

ISSN 2523-4714

UDC 336

Jie Yang

School of Business of BSU, Minsk, Belarus

**BLOCKCHAIN TECHNOLOGIES: MODERN THREATS
AND BENEFITS FOR THE BANKING SECTOR**

The article discusses the features of the application of blockchain technology in the banking sector. Based on statistical data, the areas in which representatives of banking organizations intend to introduce blockchain technology are analyzed. The variations in the use of blockchain by commercial banks in Russia are described. The author systematizes the advantages and threats associated with the use of blockchain in the Russian banking sector. The author's view on the prospects for subsequent scientific research on the issues under consideration is presented.

Keywords: banking sector, blockchain, commercial bank, advantage, technology, threat

For citation: Yang Jie. Blockchain technologies: modern threats and benefits for the banking sector. *Biznes. Innovatsii. Ekonomika = Business. Innovations. Economics*. Minsk, 2022, iss. 6, pp. 304–309.

Цзе Ян

Институт бизнеса БГУ, Минск, Беларусь

**ТЕХНОЛОГИИ БЛОКЧЕЙН: СОВРЕМЕННЫЕ УГРОЗЫ
И ПРЕИМУЩЕСТВА ДЛЯ БАНКОВСКОГО СЕКТОРА**

В статье рассматриваются особенности применения технологии блокчейн в банковском секторе. На основе статистических данных проанализированы сферы, в которых представители банковских организаций намерены внедрять технологию блокчейн. Описаны вариации использования блокчейн коммерческими банками в России. Автором систематизированы преимущества и угрозы, сопутствующие использованию блокчейн в банковском секторе России. Изложен авторский взгляд на перспективы последующих научных исследований по рассматриваемым вопросам.

Ключевые слова: банковский сектор, блокчейн, коммерческий банк, преимущество, технология, угроза

Для цитирования: Ян, Цзе. Технологии блокчейн: современные угрозы и преимущества для банковского сектора / Цзе Ян // Бизнес. Инновации. Экономика : сб. науч. ст. / Ин-т бизнеса БГУ. — Минск, 2022. — Вып. 6. — С. 304–309.

Introduction

The process of rapid development of information technologies in modern conditions has led to the fact that they begin to spread on a large scale and be introduced into various fields of activity. The banking sector is no exception. Blockchain technology, which is a distributed database, belongs to one of the key innovative solutions of recent years. We are talking about a fundamental technology: thanks to it, a set of new principles for the formation of information databases, as well as the exchange of these data, is implemented. At the same time, in addition to the advantages of blockchain technologies, it is important to take into account the accompanying threats that may arise when they are used in the banking sector, which makes the topic relevant.

Definition of blockchain technology and its application scenarios

According to IBM, the definition of blockchain is a shared, immutable ledger designed to facilitate transaction recording and asset tracking processes in business networks. Assets can be tangible (eg houses,

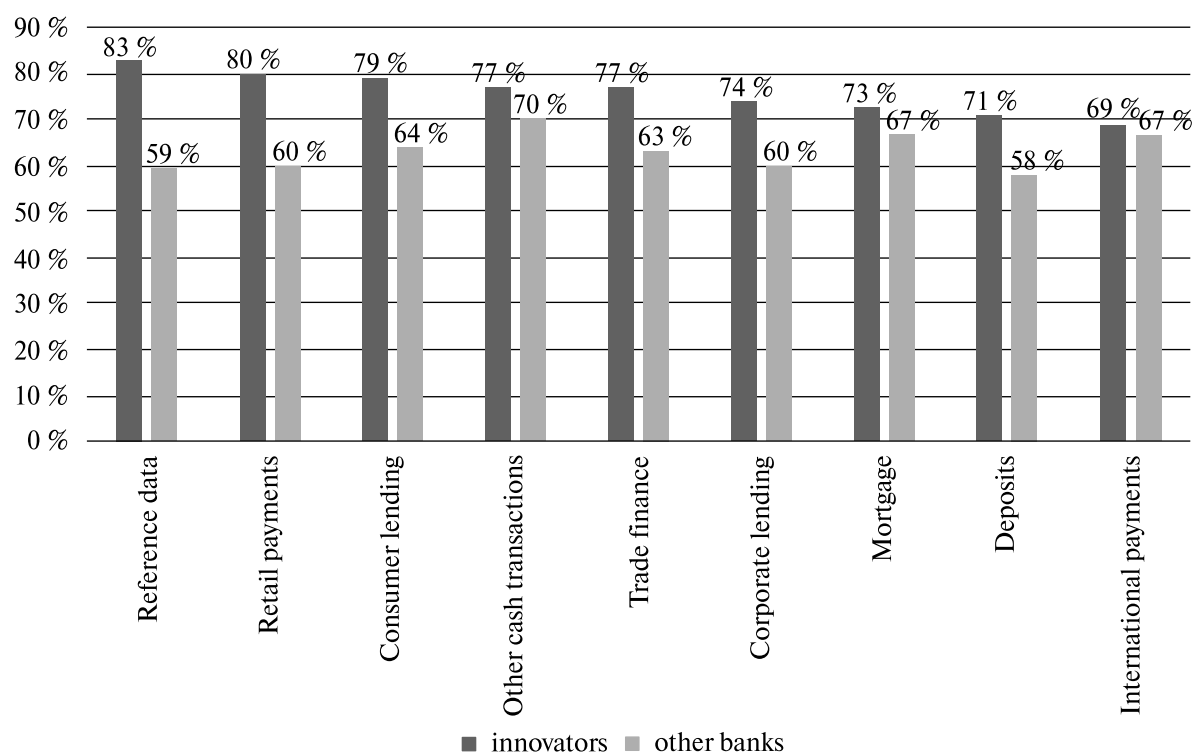
cars, cash, land) or intangible (eg intellectual property, patents, copyrights, brands). Almost anything of value can be tracked and traded on a blockchain network, reducing risk and cost in every way.

Blockchain technology can jointly generate a distributed ledger system, and various financial institutions can unite to form a consortium chain, and the process of cross-border payment will be more concise and efficient. For example, the well-known R3CEV alliance, founding members include Barclays Bank, BBVA, Credit Suisse, etc. Now China's Ping An Bank has joined the group. Blockchain technology can remove the participation of third-party institutions, improve the efficiency of information transmission and transaction speed, and reduce the transaction cost of banks.

Blockchain technology is often deployed in a point-to-point network structure, which can realize all-weather, 24-hour transfer and payment services and reduce the idle time of funds.

Results and their discussion

As part of the study of the features of the use of blockchain technologies in the banking sector, it is advisable to turn to statistical indicators. S. Mahamadou cites data obtained by the IBM Institute concerning surveys of representatives of 200 banking organizations from 16 countries. The data reflects the expectations of representatives of the banking sector from the use of blockchain. As part of the study, the following differentiation was envisaged: representatives of banks who perceive blockchain technologies with significant enthusiasm (they were classified as «innovators») and representatives who have not yet decided or are skeptical about the introduction of these technologies (Figure).



Areas in which representatives of banking organizations intend to implement blockchain technology

Source: author's developed on the basis of [3, p. 84].

As you can see from the chart above, reference data, retail payments, and consumer lending were the top areas for Innovators, while mortgages, cross-border payments, and other cash transactions were top of the list.

In Russia, starting from 2014, Sberbank began to actively implement innovative solutions based on the blockchain and associated with the transformation of the payment system [1, p. 62]. In turn, Alfa-Bank, in cooperation with the S7 airline, uses the so-called private blockchain focused on ticket sales.

Raiffeisenbank has developed a functional prototype of the blockchain platform in order to optimize and increase the speed of settlements between sellers and buyers based on the condition that participants in transactions are serviced by Raiffeisenbank itself [6, p. 109].

Blockchain technology (when used in the Russian banking sector) is characterized by many advantages, which, in our opinion (based on the study of scientific literature), can be considered in the following aspects:

- intermediary;
- temporary;
- documentation;
- transparency;
- storage of information data;
- the nature of the processing.

T. R. Lukashenok, analyzing the intermediary aspect, points out that the blockchain facilitates disintermediation (meaning the elimination of intermediaries in the economy from the supply chain), resulting in a reduction in time and resources. As for transparency, hash codes, various pointers of records that are fixed in the block system, remain irreversible and unchanged (this prevents the development of fraudulent schemes). In relation to the storage of information, the advantages are that the distributed ledger, as well as the consensus mechanism of blockchain technology, contribute to ensuring the consistency of information among a number of participants. Thanks to the blockchain, it is possible to maintain control automated transaction logs, as a result, manual processing is significantly reduced. In the documentation aspect, the advantages are manifested in the following: the blockchain makes it possible to implement business checks, as well as automatic reconciliation for the purpose of direct processing. A very significant advantage concerns time sensitivity. In this regard, blockchain technologies provide an opportunity to carry out settlements on transactions (registered) in almost real time. As a result, risks are reduced and customer service optimization is achieved [2, p. 12–13]. Thus, it can be seen that the author used a differentiated approach to characterizing the benefits. In our opinion, this approach is very valuable, since it affects a wide range of manifestations of the advantages of blockchain technologies. In subsequent studies, we see it appropriate to develop criteria for a differentiated approach.

T. S. Skrebtsova considers the benefits of using blockchain technology in the banking sector through the prism of functionality and pays attention to the following key categories: storage, communications, file serving process, archiving process. The author comes to the conclusion that the use of blockchain in the banking sector is accompanied by a positive impact on the activities of commercial banks, while emphasizing the acceleration of information exchange, reduction in time, and reduction in the cost of exchange. The advantages of blockchain are described by the author from the standpoint of improving the quality, reliability, and transparency of service [8, p. 46]. It seems to us that the author's appeal to the functional approach is very valuable, but we see it as appropriate in subsequent studies to link it with the issues of legal regulation so that the implementation of functions does not conflict with regulatory legal acts.

A. V. Novikova, A. A. Sidorenko also characterize the advantages of blockchain in the banking sector, based on a functional approach. They note that, thanks to these technologies, banking organizations achieve functionality optimization, risk reduction. Special attention is drawn to such an advantage as the ability to adapt the blockchain for a wide range of services [5, p. 202].

In addition, a number of modern studies are devoted to such an issue as the use of blockchain technologies as a tool to protect against the actions of intruders in the process of issuing digital bank guarantees. In this regard, I. E. Mikheeva designates the following advantages:

- accounting, as well as storage of information data, within which all participants can have full copies of registries with synchronization based on distributed consensus protocols;
- the use of various kinds of cryptographic tools;
- all participants in the interaction can have access to the history of transactions [4, p. 46].

In our opinion, based on the presented positions of the authors, the following areas of the banking sector can be distinguished, within which the advantages of using blockchain technologies are clearly manifested. This is about:

- payments;
- lending;
- security;
- data quality;
- cost reduction.

At the same time, among the key advantages, we see it appropriate to note the following (main):

- provision of a decentralized system;
- ensuring the safety of data;
- ensuring the transparency of ongoing transactions;
- achieving high rates of transaction speed;
- reduction of expenses belonging to the category of transaction.

At the same time, despite the wide range of advantages, one should not lose sight of the negative aspects that characterize the use of blockchain technologies in the banking sector. In this case, we are talking about threats.

When analyzing scientific publications in which researchers highlight the threats of using blockchain technologies in the Russian banking sector, we systematized these threats into a number of groups:

- informational aspects of threats;
- organizational aspects of threats;
- technical aspects of threats;
- threats associated with the labor market;
- threats associated with an insufficiently formed mechanism of legal regulation.

In order to substantiate the groups of threats identified above, it is necessary to refer to the works of modern authors.

So, M. N. Sadchikov, N. M. Kurbatov consider the issue of threats when using blockchain in the banking sector through the prism of information security, focusing on computer attacks, cyber threats, which is directly related to:

- illegal receipt of financial resources;
- falling under the control of intruders of blockchain networks (we are talking about the so-called «computer attack 51 %»);
- compromise of infrastructure of blockchain networks;
- computer DDoS attacks;
- computer attacks «Sybils» (in this case, situations are implied in which a number of identifiers are assigned to any one node);
- computer attacks of «information eclipse» (intruders seek to ensure control over the nodes of the blockchain network);
- algorithmic vulnerabilities of blockchain technology;
- phishing and the use of various kinds of botnets by attackers;
- self-mining (in this case, it means a situation in which the process of centralization of users can lead to the destruction of the original idea of the blockchain network) [7, p. 227].

When analyzing threats, I. E. Shapirov draws attention to the following key issue regarding the consolidation of blockchain technologies in legislation. Due to the fact that the technologies under consideration have not yet been sufficiently tested to date, and they also lack a history of application, according to the author, the legal framework should be supported at the initial stages by general provisions, we are talking about basic concepts and terms [10, p. 34].

In turn, K. S. Surnina, A. A. Viktorova. This is about:

- high energy consumption, as well as the cumbersomeness of the calculations;
- the absence of a coherent system of regulation by the state;
- data modifications: after the data has been added to the blockchain, it is quite difficult to modify them in the future;
- an increase in the unemployment rate: when using blockchain technologies in the banking sector, a reduction in the number of jobs can be detected with a high probability;
- excessive scaling of blockchain registers over time (data accumulation effect) [9, p. 192].

It seems to us that modern scientific publications do not pay enough attention to the organizational and technical side of threats. When assessing the threats to the use of blockchain technologies in the banking sector, it seems appropriate for us to point out the presence of the following problematic issues that carry threats:

- the technology under consideration is characterized by high energy intensity;
- there is a risk of a decrease in the speed of transactions as the number of nodes (nodes) grows;
- a very complex process of adjustment in cases of errors in transactions;
- lack of regulatory standards;
- when using blockchain in the banking sector, the susceptibility to threats directly related to information security is updated;
- still emerging (and not formed) image of blockchain technology.

In our opinion, in the future, the banking sector will fully accept and accept blockchain technologies for reasons of saving resources and expanding the client base. At the same time, it seems to us that this process will not be forced, but will become gradual, since blockchain technologies are at the initial stages of development. At the same time, despite the presence of very strict jurisdiction around the banking sector, institutions (primarily financial ones) are coming to realize the possibilities of blockchain technologies. In this regard, as a prospect for further research, we note the need to pay close attention to the relationship between the legal regulation of the functioning of the banking sector and the processes of introducing innovations, such as blockchain technologies.

Also, subsequent studies should be devoted to a deeper specification of the threats posed by the use of blockchain in the banking sector. Basically, modern research concerns the enumeration of threats, their classification, and a brief description. However, a more detailed analysis of each type of threat is needed. For example, it seems to us that it is advisable in scientific works to pay attention to such problems as:

- blockchain size;
- confidentiality;
- energy consumption;
- unconfirmed transactions;
- blockchain scalability.

In our opinion, the analysis of these problems will make it possible to develop optimal directions and recommendations for increasing the likelihood of successful use of blockchain technologies in the banking sector.

Conclusion

Thus, we can conclude that there is a wide range of advantages and threats in the application of blockchain technology in the banking sector. The advantages are manifested in the following aspects: intermediary, temporary, documentation, transparency, storage of information data, nature of processing. Threats are also characterized by a number of aspects: informational, organizational, technical aspects. threats associated with the labor market, threats associated with an insufficiently formed mechanism of legal regulation. Separately, it should be emphasized that blockchain technologies have been considered revolutionary for a relatively long time, however, all technologies have a certain level of value only if they represent simple solutions to actual problems. Threats and a number of shortcomings posed by the use of blockchain in the banking sector can be eliminated or minimized, but this requires time and a clear understanding of what exactly these technologies will become better than traditional ones used in the banking sector. In our opinion, today this awareness is at the initial stages of formation.

References

1. Badykova A. R., Ayupov A. A. Features of the monetization of blockchain platforms in the banking sector on the example of Sberbank technologies. *Kazanskii ekonomicheskii vestnik = Kazan economic bulletin*, 2020, no. 6 (50), pp. 59–66. Available at: <https://kpfu.ru/portal/docs/F2071418457/KEV.6.pdf#page=59> (accessed 9 March 2022) (in Russian).

2. Lukashenok T. R. Application of blockchain technologies in the banking sector. *Progressivnaya ekonomika* [Progressive Economics], 2021, no. 5, pp. 5–19 (in Russian).
3. Mahamadu S. Study of the impact of blockchain on the banking sector. *Nauchnyi rezul'tat. Ekonomicheskie issledovaniya = Scientific result. Economic research*, 2021, vol. 7, no. 4, pp. 77–86 (in Russian). <http://doi.org/10.18413/2409-1634-2021-7-4-0-8>
4. Mikheeva I. E. Blockchain as a tool of protection against unfair actions when issuing digital bank guarantees. *Aktual'nye problemy rossiiskogo prava* [Actual problems of Russian law], 2020. vol. 15, no. 7 (116), pp. 39–48 (in Russian). <https://doi.org/10.17803/1994-1471.2020.116.7.039-048>
5. Novikova A. V., Sidorenko A. A. Blockchain technology in the banking sector: prospects for use. *Materialy II mezhdunarodnoi nauchno-prakticheskoi konferentsii «Tendentsii i perspektivy razvitiya bankovskoi sistemy v sovremennykh ekonomicheskikh usloviyakh»* [Materials of the II International Scientific and Practical Conference «Trends and prospects for the development of the banking system in modern economic conditions»]. Bryansk, 2020, pp. 202–206 (in Russian).
6. Petrunin I. A. Benefits of using blockchain technology in the banking sector. *Tsifrovye tekhnologii v ekonomike i obrazovanii : sbornik nauchnykh trudov po itogam mezhvuzovskoi nauchno-prakticheskoi konferentsii* [Collection of scientific papers based on the results of the interuniversity scientific and practical conference «Digital technologies in economics and education»]. Saratov, 2019, pp. 107–111 (in Russian).
7. Sadchikov M. N., Kurbatov N. M. On the issue of legal regulation and ensuring information security when using blockchain technology in the banking sector of the economy of the Russian Federation. *Vestnik Saratovskoi gosudarstvennoi yurilicheskoi akademii = Bulletin of the Saratov State Law Academy*, 2020, no. 1 (132), pp. 219–229 (in Russian).
8. Skrebtsova T. S. The use of blockchain technology in the implementation of banking operations and banking transactions. *Ustoichivoe razvitie nauki i obrazovaniya = Sustainable development of science and education*, 2020, no. 10 (49), pp. 41–47 (in Russian).
9. Surnina K. S., Viktorova A. A. Application of blockchain technology in the banking sector. *Materialy XVIII Vserossiiskoi nauchno-prakticheskoi konferentsii s mezhdunarodnym uchastiem «Aktual'nye problemy i perspektivy razvitiya ekonomiki»* [Proceedings of the XVIII All-Russian scientific-practical conference with international participation «Actual problems and prospects for the development of the economy»]. Simferopol-Gurzuf, 2019, pp. 191–193 (in Russian).
10. Shapiro I. E. Possible risks and threats for the banking sector in the mass implementation of Blockchain technology. *Finansovye issledovaniya = Financial research*. Rostov-on-Don, 2019, no. 1 (62), pp. 32–36 (in Russian).

Information about the author

Yang Jie — PhD student, School of Business of BSU,
e-mail: yeungkit6666@gmail.com

Информация об авторе

Ян Цзе — аспирант, Институт бизнеса БГУ,
e-mail: yeungkit6666@gmail.com

Received by editorial board 10.03.2022

Статья поступила в редколлегию 10.03.2022