

MODERN BLOCKCHAIN TECHNOLOGIES AND THE LAW OF STATE REGISTERS (UKRAINIAN EXPERIENCE)

Anatolii Poliakh, National Academy of Internal Affairs

**Ivan Doronin, Research Institute of Informatics and Law of the National
Academy of Legal Sciences of Ukraine**

Andrii Zapototskyi, National Academy of Internal Affairs

Svitlana Pylypenko, National Academy of Internal Affairs

Oleh Yemets, National Academy of Internal Affairs

ABSTRACT

Description: The article is devoted to the problem of peculiarities of legal application of blockchain technologies in relation to State registers in Ukraine. The Subject of the Study: The subject is the examination of the legal nature and regulation legal application of blockchain technologies in relation to state registers in Ukraine.

Methodology: The following methods of scientific analysis are used to substantiate the provisions put forward in the research: method of system analysis, methods of theoretical generalization and comparison, statistical methods of information processing, economic analysis, decision making, modeling and expert evaluations.

The Results of the Study: It is stated that blockchain technology is one of the modern world technological trends. Its advantages are a high degree of protection of information from unauthorized changes, which increases the level of confidence in the whole process of its collection, storage and processing. In the domestic realities, technical specialists are actively proposing various projects for the use of blockchain technology in state registers.

Practical Implications: It is proved that are a number of legal problems related to legal application of blockchain technologies in relation to State registers in Ukraine, which, nevertheless, can be solved through the application of existing law.

Value/Originality: The article analyzes the main views expressed in modern legal science on the issue under consideration, substantiates the relevant problem area and suggests the problems for further research.

Keywords: Blockchain Technology, Private Blockchain, Public Blockchain, State Registers, Raiding.

INTRODUCTION

It is difficult to overestimate the impact of technology, especially information, on various areas of human activity, as well as on society in general in today's globalized world. The application of blockchain technology (which, in turn, is a subspecies of distributed registers,

distributed ledger technology, DLT) in this aspect applies to quite different areas, which at first glance are weakly interconnected.

Technological innovations quite often determine the need for changes in legal regulation. As a rule, general methods of legal regulation, as well as legal practice together allow to adequately respond to current challenges of society due to the latest technologies. But in the case of DLT and blockchain, the situation is somewhat different, as their impact was complex, multifaceted and complex, which is considered in the domestic literature (Doronin, 2017; Baranov, 2018; Bachynskyy & Radeiko, 2019).

Without going into the technical component of the blockchain, it is necessary to distinguish between the so-called private and public blockchain for the purposes of legal regulation. The stored information is held simultaneously by all participants in the system in public blockchain, and none of them controls all the information or any critical part of it. Thus a number of actions of an indefinite circle of participants on maintenance of the distributed register are carried out (Doronin, 2017; Cuegan, 2017; Kolisko, 2018).

In the case of a private blockchain, information is physically stored and processed by computing devices operated by a single person (organization). It is clear that there is no need to take action to maintain a decentralized system with a significant number of participants. Technically, the registry is maintained in the traditional way using slightly different protocols. In this case, there are no special legal problems compared to the functioning of computer networks because one entity is the owner of all information and is responsible for its preservation.

The issues explored in this article are primarily characteristic of the public blockchain.

MATERIALS AND METHODS

The theoretical and methodological basis of the study are the works of modern domestic and foreign scientists in the area of economic theory, law, fundamental provisions of general systems theory, general management theory, economic analysis, design approach and others.

The following methods of scientific analysis are used to substantiate the provisions put forward in the research: method of system analysis, methods of theoretical generalization and comparison, statistical methods of information processing, economic analysis, decision making, modeling and expert evaluations.

RESULTS AND DISCUSSION

Modern scientific legal literature proposes to consider the problem of legal regulation of relations related to the use of blockchain in the context of the following main elements.

Firstly, it is a set of problems related to the circulation of cryptocurrency (bitcoin and similar tools based on blockchain technology). The special nature of cryptocurrency causes legal problems related to: legal status in terms of the provisions of civil law (property rights, obligations, etc.); the possibility of applying the law on currencies or securities (in the absence of the issuer); features of income taxation; the level and limits of State regulation in the field of their acquisition, trade and exchange for money.

Secondly, it is possible to use certain applications of technology in financial transactions (initial coin offering, ICO) and transactions (Smart-contract technology).

The third element is the features of the blockchain to ensure the stability and consistency of information in various registers. According to the experts, the data register, built using a blockchain, has a significant number of advantages over traditional methods of storing information.

Therefore, it is necessary to analyze the legal possibilities and legal problems of using blockchain in the State registers of Ukraine in the context of economic and political reforms.

In general, State registers under modern conditions can be considered those automated systems (information accounting), which are maintained by government agencies in order to implement their functions. Today, some of the State registers are not fully automatic in Ukraine. As a rule, these are databases, which were maintained before the informatization process began. In any case, the current State registers maintained by State bodies are automated systems that contain relevant databases with certain information. The normative legal acts use the terminology “*State register*” and “*unified State register*”, which are essentially equivalent. The use of the term “*unified*” emphasizes its national significance, as in fact it is a centralized register by the relevant State body. The proposals to reform the system of State registers by regulating public electronic registers exist and will be explored later in this article.

The feature of public administration in Ukraine is the presence of a significant number of different State registers (including databases that can be considered registers). Independent experts reckon that there were more than 135 State registers in Ukraine, which are operated by more than 40 State bodies and institutions as of 2018. It is emphasized that the experts failed to establish the full number of registers due to the lack of accounting for such registers and clear legal criteria for the information stored in centralized databases, namely the State registers (Tapas, 2018). As a rule, the State body (institution) that maintains the register carries out the whole set of technical measures related to the receipt, processing, storage, transmission and provision of information from the budget.

State registers are divided into (from the point of view of public access to information stored in State registers):

1. Fully public registers with free access to all available information;
2. Limited public registers with free access to part of the information, except for restrictions, specially enshrined by law (for example, exception for personal data);
3. Restricted registers with free access to information only by authorized persons (first of all, it is a question of the registers containing the State or official secret).

According to the criterion of managing the information contained in them, the registers can be divided into those, in which:

1. Information management is carried out exclusively by the employees of the State agency that owns the register;
2. Information management is carried out jointly by various government agencies;
3. Information management is carried out by authorized entities (i.e. not by officials of the State agency that owns the register).

Information management in this case should be understood as actions to input, modify and delete information in the registers to varying degrees.

The relationship between the need to maintain a State register and the performance of the relevant functions of a State body is particularly problematic. The large number of registers

currently maintained in Ukraine raises the issue about their real need in terms of public functions. Besides, there are a number of problems with the integration of information stored in different State registers, as certain aspects of its use by one State agency may not be consistent with the goals and objectives of another body (institution) that maintains the register. In addition, there is a fairly large array of inconsistent legislation governing the handling of information, as well as the competence of certain government agencies to collect, process, and store and use information. Besides, the authority to organize the maintenance of State registers in many cases is entrusted to specially form State-owned enterprises, which does not have the best effect on the definition of responsibility.

The legal basis for handling information stored in State registers is special legislative acts-the Laws of Ukraine “*On Information*” (Law of Ukraine, 1992), “*On the Access to Public Information*” and others. Article 20 of the Law of Ukraine “*On Information*” enshrines that access to information may be open or restricted. Restrictions on access to information are set in cases provided by law. The following types of information restrictions are established in Ukraine-confidential, secret and official information. Confidential is information about an individual, as well as information, to which the owner has established restricted access. Criteria and procedure for classifying information as official and secret are established by the State.

Thus, the information contained in State registers may provide information about an individual, or be considered to be owned by a natural or legal person (according to the wording of the Law of Ukraine “*On Information*” and other acts of domestic legislation). At the same time, it may contain personal data (according to the wording of European law and the Law of Ukraine “*On Personal Data Protection*”). Therefore, in this case, the State (represented by a State agency) should ensure compliance with legal requirements regarding information that is owned by individuals or is personal data. In general, the Law of Ukraine “*On Information*” defines the objects, subjects of relations, the procedure for access to information, the conditions of information processing, ensuring its protection, relations between the subjects and the powers of State bodies. In case of application of blockchain technologies to the maintenance of State registers, it is possible to determine that the technology cannot be legally applied to any information subject to protection, given that it is impossible to determine who owns the system within the provisions of this Law. It is possible to identify on the example of the application of the latest technologies to certain types of registers that technical possibilities of access to the technology in the public blockchain are de facto provided by foreign legal entities. However, they are not personally identified in the system from a legal point of view, and therefore-improperly defined.

The need for the use of blockchain technology in Ukraine in relation to State registers is considered from the perspective of a number of political, economic and legal factors (Doronin, 2017; Konashevych, 2015). First of all, in our opinion, this is due to the total loss of public confidence in the State’s ability to ensure human rights, especially in relation to information. In particular, there are registers in the state, modification and deletion of information of which are critical for the protection of property rights. These registers relate to information on real estate, property and property rights. Illegal actions to modify such information seriously violate the property and other rights of owners. World practice shows that blockchain technology is used under similar conditions in other countries (Bachynskyy & Radeiko, 2019; Monsalve et al., 2017; Kim & Kang, 2017; Santiso, 2018).

The Law of Ukraine “*On Protection of Information in Information and Telecommunication Systems*” (Law of Ukraine, 1994) defines such protection as an activity aimed at preventing unauthorized actions with regard to information in the system. It is the responsibility of the system owner to provide protection.

The practice of using State registers in Ukraine shows that the authority of the owner of information and management of registers in some State agencies can be assigned to different institutions (legal entities). Numerous legislative innovations have significantly increased the number of registers, as well as the entities that manage them in recent years. For example, the Unified State Demographic Register, created on the basis of the Law of Ukraine “*On the Unified State Demographic Register and Documents Proving Citizenship of Ukraine, Identity or Special Status of a Person*”, is critical from the point of view of compliance with personal data legislation. The administration of this register is carried out by the State enterprise (SE) “*Document*”, which is not an executive body. SE “*Document*” is under the management of the State Migration Service of Ukraine, whose activities are directed through the Minister of Internal Affairs of Ukraine. In this example, it can be seen that the administration of the whole system in this case is performed by one entity, albeit with a complicated management system.

As for critically vulnerable State registers of property and property rights, in general they have a similar system of administration: as a rule, it is maintained by a State-owned enterprise under the management of the Ministry or other State agency. At the same time, the right to make changes, as well as access to various types of information are given to other authorized entities. This requires taking measures to prevent illegal (unauthorized) interference in the system and modification of information in the absence of legal grounds. Particular difficulties arise with maintaining such a State register, which is related to the right to use land, because in addition to the certification function, it requires information on spatial and geographical positioning.

The main factors causing public distrust in this case are the spread of corruption and the threat of so-called “raiding”. Regarding the application of certain advantages of blockchain technology in the area of anti-corruption, the situation does not seem optimistic enough because of the following reasons. The fact is that blockchain technology is able to effectively protect the information stored in the system; while it does not have technological means of protection against the dishonest actions of corrupt government officials who enjoy the powers associated with his (her) position.

The same essentially applies to threats caused by raiding, which is understood as actions aimed at the seizure of someone else’s property (property rights) on the basis of forged documents in various forms.

According to some experts, the effectiveness of blockchain technology in combating corruption seems somewhat exaggerated. Thus, Kibum Kim and Taewon Kang (2017) state that blockchain technology is not a panacea that will resolve all corruption issues of modernity. Without considering the data governance and privacy issues, its application on the supply chain may lead to a distorted market structure. Its implementation on the developing or underdeveloped world will not be realized on a large scale anytime soon due to the resistance of the existing leadership and lack of infrastructure. Niklas Kossow and Victoria Dykes (2018) also agree that blockchain technology is not typically used as a specific anticorruption tool. Yet, its attributes can make blockchain technology applications more resilient to corruption.

The prospects for the use of blockchain technology for its application in property and land registers by scientists are generally optimistic (Bachynskyy & Radeiko, 2019; Konashevych, 2015).

If we analyze the current practice of using certain manifestations of blockchain technology and its analogues in different countries, it is possible to recognize the presence of a significant number of examples and individual projects. The advantages in this case are due to decentralization, which guarantees transparency and fairness, especially in cases of complicated registers. The most complicated of these is the land register (cadastre), because of technical problems of correct geographical positioning, appealing against the use of such positioning on the boundaries of plots, determining the legitimacy of their changes and creating appropriate guarantees to preserve information and prevent improper modification. Besides, it should contain complete information in chronological order. However, in many cases, public expectations are much higher than the real benefits of such technologies. In the case with land cadastres, another aspect of technology is important, namely the ability to certify agreements, as a result of which the rights arise or modify by technological means (Hardjono & Maler, 2017). In this case, it is an electronic analogue of notarial acts, which contains certain guarantees against bad faith or inaccuracy of the notary. Therefore, the use of certification technologies based on blockchain is quite promising in future legal regulation.

At the same time, as some experts correctly point out, the State registration of law is derived from the legal regulation, which is determined by a particular legal system (Kaczorowska, 2019; Vos, 2017). Therefore, under such conditions, the State register does not require special legal procedures for property rights, including when using various applications specific to blockchain technology.

On January 17, 2018 the Cabinet of Ministers of Ukraine approved the Concept for the Development of Digital Economy and Society of Ukraine for 2018-2020 (Legislation of Ukraine, 2018). This Concept envisages, among other things, the measures for the development of important digital infrastructures, one of which is the blockchain. The registration of property rights with the use of this technology is considered quite promising among the directions of State policy. At the same time, the Government of Ukraine has identified further prospects for the use of blockchain technology. These include the means of e-democracy and e-government, and it is on the basis of this technology that it is proposed to develop opportunities for electronic petitions, referendums, voting, public debates, etc. The creation of fully decentralized systems is one of the prospects taking into account the possibility of technologically providing highly effective mechanisms for protecting the integrity and availability of information. According to Government experts, the use of such technology will increase public trust and prevent manipulation of registers.

Nowadays, we should talk about the existence of drafting regulation in Ukraine on the legal management of relations in the area of application of blockchain technology. These projects have not yet been implemented in the relevant legislation, while the relevant laws have already been passed in Arizona, Vermont and some others States (Svikhart, 2017; Pressgrove, 2019; Fulmer, 2019). At the same time, the mentioned legislative acts also regulate only certain narrow issues that arise in the practice of application of certain technologies.

The Verkhovna Rada of Ukraine considered the Draft Laws no. 7183, 7183-1, 7485 at the level of legislative proposals. The first two of them were devoted to the regulation of the cryptocurrency market (as one of the variations of blockchain technology). Bill 7485 (Draft Law

of Ukraine, 2018) concerned a more complex subject of legal regulation. In particular; its authors defined the purpose of legal regulation as the normalization of the cryptocurrency market, but later its task was detailed by introduction of blockchain technology into the economy. At the same time, the Bill established a number of incentive measures, including by introducing special legal regimes for economic entities. Among its shortcomings we can mention the vagueness of the subject of legal regulation and insufficient argumentation for the establishment of benefits and preferences.

The Draft Law no. 2110 of September 10, 2019 (Draft Law of Ukraine, 2019), introduced to improve the legal regulation of public electronic registers (information and communication systems, which are the property of State or municipal agencies and are owned by the relevant self-regulatory organization and provide collection, accumulation, processing, protection, accounting and provision of register information) is also worth mentioning. This Bill, which claims to be a comprehensive legal regulation of electronic registers, is not without its drawbacks, due to the shift of the purpose of legal regulation from State registers towards the general regulation of the activities related to registers.

CONCLUSION

A number of factors recognized in Ukraine at the governmental level in the Concept of Development of Digital Economy and Society of Ukraine for 2018–2020 indicate possible changes in the nature of public administration and governance, as the use of DLT (including blockchain) will lead to and the functioning of decentralized autonomous organizations (DAO), which can be considered as a promising legal reality (Reyes et al., 2017; Howell et al., 2019; Wang et al., 2019; Reyes, 2017).

At the same time, the problems of reforming the system of State registers and the peculiarities of the application of promising technologies for their maintenance should be due to overcoming contradictions and inconsistencies both in the provisions of legislation and in the activities of State bodies.

In particular, it should be about regularizing the list of State registers, entities and competencies for their maintenance, conducting personal electronic identification of the population by technical means, solving related technical problems. In the context of legal regulation, it is also necessary to update the current legislation on the protection of information in order to bring it to the realities determined by modern computer technology.

In this way, it is also important to focus on overcoming the complications caused by the features of blockchain technology, in particular, determining the responsibility of a particular entity for control over the system, solving the problem of general stimulation of the system (known as pacing problem), and possible capture of the whole system of public blockchain participants (problem attack 51%). It is these factors that should determine further scientific legal research, as well as be guidelines for Draft Law.

REFERENCES

- Bachynskyy, T., & Radeiko, R. (2019). Legal regulations of blockchain and cryptocurrency in Ukraine. *Hungarian Journal Legal Studies*, 60(1), 3-17.
- Baranov, O.A. (2018). Internet of things (IoT) and blockchain. *Information and Law*, 1(1), 59-71.

- Cuegan, D. (2017). Public blockchain versus private blockchain. *Hashs Archives ouvertes*. Retrieved June 17, 2020 from <https://halshs.archives-ouvertes.fr/halshs-01524440/document>
- Doronin, I.M. (2017). Blockchain, society and the state: Problems of law-making. *Presented at the 2nd International scientific and practical conference IT Law: Problems and Prospects in Ukraine*. Lviv, Ukraine.
- Doronin, I.M. (2017). The use of modern technologies of distributed data processing: Law and functions of the State. *Information and Law*, 2(1), 51-58.
- Draft Law of Ukraine. (2018). *On the development of the digital economy of January 15*, no. 7485. Retrieved June 19, 2020 from http://w1.c1.rada.gov.ua/pls/zweb2/webproc4_1?pf3511=63316
- Draft Law of Ukraine. (2019). *About public electronic registers of September 10*, no. 2110. Retrieved June 19, 2020 from http://w1.c1.rada.gov.ua/pls/zweb2/webproc4_1?id=&pf3511=66772
- Fulmer, N. (2019). Exploring the legal issues of blockchain applications. *Akron Law Journal*, 52(1), 162–192.
- Hardjono, T., & Maler, E. (2017). Report from the blockchain and smart contracts discussion group to the kantara initiative version 1.0. *Kantara Initiative Blockchain And Smart Contracts Discussion Group*. Retrieved June 19, 2020 from <https://kantarainitiative.org/file-downloads/report-from-theblockchain-and-smart-contracts-discussion-group-to-the-kantara-initiative-v1>
- Howell, B.E., Potgieter, P.H., & Sadowski, B. (2019). Governance of blockchain and distributed ledger technology projects. *Presented at the 2nd Europe–Middle East–North African Regional ITS Conference*. Egypt, Aswan.
- Kaczorowska, M. (2019). Blockchain-based land registration: Possibilities and challenges. *Masaryk University Journal of Law and Technology*, 13(2), 339–360.
- Kim, K., & Kang, T. (2017). Does technology against corruption always lead to benefit? The potential risks and challenges of the blockchain technology. *Paper for 2017 OECD Global Anti-Corruption & Integrity Forum*. Retrieved June 18, 2020 from <https://www.oecd.org/cleangovbiz/Integrity-Forum-2017-Kim-Kang-blockchain-technology.pdf>
- Kolisko, L. (2018). In-depth on differences between public, private and permissioned blockchains. *The Medium*. Retrieved June 20, 2020 from <http://medium.com/@lkolisko/in-depth-on-differences-between-public-private-and-permissioned-blockchains-aff762f0ca24>
- Konashevych, O. (2015). The use of blockchain technology for the development of electronic democracy and electronic governance. *Journal of the National University Ostroh Academy*, 1(1), 1-11.
- Kossow, N., & Dykes, V. (2018). Blockchain, bitcoin and corruption. A review of the linkages. *Transparency International Anti-Corruption Helpdesk Answer*. Retrieved June 19, 2020 from <https://knowledgehub.transparency.org/assets/uploads/helpdesk/Blockchain-bitcoin-and-corruption-2018.pdf>
- Law of Ukraine. (1992). *On information of October 02*, no. 2657-XII. Retrieved June 17, 2020 from <https://zakon.rada.gov.ua/laws/show/2657-12#Text>
- Law of Ukraine. (1994). *On protection of information in information and telecommunication systems of July 05*, no. 80/94-VR. Retrieved June 15, 2020 from <https://zakon.rada.gov.ua/laws/show/80/94-%D0%B2%D1%80#Text>
- Legislation of Ukraine. (2018). On approval of the Concept of development of the digital economy and society of Ukraine 2020 and approval of the Action Plan for its Implementation of January 17, no. 67-r. *Order of the Cabinet of Ministers of Ukraine*. Retrieved June 15, 2020 from <https://zakon.rada.gov.ua/laws/show/67-2018-%D1%80#Text>
- Monsalve, F., Para, O.J., & Diaz, R.A. (2017). Blockchain 3.0. Technological solution to face corruption. *Contemporary Engineering Sciences*, 10(34), 1651–1658.
- Pressgrove, J. (2019). Wyoming continues to pursue a future with blockchain. *GovTech*. Retrieved June 19, 2020 from <https://www.govtech.com/products/Wyoming-Continues-to-Pursue-a-Blockchain-Heavy-Future.html>
- Reyes, C.L. (2017). Conceptualizing cryptolaw. *Nebraska Law Review*, 96(2), 384–445.
- Reyes, C.L., Packin, N.G., & Edwards, B. (2017). Distributed Governance. *William & Mary Law Review*, Volume 59(1), 1–32.
- Santiso, C. (2018). Will blockchain disrupt government corruption? *Stanford Social Innovation Review*. Retrieved June 18, 2020 from http://ssir.org/articles/entry/will_blockchain_disrupt_government_corruption
- Svikhart, R.T. (2017). Blockchain's big hurdle. *Stanford Law Review Online*, 70(1), 100–111.
- Tapas. (2018). Status and prospects of development of State electronic information resources: Report on the results of the analytical study of the project. *Transparency and accountability in public administration and*

- services*. Retrieved June 20, 2020 from http://tapas.org.ua/wp-content/uploads/2018/11/Report_SEIR_UKR.pdf
- Vos, J. (2017). Blockchain-based land registry: Panacea, illusion or something in between? *7th ELRA Annual Publication*. Retrieved June 19, 2020 from <https://www.elra.eu/wp-content/uploads/2017/02/10.-Jacques-Vos-Blockchain-based-Land-Registry.pdf>
- Wang, S., Ding, W., Li, J., Yuan, Y., Ouyang, L., & Wang, F. (2019). Decentralized autonomous organizations: concept, model and applications. *IEEE Transactions on Computational Social Systems*, 6(5), 870–878.