offered to each user, the entities are required to definitely understand both the advantages and the risks associated with blockchain technology (*Table 1*).

A report presented to the World Economic Forum depicts five components required to ensure security of blockchain network. Reliable blockchain must be:

- implemented or maintained by the deployment service;
- created on the base of the consensus protocol;
- confirmed in a distributed ledger by network activators;
- cryptographically protected;
- maintained by a developers' community.

It is considered unreliable where a network lacks the above control mechanisms may be operated with interruptions and fails to ensure sufficient defense to digital assets.[13]

Hence it is strategically important to regularly include the blockchain technology matters in the agenda of Board meetings. This will allow the entities to proactively respond to any changes in the economy, measure their market competitiveness and adjust their operations, where required.

In this case the Directors and top management have to consider potential risks associated with the business strategy developed and take adequate control measures before making decision about application of the technology.[14] Otherwise, the economic effect of such technology implementation may be a negative one.

Key directions of blockchain technology application in corporate governance

Blockchain technology creates additional opportunities for transforming the current business processes in the entities as it allows to decrease the number of centralized mediators, improve efficiency and create

[9] MegaFon, NSD and Raiffeisenbank completed the first transaction to place ruble bonds on the blockchain. URL: https://corp.megafon.ru/press/news/federalnye_novosti/20171002–0934.html (accessed on 11.02.2021).

[10] Gartner. URL: https://www.gartner.com/en/newsroom/press-releases/2019–07–03-gartner-predicts-90—of-current-enterprise-blockchain (accessed on 12.02.2021).

[11] ICAEW IT Faculty Blockchain and the future of accountancy. P. 9. URL: https://www.icaew.com/-/media/corporate/files/technical/information-technology/thought-leadership/blockchain-and-the-future-of-accountancy.ashx (accessed on 03.02.2021).

[12] OECD. G20/OECD Principles of corporate governance. P. 8. URL: https://www.oecd-ilibrary.org/docserver/9789264252035-ru.pdf?expires=1566227217&id=id&accname=guest&checksum=6B 41575E 2752CE 29BD 7C 4E 65A675023F (accessed on 02.02.2021).

[13] WEF. URL: https://www.weforum.org/agenda/2020/06/evolution-of-blockchain-reliability-and-digital-asset-protection (accessed on 09.01.2021).

[14] Deloitte. Blockchain risk management — risk functions need to play an active role in shaping blockchain strategy. P. 4. URL: https://www2.deloitte.com/content/dam/Deloitte/us/Documents/financial-services/us-fsi-blockchain-risk-management.pdf (accessed on 03.02.2021).

Table 1

Main advantages and risks of blockchain technology application

Main advantages	Potential risks
Use of distributed ledger technology where all transactions occurred between the parties are recorded in the network and allow to track all alterations to any party	Misuse by the system participants of the rights, provided that the intruders may take the network resources or a consensus algorithm under control, including in the illegal goals
All transactions are performed with the stamps of time, date, names of participants and other information related to a specified transaction in the real time mode	Cracks of blockchain technology and its applications
To improve safety each network node has the same copy of the chain of blocks	Inaccuracy of the source data which are the base of a digital record
No mediators are required to transfer digital assets between the system participants	Loss of supporting documents which are the base of a digital record as technology stores the data rather than the documents.
No alterations and reversibility of the transactions placed in a definite ledger	Extensive costs to create and maintain technology
–	No guarantees of smart contracts performance, including by reason of software failures, negative consequences related to performance of such transactions
	Disclosure of the personal data and confidential information
	Blockchain technology is technologically incompatible with the existing IT-systems of the entity, including due to the absence of required blockchain technology standardization
	Extensive cost of technology development and application and required routine system update
	Incompatibility of the existing software with innovative technologies
	Ignorance of a subsequent declaration of will by the blockchain users after recording transactions in blockchain
	Requirement to develop the regulatory base for the broad-scale application of the technology in practice

Source: compiled on the basis of [6, 7]; Deloitte. Blockchain risk management — risk functions need to play an active role in shaping blockchain strategy. Deloitte. P. 3. URL: https://www2.deloitte.com/content/dam/Deloitte/us/Documents/financial-services/us-fsi-blockchain-risk-management.pdf (accessed on 01.02.2021); Deloitte. Blockchain: Trust economy, tech trends 2017. Deloitte Insights. 2017. URL: https://www2.deloitte.com/insights/us/en/focus/tech-trends/2017/blockchain-trust-economy.html (accessed on 02.02.2021); Chartered Professional Accountants of Canada (CPA Canada) Technological disruption of capital markets and reporting? An introduction to blockchain. 2016. P. 19–20. URL: https://www.cpacanada.ca/en/business-and-accounting-resources/other-general-business-topics/information-management-and-technology/publications/introduction-to-blockchain-technology (accessed on 06.02.2021); Blockchain as a tool for corporate governance. URL: https://www.cygnetise.com/blog/blockchain-as-a-tool-for-corporate-governance (accessed on 01.02.2021); Blockchain as a tool for corporate governance. URL: https://www.cygnetise.com/blog/blockchain-as-a-tool-for-corporate-governance (accessed on 01.02.2021).

unmodified transactions ledger. As the environment is created to offer to stakeholders reliable and accurate information and the data which are presented to them, technology is capable of improving quality of corporate governance, thus assisting the entities to reach more transparency [9] and be open for interaction with different stakeholders.

The key advantages of blockchain technology application in corporate governance are the following characteristics which are critical for ensuring reliability of the ledger (*Table 2*).

It appears that revision and adding the corporate governance standards is an ongoing process. OECD believes that orientation to the corporate

Table 2

Key characteristics of blockchain as a corporate governance tool

Characteristic	Description
Near real-time settlement	Blockchain enables the near real-time settlements thus reducing risk of non-payment by one party to the transaction
Distributed ledger	As peer-to-peer technology used makes information available to all participants, retains a secure record of proof that the transaction occurred
Irreversibility	Each transaction effected through the blockchain network may be verified. This decreases a threat of double spending of one and the same asset which is a common case for the electronic payments systems
Censorship resistant	The economic rules built into a blockchain model provide monetary incentives for the independent participants to continue validating new blocks. This means a blockchain continues to grow without an owner

Source: Blockchain technology and its potential impact on the audit and assurance profession. URL: https://www.aicpa.org/content/dam/aicpa/interestareas/frc/assuranceadvisoryservices/downloadabledocuments/blockchain-technology-and-its-potential-impact-on-the-audit-and-assurance-profession.pdf (accessed on 23.01.2021).

Table 3

Comparison of the main goals of corporate governance and features of blockchain technology

Corporate governance goals	Main features
Transparency	General distributed ledgers
Accountability	Irreversibility of records
Responsibility	Peer-to-peer network
Validity	Smart-contracts

Source: Blockchain technology and corporate governance technology, markets, regulation and corporate governance. P. 25. URL: https://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=DAF/CA/CG/RD(2018)1/REV1&docLanguage=En (accessed on 23.01.2021).

governance goals may be the useful guide to form approaches towards regulation and adaptation of new technologies, in particular, blockchain technology and compares the key goals of corporate governance against its main features (*Table 3*).

Considering the above approach, one may conclude that the main prospects of blockchain implementation currently are related to the following areas of corporate governance:

- e-voting on the agenda;
- conduct of general meetings of the shareholders;
- registration of securities issue in a distributed ledger and keeping the shareholders' register;
- accounting and bookkeeping, audit in the real-time mode;
- using smart-contracts.

E-voting on the agenda

Together with the existing technologies blockchain may be used to for e-voting (by the shareholder, member of the Directors' Board, Management, Committee, etc.) as it allows to identify a participant in his absence and verify the declaration of his or her will. Its use for the purposes of e-voting as a new corporate governance tool demonstrates a high potential and promotes effective solutions in the area of storage and verification of the voting results,

Table 4

Preparation and conduct of e-voting on the meeting's agenda

No.	Step	Description	Data record using blockchain
1	General Meeting of Shareholders (GMS) Initialization	Scheduling the GMS date and the record date in a distributed ledger	Yes
2	Ownership Record Loading	Loading the shareholders' list and share title records	Yes
3	Voting Right Allocation	Allocation of the voting rights through tokens to all persons having the right to vote	Yes
5	Voting Party Authentication	Verification of the persons having the right to vote using one of the instruments that are supported by the system	No
6	Proxy Assignment	Delegation of the right to vote by the original holder to another person acting by proxy	Yes
7	Voting	E-voting by the persons who have the right to vote by way of using the token	Yes
8	Meeting Management	Live GMS feed in Internet, different services possible (including GMS start and closing, its results processing and feed-in in compliance with the data confidentiality requirements, communications chat, etc.)	Both
9	Post-meeting actions	Any subsequent after GMS closing events (for example, giving access for the auditors and regulators to study the data)	No

Source: General meeting proxy voting on distributed ledger: Product requirements. URL: https://www.nsd.ru/common/img/uploaded/files/gm_proxy_voting.pdf (accessed on 03.02.2021).

decreasing possibility for fraudulent activities [10], and also accelerates decision making process [11]. In addition, benefits arising from e-voting may foster more active and intensive involvement of the shareholders into corporate governance procedures.[15]

CSD Working Group on Distributed Ledger Technologies (DLT), which is a developer of products based on distributed ledger technology, announced its vision of the stages of preparing and conduct of e-voting on the agendas similar in most countries, which may be applied by the entities (*Table 4*).

In 2001 IT-company Inforte Corporation (USA) conducted the first in the world GMS with a possible e-voting of the shareholders [12]. In 2016 as blockchain platform was implemented to ensure for the shareholders of the entities registered by Nasdaq Tallinn AS possible e-voting at GMS.[16] Here in Russia e-voting is becoming ever more popular instrument for the parties to declare their will. Its application is recommended by the Corporate Governance Rules of the Bank of Russia[17] and Moscow Exchange Listing Rules.[18] As to this possibility, it is prescribed by the

[15] Blockchain as a tool for corporate governance. URL: https://www.cygnetise.com/blog/blockchain-as-a-tool-for-corporate-governance (accessed on 04.02.2021).

[16] e-Residency to support Nasdaq in transforming shareholder participation. URL: https://e-estonia.com/e-residency-to-support-nasdaq-in-transforming-shareholder-participation (accessed on 02.02.2021).

[17] Letter of the Bank of Russia dated April 10, 2014 No. 06–52/2463 "On the Corporate Governance Code", clauses 20, 159, 165.

[18] Section 3.3. Additional rules.

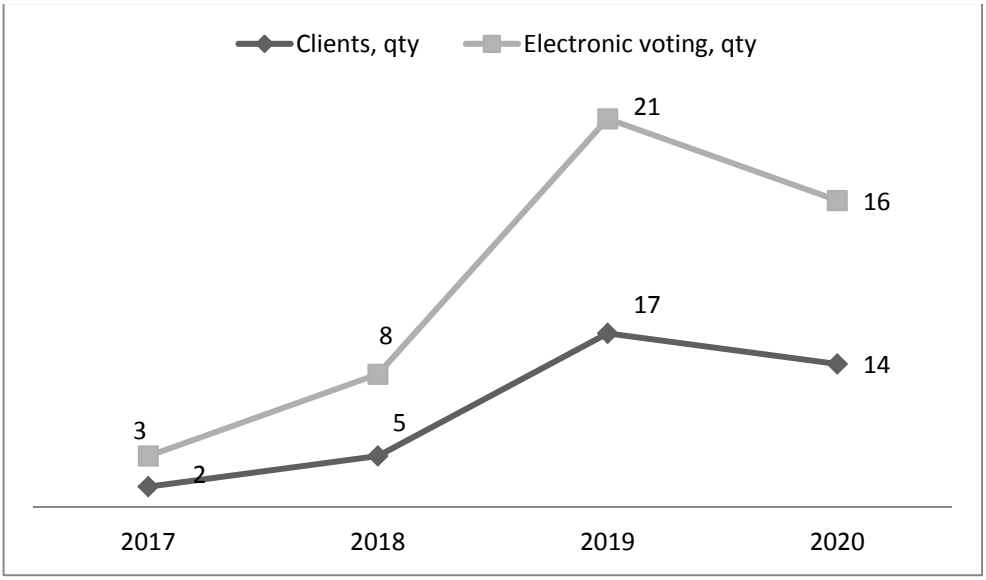

Fig 1. **JSC Reestr: Meetings conducted using the electronic voting service**

Source: JSC "Reestr". URL: https://www.aoreestr.ru/shareholders/e_voting/meeting-reestr-online (accessed on 01.02.2021).

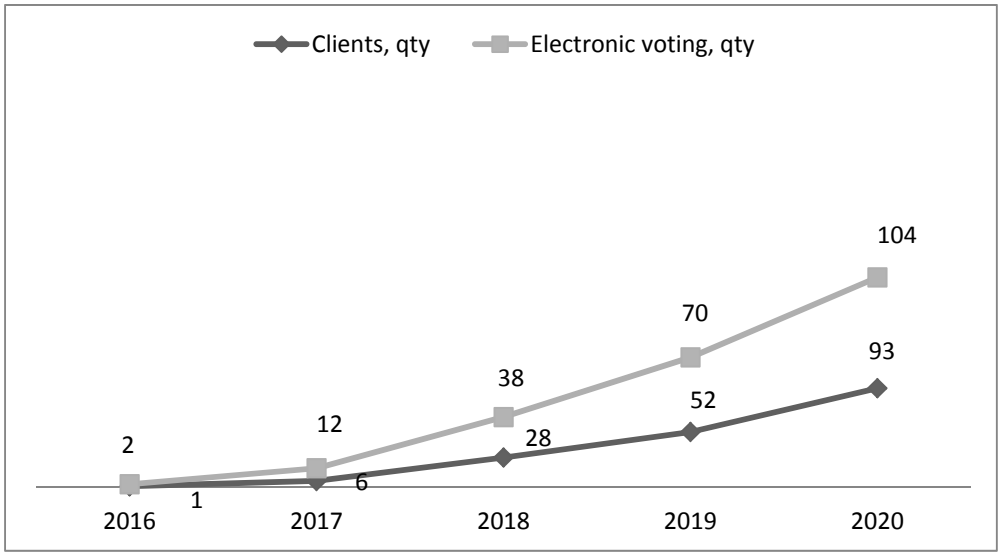

Fig 2. **JSC VTB Registrar: Meetings conducted using the electronic voting service**

Source: PJSC "VTB". URL: https://www.vtbreg.ru/elektronnoe-golosovanie (accessed on 01.02.2021).

Russian legislation which requires it to be stated in the entity's Articles of Association.[19]

In Russia the GMS e-voting service[20] application on blockchain platform is provided by National Settlement Depository (NSD). In 2020 NSD was the first Russian participant of Forbes rating of 50 companies, which actively apply blockchain, as it conducted the first in Russia transaction of the obligations issue using blockchain.

The NSD e-voting service is used as an online voting platform for the annual and extraordinary general meetings of the shareholders of Russian issuers, including PJSC Sberbank, PJSC Moscow Exchange, JSC ALROSA (PJSC), PJSC NLMK, PJSC Gazpromneft, PJSC Rostelecom, PJSC RusHydro, PJSC MTS. The e-voting

[19] Part 4 of Art. 60 FZ-208 of December 26, 1995 "On Joint Stock Companies".

[20] E-voting. URL: https://www.e-vote.ru/ru/ (accessed on 05.02.2021).

service allows the issuers to ensure electronic voting through the central depositary site via the Internet network and the securities' holders not only virtually participate in the shareholders' meetings conducted in the physical meeting form but also vote at the absentee meetings.[21] At the same time, one should note here that electronic voting is possible and the result of using innovative products will not be compromised without blockchain application.[22]

In 2020, during the coronavirus pandemic a considerable increase in e-voting was triggered by the legislation which permitted the Russian entities to conduct GMS in the absentee voting form irrespective of the agenda.[23] Here one should take into account that such increase in the above practice [PJSC Group LSR,[24] PJSC Inter RAO,[25] PJSC Rostelecom,[26] JSC ALROSA (PJSC),[27] etc.] was a consequence of the requirement of the participants of corporate relations rather than a consequence of legal changes, which is demonstrated by the following charts of GMS frequency (*Fig. 1*, *2*).

Thus, e-voting has become a tool which is used more and more often as it allows for declaring the will of the parties in the corporate environment. Modern technologies make it possible to conduct GMS, which does not require integration in blockchain technology.

Holding general meetings of shareholders

Holding a general meeting of shareholders in the form of their joint virtual presence (virtual GMSs) was the top subject of discussion in the corporate community in the 2000s. In 2000, Delaware (USA) authorities, in which state more than 66% of the Fortune 500 companies are registered,[28] authorized the annual general meetings of shareholders (hereinafter, AGM) both in the virtual form or in the form of virtual presence of the shareholders jointly with their physical presence[29] (the so-called hybrid approach). In 2016, Jimmy Choo conducted the first in the world virtual AGM among the companies listed at London Stock Exchange.[30] A similar approach is being publicly discussed in the Russian Federation to allow holding a GMS in the virtual form without the definition of the place of conduct and with the use of information and communicating technologies.[31]

Virtual GMSs go beyond the scope of simple electronic voting and make it possible to hold the meeting without joint physical presence of shareholders gathered in one place [11]. Such meetings are held online using audio/video transmission in which the shareholders participate via the Internet. The possible benefits of the virtual GMS conducted on blockchain platform are the decrease of the security issuer's costs for the meeting conduct and shareholders participation, increased number of the participating shareholders, improved decision making in the decentralized environment, storage of the meeting data in a cryptographic electronic form, etc. In this context the key matters include the legal possibility to hold a GMS remotely, technical possibility of their arrangement and the will of shareholders to transfer to such format of communication with the entity. In addition, it is required to compare the costs related to the development, implementation and maintenance of the technology against current and future expenses of the entity.

The Best Practices Committee for Shareowner Participation in Virtual Annual Meetings proposed

[21] E-voting. URL: https://www.e-vote.ru/ru/news/meet/index.php?id29=633474#bid2252 (accessed on 11.02.2021).

[22] VTB Registrar. URL: https://vtbreg.com (accessed on 11.02.2021).

[23] Information Letter of the Bank of Russia dated 03.04.2020 No. IN-06–28/48 "On holding general meetings of shareholders in 2020"; part 2 of article 50 of the Federal Law of December 26, 1995 No. 208-FZ (as amended on 11/04/2019, as amended on 04.07.2020) "On Joint Stock Companies" (as amended and supplemented, entered into force on 01.01.2020).

[24] General meeting of shareholders, LSR. URL: https://www.lsrgroup.ru/investors-and-shareholders/obshhie-sobraniya-akcionerov (accessed on 05.02.2021).

[25] PJSC Inter RAO. URL: https://www.interrao.ru/investors/meetings/2020/ (accessed on 05.02.2021).

[26] PJSC Rostelecom. URL: https://www.company.rt.ru/ir/agm/events/gosa/detail/2019 (accessed on 05.02.2021).

[27] E-voting. URL: https://www.e-vote.ru/ru/news/meet/index.php?id29=634692#bid2252 (accessed on 05.02.2021).

[28] The State of Delaware Division of Corporations. URL: https://corp.delaware.gov/aboutagency (accessed on 05.02.2021).

[29] Broadridge virtual shareholder meetings. URL: https://www.broadridge.com/_assets/pdf/broadridge-vasm-guide.pdf (accessed on 05.02.2021).

[30] EQS Group. URL: https://www.eqs.com/ir-casestudy/jimmy-choo-the-uks-first-electronic-agm/ (accessed on 05.02.2021).

[31] On amendments to the Federal Law "On Joint Stock Companies" in terms of creating the possibility of holding general meetings of shareholders in the form of a meeting by means of joint remote presence to discuss issues on the agenda and make decisions on issues put to a vote, using information and communication technologies without specifying a place for holding a meeting. URL: https://regulation.gov.ru/projects#npa=107789 (accessed on 06.02.2021).

Table 5

Principles and best practices of holding virtual Annual Meetings

Principles	Best practices
Broad investor participation in annual meetings should be valued and encouraged	Evaluate constantly changing technology and process
Shareowner meetings should promote equitable and equal treatment of investor participants	Ensure equal access for all annual meeting participants
Opportunities for meaningful engagement between investors and directors should be provided	Create formal rules of conduct during virtual annual meetings (rules of asking questions, publication of questions obtained online in the course of the meeting, etc.)
Issuers should communicate the benefits of a virtual meeting to shareholders	Have a technical support line available during virtual annual meetings
Virtual meetings should be used as a way to provide meaningful open dialogue between shareholders and companies	Archive virtual shareowner meetings for future viewing
–	Post questions received online during virtual annual meetings

Source: Broadridge virtual shareholder meetings. URL: https://www.broadridge.com/_assets/pdf/broadridge-vasm-guide.pdf (accessed on 01.02.2021).

the US companies to adhere to the Principles and Best Practices in this sphere, as presented below (*Table 5*).

Despite increased technological possibilities of holding virtual events, the need in the shareholders and other stakeholders' physical presence in the course of general meetings of shareholders (GMSs) has not decreased. This may be driven by the following factors. First, for most shareholders' meetings allows to personally see management of the entity, assess its performance, and discuss the topical issues. As to the issuer, this is a perfect chance to understand shareholders and know their needs and expectations. Second, there are concerns that GMSs, when held virtually, will hamper the entities to decide on difficult corporate matters and also that the entities will find it far more difficult to properly run the meeting [13]. Third, there is a possibility that such format makes it possible for the entity's management to moderate the incoming questions and shareholders' speeches as they like.[32] And, fourth, minority shareholders may find themselves in a disadvantaged position if compared to majority shareholders. As such form of conducting the meeting is applied the process of making a decision in the course of cumulative voting for directors' appointment is evidently more difficult for those shareholders who wish and have a possibility to elect their representatives at the board, because they are unaware of the quorum and thus the resulting allocation of the votes between several candidates. Therefore, there is an opinion that currently virtual annual meetings may be only an addition to the traditionally held meetings with joint presence of the shareholders.[33]

There is an interesting fact that up until recently virtual annual meetings were permitted in 30 states of the UAS (Minnesota, Pennsylvania, Texas, etc.) and in 41 states (New Jersey, Connecticut, etc.) the hybrid approach was used, while in eight states (Idaho, New York, etc.) only the physical presence format was allowed.[34] Meanwhile on 13 March 2020, the US Securities and Exchange Commission published its Staff Guidance for Conducting Shareowner Meetings in Light of COVID-19 Concerns. This statement underlines that general shareholders meeting may be held virtually, which is regulated by the legislation of the state and the foundation documents of the

[32] The pros and cons of virtual shareholder meetings. 2018. URL: https://finprofiles.com/news/index.php/2018/10/22/the-pros-and-cons-of-virtual-shareholder-meetings (accessed on 01.02.2021).

[33] Harvard Law School Forum on Corporate Governance. URL: https://corpgov.law.harvard.edu/2016/12/09/annual-shareholder-meeting-selected-considerations-for-a-virtual-only-meeting (accessed on 01.02.2021).

[34] PWC. Virtual shareholder meetings — what boards need to know. 2018. URL: https://www.pwc.com/us/en/governance-insights-center/publications/assets/pwc-virtual-shareholder-meetings-what-boards-need-to-know.pdf (accessed on 01.02.2021).

Table 6

Comparison of the formats of the AGMs

	Shareholders' physical presence	Shareholders' hybrid participation (physical and virtual)	Shareholders' virtual participation	Shareholders' absentee voting
How apprehended by entity's shareholders	Traditional arrangement	Innovative arrangement	Innovative and cost-conscious arrangement	Traditional arrangement
Participation in the meeting	Shareholders should be physically present	Shareholders can attend in person or online	Shareholders need a digital connection	Shareholders may vote either online in the absentee format or by hard copies
Number of participants	Constrained by venue	Unlimited	Unlimited	Constrained by the number of the voting shareholders
Support staff needed	Many	Many, including technical	Many, including technical	No
Logistics	Complicated	Complicated	Simple	Simple
Expenses	Varies	High	Low	Low
Appropriate type of the entity	Large and well-established	Innovative and prosperous, seeking to maximize shareholder participation	Small, startups or innovative company seeking to maximize shareholder participation	Any type

Source: Broadridge virtual shareholder meetings. This table was developed based on: Evolving virtual shareholder meetings. URL: https://www.broadridge.com/_assets/pdf/broadridge-nacd-ethical-boardroom-vsm-byline.pdf (accessed on 02.02.2021).

issuer. The Commission recommended the entities which intend to conduct a virtual or hybrid meeting of the shareholders to early notify the shareholders and other stakeholders about such plans and also provide clear guidance as to the meeting logistics, including the remote access to be ensured for the shareholders, their participation and voting.[35] In addition, under the pandemic conditions several states (New Jersey, Georgia, Connecticut, and New York) allowed to conduct annual general meetings but only in the virtual format.[36] In accordance with Broadridge, a leading provider of virtual general meeting services in the USA, the number of such meetings grew 7-fold (from 125 reaching 860) only in the first half of 2020.[37]

So, comparison between different virtual annual meetings formats is of practical importance (*Table 6*).

As to corporate governance aspect it is noteworthy that those entities which use the virtual meetings format demonstrate structures and governance

[35] US Securities and Exchange Commission. Staff guidance for conducting shareholder meetings in light of COVID-19 concerns. URL: https://www.sec.gov/ocr/staff-guidance-conducting-annual-meetings-light-covid-19-concerns (accessed on 01.02.2021).

[36] Managing COVID-19: Virtual annual shareholder meetings. Covington & Burling LLP. 2020. URL: https://www.cov.com/-/media/files/corporate/publications/2020/03/managing-covid-19-virtual-annual-shareholder-meetings.pdf (accessed on 01.02.2021).

[37] Broadridge Virtual Shareholder Meetings ("VSMs"): Preliminary statistics. Harvard Law School Forum on Corporate Governance. 2020. URL: https://corpgov.law.harvard.edu/2020/06/03/broadridge-virtual-shareholder-meetings-vsms-preliminary-statistics/#1 (accessed on 01.02.2021).

practices comparative to those of the entities which do not use.[38]

Registration of the securities issue in the distributed ledger and shareholders register keeping

Application of blockchain technology to record the title rights of the securities issued may ensure the accurate and proper recording of the shareholders. In addition, this technology allows to decrease such shares trading expenses and ensures a transparent transfer of the title right from one holder to another in the real time mode.

In most countries the shareholders' registers are kept by third parties, the registrars.[39] This technology allows minimizing the registrar's role as a mediator and also the entity's expenses related to register keeping and at the same time improves the level of trust between the issuer and the shareholder. However, if keeping the register is required by the legislation to be performed by registrars, i.e., the mediators, and not by the entities from the economic point of view application of blockchain technology is doubtful as in this case we can speak only about electronic document turnover which may be performed without use of this technology.

It is noteworthy that on the Russian market the Titan. TAS infrastructure system is being actively developed on the basis of blockchain platform, which automates the registrars' operations related to processing the documents accepted by the transfer agent with the aim to integrate the register keeping systems of the recording institutions (subject to licensing by the State). The above system aims to provide unified electronic services to legal entities and individuals. As at the 31st of March, 2020, all large registrars in Russia with the total clients number more than 68% of the securities market are connected to the system.[40]

In the scientific society there is an opinion that registration of securities issues in the distributed ledger, which as a consequence improves transparency of the entity's operations, on the one hand, may increase the role played by the shareholders in corporate governance. On the other hand, it may result in certain constrains for the board to perform their strategical and governance functions. Such format of registration may potentially improve shareholders and other interested parties awareness[41] about the entity's operations as access to respective information may be obtained in the real time mode. However, where shareholders or other interested parties lack necessary professional knowledge a situation may occur when misunderstanding of current business processes will result in their unreasonable wariness and possible volatility on the stock markets. In addition, irrespective of the selected type of the distributed ledger, registration of the entity's securities issue requires additional expenses for employees' training [10], and also change in corporate culture.

Realtime accounting and auditing

Currently, there are discussions underway concerning a possible transfer of the entities to accounting using blockchain technology and placing all business operations on distributed ledgers.

Such approach will supposedly facilitate decreasing accounting costs, improve the internal controls and audit of the entity by way of ensuring the auditors access to the ledger and possibly minimizing the human factor and fraudulent actions of employees in the real time mode. Some experts point out that in the future thanks to blockchain technology a set of digital keys may be given to external auditors to ensure their unprecedented access to the information about all transactions. Also the entities may conduct internal audit, improve the internal controls and analyze information in the real time mode.[42] Provided they will establish no restrictions on the access to the ledger data, the above information will potentially become available for all interested parties having seriously changed their situation [14]. Herewith at least requires availability

[38] Harvard Law School Forum on Corporate Governance. Virtual shareholder meetings in the U.S. 2019. URL: https://corpgov.law.harvard.edu/2019/10/10/virtual-shareholder-meetings-in-the-u-s (accessed on 01.02.2021).

[39] A.2. article 149. Part 1. Civil Code of the Russian Federation.

[40] JSC "Status". URL: https://rostatus.ru/about/news/sistema-transfer-agentskikh-otnosheniy-titan-prodolzhaet-rasshiryat-chislo-uchastnikov-i-masshtab-pr/?sphrase_id=3375 (accessed on 01.03.2021).

[41] Here the level of entity's operations transparency largely depends on readiness of the securities issuer to produce a large volume of information for the investors which exceeds the required by the legislation volume.

[42] Chartered Professional Accountants of Canada (CPA Canada). Technological disruption of capital markets and reporting? An introduction to blockchain. 2016. P. 16. URL: https://www.cpacanada.ca/en/business-and-accounting-resources/other-general-business-topics/information-management-and-technology/publications/introduction-to-blockchain-technology (accessed on 07.02.2021).

of the approved policies in the entity which are in compliance with the national statutory legislation, as it regulates access to confidential information which may be inappropriately used.

One should take into account that blockchain is one of many technologies capable of raising the level of transparency and trust between the stakeholders and also automate certain types of operations. At the same time, recording of transactions in blockchain not always may ensure evidence required for the purposes of audit. If the transaction recorded is based on the unreliable data, it will be impossible to address the problem through the technology. As previously the involvement of an expert and his professional opinion on the analyzed financial statements will be necessary (records and transactions may be unauthorized, fraudulent or illegal, performed between the related parties, have relation to supplementary agreements which are registered outside the blockchain or classified in the financial statements with mistakes).[43]

In addition, the technology's inability of transaction backdating does not prevent the employees from opportunist behavior and the entity from shadow accounting [10]. Thus, taking into account high current cost of technology implementation and potential risks, blockchain application in the entity requires additional consideration.

As more and more entities study the use of closed or open block chains, the auditors should analyze potential impact the blockchain technology may have on audit as a new source of financial statements information. Also it will be required to assess the accounting policies applied to digital assets and liabilities, which currently still remain out of the scope of International Financial Reporting Standards (IFRS) and GAAP (USA). It is necessary to consider not only how to effectively adapt the audit procedures in order to use of blockchain benefits but also how to minimize the increasing risks.

Smart-contracts application

Jensen, M.C. and Meckling, W.H. in their "Theory of the Firm: Managerial Behavior, Agency Costs and Ownership Structure" [15], as they studied agency costs from the perspective of ownership separation from control (principal-agent problem), propose to consider the entity as a population of contracts between the parties [16]. The increased digitalization of the economy enhances the problem of asymmetric information between the parties of the contracts. Generally, it is minimized by the search of informed agents (financial mediators, managers, etc.), or through the development of technologies which decrease uncertainty and increase knowledge of the economic subjects [17]. At the same time different interests of the stakeholders, irregular distribution of information (data) between them and other factors also may result in technological inequality or innovative asymmetry.[44]

Currently the so-called smart contracts gain popularity in the economy [18], which if based on a blockchain technology, may resolve the above issues and decrease transaction-related costs. Such contracts represent a computer program which is a fragment of a code in a code chains. Where the predetermined conditions are met a respective clause of the contract is automatically performed. In addition, irrespective of other codes this one is embedded in the chain of the blocks rather than on the server, which makes even a technical deviation from the contract terms impossible.[45] Thus, the blockchain technology makes it possible to drastically change approaches towards control over the entity's operation by the stakeholders and also brings a lot of questions including transformation of the entity's operations.

Despite considerable benefits of smart contracts (speed and updates in the real time mode, secure conduct of transactions, decreasing the risk of contract nonperformance, etc.) they also pose serious risks (errors in the program code, high implementation costs, uncertain status of legal responsibilities of the parties to the contract, information security risks, etc.). Taking into account the above factors, their analysis and consideration become more important. For example, EY launched the Smart Contract Analyzer service which makes

[43] Deloitte. Blockchain technology and its potential impact on the audit and assurance profession. P. 16. URL: https://www2.deloitte.com/content/dam/Deloitte/global/Documents/Audit/gx-audit-blockchain-technology-and-its-potential-impact-on-the-audit-and-assurance-profession.pdf (accessed on 07.02.2021).

[44] Milovidov V.D. Uncertainties of the global financial market in the context of the technological revolution. Dissertation for the degree of Doctor of Economics. Moscow, 2019:285–286. (In Russ.).

[45] In years to come such contracts may be developed also in the Russian Federation. Refer to Part 2, Art. 309 of the Civil Code of the Russian Federation (First Part), No. 51-FZ, dated 30.11.1994.

it possible to track smart contracts and tokens on the subject of known security threats within the frameworks of the Ethereum platform both before and after they become available in the system.[46] The Directors and Management of the entity are required to clearly understand the consequences of their use and take adequate and proper measures bearing in mind continuous growth of their use in practice [5].

Conclusions

The new economic and social realities necessarily call for in-depth study of such subject as development of new technologies, consequences of their integration into the entities' operations and their impact on its strategic development. As the format of interaction between the board, shareholders and other stakeholders demonstrates a potential for its further transformation, it is important to ensure that the parties possess the required skills and competences in this area as well as practical instruments of monitoring and audit of technologies application.

Practically any operation in the data base may be performed using blockchain technology. However, such the rationality of this choice depends on different factors since many projects may be completed with the same results based on the centralized database and existing systems. In addition, this measure will require additional implementation and technology maintenance cost provided that nowadays legal recognition of contracts and assets performed in the digital form is relatively limited.[47] So, from the very beginning the entities are required to understand feasibility of such technology implementation into their operations.

To gain maximum benefit from application of the blockchain technology and managing the emerging risks it is recommended to the entities to comply with the following principles:

1. Consider feasibility of integrating blockchain technology into the entity's operations at the level of the board of directors.
2. Develop and approve at the level of the board of directors the strategy of using blockchain technology through its integration into the general business strategy of the entity.
3. Develop and approve at the level of the board of directors' internal policies and procedures that govern the blockchain technology application in the entity.
4. Agree on the risk-appetite of the entity in relation to blockchain technology application within the framework of the general risk-management strategy of the entity.
5. Introduce analysis of efficiency of using blockchain technology and its impact on entity's operations at the level of the board of directors.
6. Ensure improving the level of employees training and competences regarding using blockchain technology.

In the next years blockchain technology will potentially change the content of corporate governance mechanisms all over the world. Here one should agree that currently this technology is still under development. Its wide application will require serious technological, institutional and legislative changes as well as closer interaction between the regulating bodies, issuers, private and institutional investors (shareholders) and auditors for the purposes of creating the system, which will change corporate practices applied in the recent years. Currently its active use will take place in the spheres where it can offer more effective alternative to the existing systems in their current condition.

[46] EY launches smart contract testing service for blockchain clients. EY Press release. 2019. URL: https://www.ey.com/en_gl/news/2019/04/ey-launches-smart-contract-testing-service-for-blockchain-clients (accessed on 06.02.2021).

[47] Blockchain: Trust economy, tech trends 2017. Deloitte Insights. 2017. URL: https://www2.deloitte.com/pg/en/pages/technology/articles/blockchain-trust-economy.html (accessed on 06.02.2021).

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