



Әкімшілік құқық. Әкімшілік процесс / Administrative Law. Administrative procedure/ Административное право. Административный процесс

Scientific article

<https://doi.org/10.32523/2616-6844-2026-156-3-92-104>

IRSTI 10.19.01.

Legal Regulation of the Integration of Artificial Intelligence and Blockchain Technologies in the Republic of Kazakhstan

K.R. Useinova*¹, A.A. Toktybaev², A.T. Berekenov³

¹*Al-Farabi Kazakh National University, Almaty, Kazakhstan*

^{2,3}*Almaty Academy of the Ministry of Internal Affairs of the Republic of Kazakhstan named after M. Esbolatov, Almaty, Kazakhstan*

(e-mail: ¹karlygash_usein@mail.ru, ²tamerlan.arslan.83@bk.ru, ³askar_868@mail.ru)

Abstract. This article provides a comprehensive analysis of the legal regulation of artificial intelligence and blockchain technologies in the Republic of Kazakhstan in the context of the formation of a modern digital legal system. It examines the provisions of the Law of the Republic of Kazakhstan “On Artificial Intelligence,” the Law “On Digital Assets,” and the Digital Code of the Republic of Kazakhstan, analyzing their conceptual approaches to regulating autonomous algorithmic decision-making, digital assets, and smart contracts. Particular attention is paid to issues of liability allocation in the context of AI system autonomy, the correlation between the immutability of distributed ledger technologies and civil law protection mechanisms, as well as issues of algorithmic transparency and non-discrimination. The study is based on a systemic analysis of national legislation, incorporating international approaches, including OECD principles and the European model of AI regulation. The scientific novelty of the research lies in examining artificial intelligence and blockchain technologies in their technological and legal interconnection, which makes it possible to identify specific features of regulating integrated digital ecosystems. As a result, proposals have been formulated to improve the legal framework, including the introduction of a multi-level liability model, the development of algorithmic auditing, the establishment of “digital restitution” procedures, and insurance mechanisms for risks associated with the operation of autonomous systems.

Keywords: artificial intelligence; blockchain technologies; digital assets; smart contract; algorithmic transparency; algorithmic bias; civil liability; digital code; autonomous systems; digital ecosystems; legal regulation.

Received: 18.09.2026. Accepted: 23.09.2026. Available online: 30.09.2026

Қ.Р. Усеинова*¹, А.А. Тоқтыбаев², А.Т. Берекенов³

¹Әл-Фараби атындағы Қазақ Ұлттық Университеті, Алматы, Қазақстан

^{2,3}Қазақстан Республикасы ИМ М. Есболатов атындағы Алматы академиясы,
Алматы, Қазақстан

(e-mail: ¹karlygash_usein@mail.ru, ²tamerlan.arslan.83@bk.ru, ³askar_868@mail.ru)

Қазақстан Республикасында жасанды интеллект пен блокчейн-технологияларды интеграциялаудың құқықтық реттелуі

Аңдатпа. Мақалада қазіргі заманғы цифрлық құқықтық жүйені қалыптастыру контекстінде Қазақстан Республикасындағы жасанды интеллект пен блокчейн-технологияларды құқықтық реттеуге кешенді талдау жүргізіледі. Қазақстан Республикасының «Жасанды интеллект туралы» Заңы, «Цифрлық активтер туралы» Заңы және Қазақстан Республикасының Цифрлық кодексі қарастырылып, олардың автономды алгоритмдік шешімдерді, цифрлық активтерді және смарт-келісімшарттарды реттеудегі тұжырымдамалық тәсілдері талданады. Зерттеуде ерекше назар жасанды интеллект жүйелерінің автономдылығы жағдайында жауапкершілікті бөлу мәселелеріне, таратылған тізілімнің өзгермейтіндігі мен азаматтық-құқықтық қорғау институттарының арақатынасына, сондай-ақ алгоритмдік ашықтық пен кемсітпеу мәселелеріне аударылады. Зерттеу ұлттық заңнаманы жүйелі талдауға негізделген және халықаралық тәсілдерді, оның ішінде OECD қағидаттарын және жасанды интеллектті реттеудің еуропалық моделін қамтиды. Жұмыстың ғылыми жаңалығы жасанды интеллект пен блокчейн-технологияларды олардың технологиялық және құқықтық өзара байланысында қарастыру болып табылады, бұл интеграцияланған цифрлық экожүйелерді реттеудің ерекшеліктерін айқындауға мүмкіндік береді. Зерттеу нәтижесінде құқықтық тетікті жетілдіру бойынша ұсыныстар әзірленді: жауапкершіліктің көпдеңгейлі моделін енгізу, алгоритмдік аудитті дамыту, «цифрлық реституция» рәсімдерін бекіту және автономды жүйелерді пайдалану тәуекелдерін сақтандыру.

Түйін сөздер: жасанды интеллект; блокчейн-технологиялар; цифрлық активтер; смарт-келісімшарт; алгоритмдік ашықтық; алгоритмдік біржақтылық; азаматтық-құқықтық жауапкершілік; цифрлық кодекс; автономды жүйелер; цифрлық экожүйелер; құқықтық реттеу.

К.Р. Усеинова*¹, А.А. Токтыбаев², А.Т. Берекенов³

¹Казахский национальный университет имени аль-Фараби, Алматы, Казахстан

^{2,3}Алматинская академия МВД Республики Казахстан имени М. Есболатова,
Алматы, Казахстан

(e-mail: ¹karlygash_usein@mail.ru, ²tamerlan.arslan.83@bk.ru, ³askar_868@mail.ru)

Правовое регулирование интеграции искусственного интеллекта и блокчейн-технологий в Республике Казахстан

Аннотация. В статье проводится комплексный анализ правового регулирования искусственного интеллекта и блокчейн-технологий в Республике Казахстан в контексте формирования современной цифровой правовой системы. Рассматриваются

положения Закона Республики Казахстан «Об искусственном интеллекте», Закона Республики Казахстан «О цифровых активах» и Цифрового кодекса Республики Казахстан, анализируются их концептуальные подходы к регулированию автономных алгоритмических решений, цифровых активов и смарт-контрактов. Особое внимание уделяется проблемам распределения ответственности при автономности ИИ-систем, соотношению неизменяемости распределённого реестра с институтами гражданско-правовой защиты, а также вопросам алгоритмической прозрачности и недискриминации.

Исследование основывается на системном анализе национального законодательства с привлечением международных подходов, включая принципы OECD и европейскую модель регулирования ИИ. Научная новизна работы заключается в рассмотрении искусственного интеллекта и блокчейн-технологий в их технологической и правовой взаимосвязи, что позволяет выявить особенности регулирования интегрированных цифровых экосистем. В результате сформулированы предложения по совершенствованию правового механизма: внедрение многоуровневой модели ответственности, развитие алгоритмического аудита, закрепление процедур «цифровой реституции» и страхование рисков эксплуатации автономных систем.

Ключевые слова: искусственный интеллект; блокчейн-технологии; цифровые активы; смарт-контракт; алгоритмическая прозрачность; алгоритмическая предвзятость; гражданско-правовая ответственность; цифровой кодекс; автономные системы; цифровые экосистемы; правовое регулирование.

Introduction

The development of technologies of the fourth industrial revolution imposes increased requirements on states to form an effective legal framework for regulating digital innovations. In particular, artificial intelligence (AI) and blockchain technologies have a significant impact on economic, social, and legal processes, creating new opportunities for automation, transparency, data protection, and increasing the trust of participants in digital relations.

In the Republic of Kazakhstan, in 2025, the Law "On Artificial Intelligence" was adopted, which established the basic principles of AI application, including the classification of systems by risk level, ensuring transparency of algorithmic decisions and the distribution of responsibility between the owner and user [1]. In 2026, the Digital Code came into force, establishing the legal regime for digital assets and smart contracts, as well as requirements for protecting personal data and ensuring information security in digital transactions. These regulations create the basis for the introduction of innovative technologies and the formation of trusting digital relations between the subjects of legal relations.

Despite the existing regulatory framework, there are still significant legal challenges associated with the use of AI and blockchain technologies. Among them are the distribution of responsibility for the actions of intelligent systems, the regulation of smart contracts, the determination of the legal status of digital assets, as well as the interaction of AI with blockchain platforms. Insufficient specification of legal norms creates uncertainty for participants in digital relations and can hinder the scaling of innovations. The analysis of these issues, taking into account both national and international practice, is a prerequisite for ensuring sustainable digital development and the formation of effective legal regulation.

The aim of the study is to comprehensively analyze the legal regulation of artificial intelligence and blockchain technologies in the Republic of Kazakhstan, identify gaps in the current regulatory framework, and formulate proposals for improving the legal mechanism for integrating digital innovations.

The scientific novelty of the work consists in considering AI and blockchain technologies not as isolated objects, but in the context of their technological and legal synergy, which allows us to identify the features of interaction of these technologies in the legal sphere, identify areas of legal uncertainty, and propose conceptual solutions for their regulation.

Research methods. The paper uses general scientific methods of analysis and comparison, as well as private scientific methods of legal research. A systematic analysis of regulatory legal acts of the Republic of Kazakhstan, including the Law "On Artificial Intelligence" (2025), the Digital Code (2026) and specialized laws on digital assets, was carried out.

The main part

The adoption of the Law of the Republic of Kazakhstan "On Artificial Intelligence" has become an important stage in the institutionalization of legal regulation of digital technologies in the country [1]. The law was adopted in response to the rapid development of AI and digital systems, which are actively implemented in the economy, public administration, and everyday life of citizens. Until 2025, the regulation of AI was fragmented and was carried out mainly through general provisions of civil and digital legislation, which did not take into account the specifics of autonomous algorithmic solutions, the distribution of responsibility between the owner and the user, as well as potential risks to the rights of citizens. The introduction of a comprehensive law provided a systematic approach to AI regulation, establishing the classification of systems by risk level, principles of transparency of algorithms and distribution of responsibility, which allowed creating a balance between innovative technology development and protection of public interests.

The Law of the Republic of Kazakhstan "On Artificial Intelligence" consists of six chapters and 31 articles and introduces key legal definitions, including "artificial intelligence" (AI), "artificial intelligence system" (SI), "data library" and "synthetic results". The law establishes a risk-based approach that allows differentiating control and monitoring measures depending on the potential impact of AI on the rights, health and safety of citizens. In addition, the document sets out the basic principles of state regulation of public relations in the field of AI, creating a legal basis for the safe, transparent and ethically responsible implementation of technologies in various spheres of the economy and social life.

One of the key elements of regulation is transparency of algorithmic decisions. The law requires developers and owners of AI systems to provide an opportunity to explain the logic of algorithms, especially in cases that affect the rights and legitimate interests of citizens, such as automated credit assessment or personnel selection. This norm meets international standards: the OECD AI Principles emphasize the need for explainability and transparency [2], and the UNESCO Recommendation on the Ethics of AI establishes a duty to ensure that users are informed about their interaction with algorithmic systems in order to prevent discrimination, unjustified interference with human rights, and security threats [3]. Transparency is also associated with the ability to audit algorithms, assess risks, and control autonomous solutions, which creates the basis for subsequent discussion of the distribution of responsibility and legal regulation of autonomous AI systems.

The law establishes the distribution of responsibility between the owner of the AI system and the user. The owner is responsible for the ownership of the system as an object; the owner is responsible for managing its operation and maintaining its operability, and the user is responsible for using the system in their operations. In practice, it becomes difficult when AI functions autonomously, making decisions without direct human intervention. In such cases, it becomes extremely difficult to determine who is responsible for the damage caused: the owner, the user, and, in some situations, indirectly the developer, especially if the algorithm was insufficiently tested or contains defects.

To solve the problem of distribution of responsibility in the scientific doctrine, the model of "increased responsibility of the owner of a source of increased danger" is proposed. According to this model, the owner of an AI system is responsible for the consequences of an autonomous system's actions, regardless of proof of guilt, which provides legal protection for victims and encourages all participants in the process - including developers, owners, and users - to improve the security and reliability of AI systems [4].

In practice, the implementation of autonomous transport technologies in the Republic of Kazakhstan is already reaching the level of pilot projects, which makes the issues of legal regulation of responsibility for AI actions particularly relevant. In Astana, in 2026, it is planned to launch unmanned taxis on limited routes, in which cars will move first under the control of operators who can interfere with the work of AI if necessary, and then a gradual transition to more autonomous control is expected [5]. Similar initiatives are being implemented in Almaty, where it is planned to deploy up to 50 driverless taxis on urban routes as part of a pilot project that includes testing the operation of AI in a real-world road environment [6].

These Kazakh examples demonstrate the need for a clear definition of responsibility for the actions of autonomous vehicles. In particular, the current law on Artificial Intelligence assigns responsibility only to the owner of the AI system, its owner and user, but there are still gaps for cases when decisions are made completely independently, without human intervention. During the pilot testing phase, responsibility may be partially shared between operators and owners, but as we move to autonomous systems, legal uncertainty increases, creating risks for the safety of passengers and third parties.

In the United States, there have been cases of road accidents involving autonomous vehicles (Tesla, Uber), which revealed the complexity of distributing responsibility between the driver, operator, and software developer [7].

These international examples show that traditional approaches to civil liability based on the fault of a person (owner, operator or user) are not sufficient for fully autonomous systems. A number of countries are developing models of subsidiary liability, where all key actors are involved: algorithm developers, vehicle owners and operators. Additionally discussed are the introduction of mandatory insurance for the risks of operating autonomous systems and the creation of special funds to compensate for damage to victims.

A comparison of these international practices with Kazakhstan's experience shows that the legal uncertainty in the Republic of Kazakhstan requires additional clarifications: it is necessary to provide for the liability of developers, owners, and operators of autonomous systems, as well as mechanisms for compensating victims. This approach will increase security, reduce legal risks, and create a legal framework for the safe implementation of autonomous technologies in the economy and urban infrastructure.

The next key aspect of AI regulation is the fight against discrimination and bias in algorithms. Although the law of the Republic of Kazakhstan explicitly states that AI should be created and

applied on the basis of non-discrimination principles, in practice algorithms often reproduce or reinforce social biases, as they learn from data reflecting historical and social inequalities. Such phenomena in the scientific literature are called algorithmic bias, when machine learning models give different results depending on sensitive attributes - race, gender, age, or social status, which undermines equality and fairness in decision-making. For example, studies show that solvency assessment and credit scoring algorithms can produce unfair results for certain population groups in different countries due to biases in the original data [8], and large facial recognition models showed significantly higher levels of risk for certain populations. There are higher levels of errors in identifying dark-skinned individuals than light-skinned individuals, which indicates the risk of discriminatory outcomes when using AI in the field of security and access control [9].

In real practice, such risks have led to legal disputes and complaints: in the United States, a class-action lawsuit was filed against the Workday platform used for automated job selection, claiming that its AI mechanisms discriminated against applicants on the grounds of race, age, and disability, which may become one of the first precedents for holding AI systems accountable for discriminatory consequences in employment [10].

According to E. O. Fedoruk, in modern conditions, artificial intelligence does not have the characteristics of a legal personality and cannot be considered as an independent subject of legal responsibility [11]. Despite active scientific discussions about the possible transformation of the legal status of AI in the coming decades (approximately within the next 10 years, taking into account the pace of technological development), at the current stage there are no ontological or legal grounds for recognizing AI as an autonomous tort. In this regard, responsibility for harm caused by the use of AI systems should be assigned to the appropriate legal entity - the developer, manufacturer, owner, or operator of the relevant technology - depending on the nature of the offense and the industry specifics of regulation. In this case, AI can be considered exclusively as a means or instrument of causing harm, but not as a carrier of legal liability.

Scientists emphasize that discrimination in AI is not related to the "fault" of the technology itself, but to the quality of data, statistical distortions, and human biases that the algorithm unconsciously reproduces. This creates serious challenges for legal regulation, as traditional mechanisms for protecting citizens' rights require that decisions affecting their interests be fair and non-discriminatory, which is difficult to guarantee in automated systems without additional control and audit measures.

In response to these challenges, the law "On Artificial Intelligence" provides for administrative liability for violating the principles of non-discrimination, security, and transparency of AI systems. Owners and developers are required to monitor algorithms, prevent data bias, correct potentially discriminatory outcomes, and ensure that users are informed about the risks of interacting with AI. Violation of these requirements can lead to the imposition of fines, differentiated depending on the size of the subject - from individuals to large companies - which creates a basic mechanism for influencing violators.

However, in practice, serious difficulties remain: traditional administrative measures are often insufficient for large digital platforms, where the introduction of high-risk algorithms can bring economic benefits that significantly exceed the size of fines. In addition, identifying discrimination and the causal relationship between the algorithm's operation and human rights violations requires specialized auditing, data analysis, and expert evaluation, which makes enforcement a time-consuming and complex process.

Similar measures are being taken in international practice. For example, in the EU, the AI Act provides for mandatory evaluation of high-risk AI systems, algorithm audits, and public reporting, while in the US, laws on non-discrimination in the workplace and financial sector are beginning to apply to automated solutions, including the possibility of holding platforms accountable for algorithmic bias [12]. Comparison of these approaches with Kazakhstan's practice shows the need to strengthen administrative control, implement regular audits and monitoring of AI systems, and develop methods for detecting and preventing discrimination at an early stage of algorithm operation.

Thus, the regulation of artificial intelligence forms the basic principles of algorithmic transparency and responsibility. In parallel with the development of AI, a special role in the digital ecosystem is played by blockchain technologies, which form the legal basis for the turnover of digital assets. Their implementation allows you to record the results of algorithmic decisions in immutable distributed ledgers, ensuring transparency, data protection, and automatic fulfillment of obligations through smart contracts.

The development of distributed ledgers and digital assets in the Republic of Kazakhstan has received regulatory consolidation in the Law of the Republic of Kazakhstan dated February 6, 2023 No. 193-VII "On Digital Assets" (hereinafter – the Law on Digital Assets) [13]. This act defines the legal status of digital assets as objects of civil rights that have property value and establishes the basis for their issuance, circulation, and accounting.

The Law on Digital Assets establishes the legal regime of tokens, the activities of digital mining entities, as well as the basics of the functioning of digital asset platforms. At the same time, blockchain technology is not directly regulated as an independent object of law, but is considered as a technological infrastructure that ensures the recording and execution of operations with digital assets. Thus, the legislator uses a functional approach: the subject of regulation is the legal consequences of digital transactions, and not the technical architecture of a distributed network [14].

Such a model forms a framework for legal regulation, in which state influence is directed primarily at participants in digital turnover, and not at technology as such. At the same time, the lack of specific rules on the status of distributed ledgers raises questions about the legal qualification of individual elements of the blockchain infrastructure, including network nodes, consensus algorithms, and access key storage mechanisms.

Smart contracts are an essential element of digital asset regulation. A smart contract in the legal sense is not identical to a civil contract, but is a software algorithm that provides automatic fulfillment of obligations when pre-defined conditions occur. There are two main positions in the doctrine:

1. smart contract as an independent form of contract.
2. smart contract as a way of technical implementation of the parties' agreement.

A systematic analysis of the civil legislation of the Republic of Kazakhstan allows us to conclude that a smart contract does not form an independent contractual structure, but acts as a way to fulfill an obligation based on a preliminary agreement of the parties. If a smart contract is treated as a contract, the question arises of compliance with the written form. The program code itself does not express the will in a legally significant form if it is not possible to identify the parties and record their consent. Consequently, it is not the code itself that takes on legal significance, but the previous agreement expressed in the form permitted by law.

The automatic nature of the fulfillment of obligations makes it difficult to apply the institute of invalidity. In the traditional model, the recognition of a transaction as invalid entails restitution. However, in a distributed registry, the record is immutable, and execution is irreversible.

Under these conditions, restitution may acquire:

- compensatory nature (monetary compensation);
- technologically mediated nature (conclusion of a reverse transaction);
- non-contractual nature (recovery of losses).

Thus, the immutability of a record does not eliminate the possibility of protecting rights, but transforms its mechanism.

A smart contract restricts the ability to change or terminate an obligation after it is launched. This actually increases the imperative of execution and reduces the flexibility of contractual regulation. Therefore, the use of smart contracts requires prior consideration of potential risks and the inclusion of emergency stop mechanisms (kill switch) or an arbitration clause.

The lack of detailed regulation of procedural mechanisms for challenging digital transactions indicates the need for further development of legal instruments for protecting the rights of participants in digital turnover.

One of the key features of blockchain technology is the decentralized nature of its operation. In public distributed networks, there is no single managing entity, which complicates the application of traditional models of legal liability.

Under the current legislation, responsibility is assigned to participants in digital relations - owners of digital assets, platform operators, as well as other entities engaged in relevant activities. However, when using decentralized protocols, there is a problem of determining the appropriate defendant in the event of harm caused due to a technical failure, a defect in the program code, or unauthorized access to digital assets.

Thus, the current model of responsibility is mainly subject-oriented and does not fully take into account the specifics of distributed autonomous systems.

Despite the technological immutability of entries in the distributed registry, vulnerabilities persist at the level of application solutions: smart contracts, interaction interfaces, access key storage systems.

General requirements for ensuring information security and personal data protection are set out in the industry legislation of the Republic of Kazakhstan, as well as in the Digital Code of the Republic of Kazakhstan [15]. However, special cybersecurity standards for blockchain infrastructure are not regulated in detail in national law.

In general, the legal regulation of blockchain technologies in Kazakhstan is characterized by institutional certainty in terms of the status of digital assets, but there are still gaps in the field of technologically driven risks [16].

The adoption of the Digital Code of the Republic of Kazakhstan in 2026 marked the transition to the systematization of digital legislation. The Code establishes the legal basis for the functioning of digital infrastructure, digital platforms, automated systems, and information security mechanisms.

Unlike the Law on Digital Assets, which has a specialized nature, the Digital Code forms the general regulatory architecture of digital relations. Its provisions apply to digital data, automated processes, digital transactions, and platform solutions, which are directly relevant for regulating both AI and blockchain systems.

The Digital Code stipulates:

- legal regime of digital objects and digital platforms;
- requirements for personal data protection and cybersecurity;
- fundamentals of functioning of automated digital solutions;
- principles of responsibility of subjects of digital relations.

Although blockchain and artificial intelligence are regulated by separate special acts, it is the Digital Code that forms the system basis for their joint application.

The integration of AI and blockchain technologies forms a comprehensive model of digital interaction, in which:

- artificial intelligence algorithms analyze data and make autonomous decisions.
- smart contracts provide automatic execution of such decisions;
- the distributed registry records the result in an immutable form.

In fact, a technologically determined legal fact is formed, in which the will of the parties is mediated by an algorithm, and the fulfillment of the obligation is carried out automatically without additional confirmation of intent. This requires a revision of the classical construction of a legal fact as a result of volitional behavior of the subject.

From a legal point of view, this model complicates the qualification of actions of subjects and the distribution of responsibility. Harm can result from a combination of algorithmic decisions, program code, and infrastructure features of the platform.

Key issues of legal regulation

1. Distribution of responsibility for autonomous solutions. The Law "On Artificial Intelligence" establishes the responsibility of the owner, operator, and user of the AI system. However, in the case of integration with the blockchain infrastructure, there is a multiplicity of actors, including developers of smart contracts and platform operators. The current legislation does not contain a comprehensive model of responsibility allocation for integrated digital ecosystems.

2. The ratio of immutability of the registry and judicial protection. The principle of immutability of records in the blockchain may conflict with civil law institutions that provide for the possibility of declaring a transaction invalid and restoring violated rights. The Digital Code establishes the right to protect digital rights, but the procedural mechanisms for correcting the consequences of automated transactions require additional regulatory detail.

3. Algorithmic transparency and evidentiary value of digital records. With the integration of AI and blockchain, the importance of auditing algorithms and fixing decision logic increases. An entry in the distributed registry confirms that an operation has been performed, but does not disclose the algorithmic basis for its acceptance. This complicates the assessment of the legality of actions in the judicial process.

Conclusion

The analysis of the legislation of the Republic of Kazakhstan allows us to state the formation of a multi-level model of legal regulation of digital technologies, including special regulation of artificial intelligence (the Law of the Republic of Kazakhstan "On Artificial Intelligence"), the legal regime of digital assets (the Law of the Republic of Kazakhstan "On Digital Assets") and system regulation of digital infrastructure (the Digital Code of the Republic of Kazakhstan).

These regulations form the institutional basis of digital law, but their application in the context of technological integration of artificial intelligence and blockchain infrastructure reveals a number of conceptual and practical problems.

First, the current model of responsibility is mainly subject-oriented and proceeds from the presumption of human control of the technological process. In the context of autonomous algorithmic solutions and decentralized architectures, such a presumption is partially fictitious, which makes it difficult to establish the proper respondent and causal relationship.

Secondly, the principle of immutability of the distributed registry comes into potential conflict with civil law institutions that allow the recognition of transactions as invalid and the restoration of violated rights. The lack of procedural mechanisms for "digital restitution" forms a zone of legal uncertainty.

Third, the integration of AI and smart contracts transforms the nature of legal fact: algorithmic decision and its automatic execution become part of a single technological cycle, which requires a revision of traditional ideas about will, control and guilt.

In order to improve the legal regulation, it is advisable to:

1. Develop a model of multi-level (composite) responsibility of participants in integrated digital ecosystems.
2. Establish mandatory algorithmic audit procedures for high-risk AI systems.
3. Introduce special procedural mechanisms for judicial correction of the consequences of automated digital transactions.
4. Consider the possibility of compulsory insurance of risks of operation of autonomous digital systems.

Thus, further development of the digital legislation of the Republic of Kazakhstan should be aimed at forming a comprehensive model of regulation of integrated digital ecosystems, ensuring a balance between technological development, protection of the rights of subjects and the principle of legal certainty.

This research was funded by the Science Committee of the Ministry of Science and Higher Education of the Republic of Kazakhstan (Grant No. AP 26199757 «Legal problems of transformation of Kazakhstan in the conditions of integration of artificial intelligence and blockchain technologies»).

Conflict of interest

The authors state that there are no potential or apparent conflicts of interest under this article.

Contribution of the authors

Useinova K.R. – developed the overall concept and methodological framework of the study, formulated the key scientific problem, goals, objectives and main conclusions. She conducted a comprehensive analysis of the national legislation of the Republic of Kazakhstan (the Law "On Artificial Intelligence", the Law "On Digital Assets" and the Digital Code), substantiated the scientific novelty of the research and prepared proposals for improving the legal regulation. She coordinated the preparation of the article and critically reviewed the manuscript for significant intellectual content.

Toktybaev A.A. – performed a systematic analysis of the legal regulation of artificial intelligence, including issues of system autonomy, liability allocation, algorithmic transparency and non-discrimination. He was responsible for preparing the core sections of the “Main Part” devoted to the Law “On Artificial Intelligence”, as well as for the comparative analysis of international standards (OECD principles and the European model of AI regulation).

Berekenov A.T. – investigated the legal regulation of blockchain technologies, digital assets and smart contracts, analyzed the problems of their integration with artificial intelligence and the correlation between the immutability of the distributed ledger and civil law protection institutions. He prepared the sections concerning smart contracts, decentralized systems and key issues of legal regulation, and also participated in the literature review and formatting of the reference list.

Список литературы

1. Закон Республики Казахстан от 17 ноября 2025 года № 230-VIII ЗПК «Об искусственном интеллекте» // Интернет-ресурс: <https://adilet.zan.kz/rus/docs/Z2500000230> (accessed: 10.02.2026)
2. OECD, Recommendation of the Council on Artificial Intelligence, OECD/LEGAL/0449 // Интернет-ресурс: https://oecd.ai/en/assets/files/OECD-LEGAL-0449-en.pdf?utm_source (accessed: 10.02.2026)
3. Рекомендация об этических аспектах искусственного интеллекта // Интернет-ресурс: <https://ifap.ru/ofdocs/unesco/airec.pdf> (accessed: 10.02.2026)
4. European Parliament resolution of 20 October 2020 with recommendations to the Commission on a civil liability regime for artificial intelligence (2020/2014(INL)) // (accessed: 10.02.2026)
5. inDrive и госорганы Казахстана договорились о запуске беспилотного такси в Астане // интернет-ресурс: <https://www.gov.kz/memleket> (accessed: 10.02.2026)
6. Беспилотные такси в Алматы начнут курсировать весной // интернет-ресурс: <https://www.inform.kz/ru/bespilotnie-taksi-valmati-nachnut-kursirovat-vesnoy-99f60d> (accessed: 10.02.2026)
7. Tesla Autopilot system’s ‘limitations’ played ‘major role’ in 2016 crash: NTSB // Интернет-ресурс: <https://fortune.com/2017/09/12/tesla-crash-autopilot-fatality-ntsb/> (accessed: 12.02.2026)
8. Fuster, A., Goldsmith-Pinkham, P., Ramadorai, T. & Walther, A. (2022). Predictably Unequal? The Effects of Machine Learning on Credit Markets. *Journal of Finance*, 77(1), 5–47. DOI:10.1111/jofi.13090
9. Angwin, J., Larson, J., Mattu, S., & Kirchner, L. (2016). Machine Bias. *ProPublica*. <https://www.propublica.org/article/machine-bias-risk-assessments-in-criminal-sentencin>
10. Buolamwini, J., & Gebru, T. (2018). Gender Shades: Intersectional Accuracy Disparities in Commercial Gender Classification. *Proceedings of Machine Learning Research*. <https://proceedings.mlr.press/v81/buolamwini18a/buolamwini18a.pdf>
11. Федорук Е.О. Институт юридической ответственности в контексте развития технологий искусственного интеллекта: критический анализ: дис...канд. юрид. наук. – Санкт-Петербург, 2024. – 233 с.
12. EU Artificial Intelligence Act // Интернет-ресурс: <https://www.aiact-info.eu/> (accessed: 13.02.2026)
13. Закон Республики Казахстан от 6 февраля 2023 года № 193-VII ЗПК «О цифровых активах в Республике Казахстан» // интернет-ресурс: <https://adilet.zan.kz/rus/docs/Z2300000193> (accessed: 13.02.2026)
14. M. Raskin, The law and legality of smart contracts (2017) <https://perma.cc/673G-3ANE>
15. Цифровой Кодекс Республики Казахстан от 9 января 2026 года № 255-VIII ЗПК // интернет-ресурс: <https://adilet.zan.kz/rus/docs/K2600000255> (accessed: 13.02.2026)

16. Askarbekova A., Niyazova A., & Abdrassulova A. (2023). Legal regulation of smart contracts. BULLETIN of L.N. Gumilyov Eurasian National University Law Series, 144(3), 170–178. <https://doi.org/10.32523/2616-6844-2023-144-3-170-178>

References

1. Zakon Respubliki Kazakhstan ot 17 noyabrya 2025 goda № 230-VIII ZRK «Ob iskusstvennom intellekte» // Internet-resurs: <https://adilet.zan.kz/rus/docs/Z2500000230> (accessed: 10.02.2026)
2. OECD, Recommendation of the Council on Artificial Intelligence, OECD/LEGAL/0449 // Internet-resurs: https://oecd.ai/en/assets/files/OECD-LEGAL-0449-en.pdf?utm_source (accessed: 10.02.2026)
3. Rekomendatsiya ob eticheskikh aspektakh iskusstvennogo intellekta // Internet-resurs: <https://ifap.ru/ofdocs/unesco/airec.pdf> (accessed: 10.02.2026)
4. European Parliament resolution of 20 October 2020 with recommendations to the Commission on a civil liability regime for artificial intelligence (2020/2014(INL)) (accessed: 10.02.2026)
5. inDrive i gosorgany Kazakhstana dogovorilis o zapuske bespilotnogo taksi v Astane // Internet-resurs: <https://www.gov.kz/memleket> (accessed: 10.02.2026)
6. Bespilotnye taksi v Almaty nachnut kursirovat vesnoy // Internet-resurs: <https://www.inform.kz/ru/bespilotnie-taksi-valmati-nachnut-kursirovat-vesnoy-99f60d> (accessed: 10.02.2026)
7. Tesla Autopilot system's 'limitations' played 'major role' in 2016 crash: NTSB // Internet-resurs: <https://fortune.com/2017/09/12/tesla-crash-autopilot-fatality-ntsb/> (accessed: 12.02.2026)
8. Fuster, A., Goldsmith-Pinkham, P., Ramadorai, T., & Walther, A. (2022). Predictably Unequal? The Effects of Machine Learning on Credit Markets. *Journal of Finance*, 77(1), 5–47. DOI:10.1111/jofi.13090
9. Angwin, J., Larson, J., Mattu, S., & Kirchner, L. (2016). Machine Bias. ProPublica. <https://www.propublica.org/article/machine-bias-risk-assessments-in-criminal-sentencin>
10. Buolamwini, J., & Gebru, T. (2018). Gender Shades: Intersectional Accuracy Disparities in Commercial Gender Classification. *Proceedings of Machine* <https://proceedings.mlr.press/v81/buolamwini18a/buolamwini18a.pdf>
11. Fedoruk, E.O. Institut yuridicheskoy otvetstvennosti v kontekste razvitiya tekhnologiy iskusstvennogo intellekta: kriticheskiy analiz: dis. ... kand. yurid. nauk. – Sankt-Peterburg, 2024. – 233 s.
12. EU Artificial Intelligence Act // Internet-resurs: <https://www.aiact-info.eu/> (accessed: 13.02.2026)
13. Zakon Respubliki Kazakhstan ot 6 fevralya 2023 goda № 193-VII ZRK «O tsifrovyykh aktivakh v Respublike Kazakhstan» // Internet-resurs: <https://adilet.zan.kz/rus/docs/Z2300000193> (accessed: 13.02.2026)
14. Raskin, M. The law and legality of smart contracts (2017) <https://perma.cc/673G-3ANE>
15. Tsifrovoy kodeks Respubliki Kazakhstan ot 9 yanvarya 2026 goda № 255-VIII ZRK // Internet-resurs: <https://adilet.zan.kz/rus/docs/K2600000255> (accessed: 13.02.2026)
16. Askarbekova A., Niyazova A., & Abdrassulova A. (2023). Legal regulation of smart contracts. BULLETIN of L.N. Gumilyov Eurasian National University Law Series, 144(3), 170–178. <https://doi.org/10.32523/2616-6844-2023-144-3-170-178>

Information about authors:

Useinova K.R. – corresponding author, Candidate of Legal Sciences, Associate Professor, Head of the Department of Theory and History of State and Law, Constitutional and Administrative Law, Al-Farabi Kazakh National University, 71 Al-Farabi Avenue, 050000, Almaty, Kazakhstan

Toktybaev A.A. – Candidate of Legal Sciences, Senior Lecturer, M. Esbulatov Almaty Academy of the Ministry of Internal Affairs of the Republic of Kazakhstan, 29 Utepov Street, 050060, Almaty, Kazakhstan

Berekenov A.T. – Master of Legal Sciences, Senior Research Fellow of the Department for the Organization of Research and Editorial and Publishing Activities, M. Esbulatov Almaty Academy of the Ministry of Internal Affairs of the Republic of Kazakhstan, 29 Utepov Street, 050060, Almaty, Kazakhstan

Усеинова К.Р. – автор для корреспонденции, кандидат юридических наук, ассоциированный профессор, заведующая кафедрой теории и истории государства и права, конституционного и административного права, Казахский национальный университет имени аль-Фараби, проспект Аль-Фараби, 71, 050000, Алматы, Казахстан

Тоқтыбаев А.А. – кандидат юридических наук, старший преподаватель, Алматинская академия МВД Республики Казахстан имени М. Есбулатова, ул. Утепова, 29, 050060, Алматы, Казахстан

Берекенов А.Т. – магистр юридических наук, старший научный сотрудник отдела организации научно-исследовательской работы и редакционно-издательской деятельности, Алматинская академия МВД Республики Казахстан имени М. Есбулатова, ул. Утепова, 29, 050060, Алматы, Казахстан

Усеинова К.Р. – хат-хабар авторы, заң ғылымдарының кандидаты, қауымдастырылған профессор, әл-Фараби атындағы Қазақ ұлттық университетінің мемлекет және құқық теориясы мен тарихы, конституциялық және әкімшілік құқық кафедрасының меңгерушісі, әл-Фараби даңғылы, 71, 050000, Алматы, Қазақстан

Тоқтыбаев А.А. – заң ғылымдарының кандидаты, Қазақстан Республикасы ІІМ М. Есболатов атындағы Алматы академиясының аға оқытушысы, Өтепов көшесі, 29, 050060, Алматы, Қазақстан

Берекенов А.Т. – заң ғылымдарының магистрі, Қазақстан Республикасы ІІМ М. Есболатов атындағы Алматы академиясының ғылыми-зерттеу жұмысын ұйымдастыру және редакциялық-баспа қызметі бөлімінің аға ғылыми қызметкері, Өтепов көшесі, 29, 050060, Алматы, Қазақстан



Copyright: © 2026 by the authors. Submitted for possible open access publication under the terms and conditions of the Creative Commons Attribution (CC BY NC) license (<https://creativecommons.org/licenses/by-nc/4.0/>).