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DIGITALIZATION OF CONSTRUCTION OF FACILITIES OF THE FUEL AND ENERGY COMPLEX

Illarionova Y.A.

Lawyer, Gazpromneft Expert Solutions, LLC
E-mail: illarionova_99@list.ru

Abstract. The advent of new technologies and the evolving economic landscape have prompted a need to rethink the existing regulatory framework governing market players. Digitalization forces to create new legal mechanisms for regulating emerging economic relations. These include the development of normative legal acts that strike a balance between ensuring the public interest and business development, the introduction of new institutions or the modernization of existing ones, and the broad integration of various spheres of social life. The current legal framework presents shortcomings that create difficulties in introducing new technologies into the economy. This article will examine the existing legal issues of surrounding the use of new technologies in the construction of fuel and energy infrastructure facilities. It will focus on the legal nature of BIM-modeling, tort liability in the application of technologies in the construction/design process, and the problems of widespread introduction of smart contracts in construction activities. In preparing this scientific article, we relied on normative legal acts regulating the introduction of new technologies in economic activity, a small amount of judicial practice reflecting the current attitude of the judicial system to the legal regulation of new technologies, developed concepts reflecting the main areas of activity in the development of digitalization, and news portals. The following scientific methods were employed in the research process: analysis, comparison, description, interpretation, synthesis, abstraction, and analogy. This paper presents the current discussions on the mentioned problems of digitalization in the construction of facilities of the fuel and energy complex. It addresses the need/absence of the need for detailed legal regulation, the legal nature of the "liability" of objects of digitalization, and gaps in the current legislation in terms of regulating the mechanism of smart contracts. The existing legal regulation issues surrounding digitalization in the construction of facilities of the fuel and energy complex, as outlined in this article, require a comprehensive solution that strikes a balance between economic development and effective legal regulation.

Keywords: energy law, BIM modeling, artificial intelligence, digitalization, tort liability.

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ЦИФРОВИЗАЦИЯ СТРОИТЕЛЬСТВА ОБЪЕКТОВ ТЭК

Илларионова Е.А.

Юрист, ООО "Газпромнефть Экспертные решения"
E-mail: illarionova_99@list.ru

Аннотация. Изменения в экономической сфере, широкое использование новых технологий породили необходимость корректировки существующего регулирования правоотношений участников рынка. Цифровизация вынуждает создавать новые механизмы правового регулирования для возникающих экономических отношений: разработку нормативно-правовых актов, требующих соблюдения баланса между обеспечением публичного интереса и развитием бизнеса; внедрение новых институтов либо модернизацию существующих; широкую интеграцию различных сфер жизни общества. Действующая правовая база имеет недостатки, которые создают трудности внедрения новых технологий в экономику. В рамках настоящей статьи рассмотрим существующие правовые проблемы использования новых технологий при строительстве объектов топливо-энергетической инфраструктуры, такие как: правовая природа BIM-моделирования, привлечение к деликтной ответственности при применении технологий в процессе строительства/проектирования, проблемы широкого внедрения смарт-контрактов в строительную деятельность. Для подготовки настоящей научной статьи были использованы: нормативно-правовые акты, регулирующие вопросы внедрения новых технологий в экономическую деятельность; немногочисленная судебная практика, отражающая современное отношение судебной системы к правовому регулированию новых технологий; разработанные концепции, отражающие основные направления деятельности в части развития цифровизации; новостные порталы. В процессе исследования были применены следующие научные методы: анализ, сравнение, описание, интерпретация, синтез, абстрагирование, аналогия. В работе приводятся существующие дискуссии в части отмеченных проблем использования цифровизации в строительстве объектов ТЭК: необходимость/отсутствие необходимости детального правового регулирования; правовая природа "ответственности" объектов цифровизации; пробелы действующего законодательства в части вопроса урегулирования механизма заключения смарт-контрактов. Существующие проблемы правового регулирования цифровизации в сфере строительства объектов ТЭК, отраженные в настоящей статье, требуют комплексного решения, позволяющего сохранить баланс между экономическим развитием и эффективным юридическим нормированием.

Ключевые слова: энергетическое право, BIM-моделирование, искусственный интеллект, цифровизация, деликтная ответственность.

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The modern high-tech society sets trends for the development of the economic sphere of any state. In his book The Digital Economy: Promise and Peril in the Age of Networked Intelligence, D. Tapscott defines the digital economy as a form of organization of economic activity based on digital and electronic technologies, implemented directly through e-commerce, cloud technologies, digital platforms, and network business. At the same time, digitalization is not limited to the introduction of modern technologies. It also encompasses the cumulative restructuring of existing business processes [1].

The advantages of the digital economy include the capacity to automatically manage the entire system and its individual components, as well as the virtually unlimited ability to scale the system without loss of efficiency, which allows for a significant increase in the efficiency of economic management at the micro and macro levels.

The advent of new technologies and the evolving economic landscape have prompted a need to rethink the existing structure of legal relations between market players. The Russian Federation has recently

adopted normative legal acts regulating the use of information technologies in various spheres and amended the existing normative legal acts. For example, the Federal Law on Digital Financial Assets, Digital Currency and on Amending Certain Legislative Acts of the Russian Federation, the Urban Development Code of the Russian Federation, the Civil Code of the Russian Federation, Presidential Decree No. 490 on the Development of Artificial Intelligence in the Russian Federation of October 10, 2019, etc.

In addition, subordinate legislation in certain regions of Russia establishes experimental legal regimes in the field of digital innovations for the operation of unmanned aircraft systems. For example, Resolution of the Government of the Russian Federation No. 100 on Establishment of the Experimental Legal Regime in the Field of Digital Innovations and Approval of the Program of the Experimental Legal Regime in the Field of Digital Innovations for the Operation of Unmanned Aircraft Systems in the Nenets Autonomous Area dated February 2, 2024, in the Nenets Autonomous Area and Resolution of the Government of the Russian Federation No. 185 on Establishment of the Experimental Legal Regime in the Sphere of Digital Innovations and Approval of the Program of the Experimental Legal Regime in the Sphere of Digital Innovations for the Operation of Unmanned Aircraft Systems in Innopolis (Republic of Tatarstan) dated February 17, 2024, in Innopolis (Republic of Tatarstan).

At the same time, the existing legal framework is deficient in certain respects, which impedes the implementation of digital mechanisms in the economy. Let us consider the existing legal issues associated with the use of new technologies in the construction of fuel and energy infrastructure facilities.

The most effective and widely used technologies in construction are as follows: BIM modeling (design of construction projects using building information modeling), high-tech topographical surveying for construction and geological surveying, 3D printing, smart sensors that connect all infrastructure facilities and workers to a single network in order to monitor the construction process in real time, robots and drones, artificial intelligence, virtual and augmented reality, and blockchain (e.g., for smart contracts).

BIM modeling technology is the most widely applicable and controversial in terms of legal regulation. Currently, various construction industries are developing regulations pertaining to the use of BIM technologies (building information modeling).

Executive Order of the Government of the Russian Federation No. 2101-r on Approval of the Comprehensive Plan for the Modernization and Expansion of Trunk Infrastructure for the Period up to 2024 dated September 30, 2018, states that it is planned to use Building Information Modeling (hereinafter referred to as BIM) technology in the management system for the implementation of the transportation part of the plan. The collective construction and use of information on transport infrastructure facilities through BIM will provide a reliable basis for decision-making at any stage of the project, from early concepts to operation.

One of the practical challenges in implementing information models in construction is the issue of defining the contractual framework for creating information models (hereinafter referred to as IM).

The literature suggests that the choice of contractual model for information modeling is based on several factors. These include the way in which the information model is constructed and its content, the peculiarities of the parties involved in the legal relationship, the distribution of risks and the nature of design management, and the degree of integration of the information model into the design, construction, and operation processes [3].

An information model is comparable to the result of design and survey work, but differs in the form of providing the result as a digital asset. An information model is not a typical object of civil rights.

The normative document, Methodological Recommendations on the Preparation of the Information Model of the Construction Project Submitted for Consideration to Glavgosexpertiza of Russia Federal Autonomous Institution as Part of the State Expert Examination of Design Documentation and Assessment of the Information Model of the Construction Project, defines the IM as including digital information models of the construction project (hereinafter referred to as DIM–CP) and digital engineering models of terrain (hereinafter referred to as DEM-T). The composition and content of DIM–CP and DEM-T are represented using the concept of a "layer" ("level").

A layer (level) represents structured information (graphical, textual, tables, sheets, specifications, information, data, elevation marks, penetration marks, information on soil load bearing capacity, information on underground utility systems, etc.) applied to

the previous layer (level) of information about the construction project. Software tools can be used to isolate information for IM users in order to improve the perception of the model and the user's decision-making on certain IM aspects. Methods of technical implementation of model information isolation include the use of (for example) branches of element hierarchy and sets of elements in specialized software products.

In the context of judicial practice, there are various approaches employed to ascertain the nature of contractual relations the creation of BIM models: 1) Contractor agreement (for example, Ruling of the Supreme Court of the Russian Federation No. 305-ES22-4588 dated March 31, 2022, in case No. A40-281512/2019, Decision of the Commercial Court of the North-Western District No. F07-10387/2023 dated August 10, 2023, in case No. A56-84385/2022); 2) Services agreement (for example, Decision of the Ninth Commercial Appellation Court No. 09AP-21141/2021 dated May 19, 2021, in case No. A40-145924/2020); 3) Design documentation agreement (for example, Decision of the Commercial Court of the North-Western District No. F07-13179/2023 dated October 11, 2023, in case No. A56-49907/2022, Decision of the Commercial Court of the North-Western District No. F07-10342/2023 dated August 3, 2023, in case No. A56-117122/2022).

Due to the lack of clarity in the judicial practice regarding the classification of the relevant information model contract, the scientific literature suggests the need for the creation of a unified regulatory mechanism to oversee the results of the use of BIM technologies in designing.

One of the challenges of using information technologies in construction is the possibility of tort liability when a robot (in the broad sense of the word) commits an offense. It is important to understand that robots can have artificial intelligence and can execute tasks based on a predefined program. The question of liability for robots created on the basis of artificial intelligence is an interesting one.

The Concept for the Development of Regulation of Relations in the field of Artificial Intelligence and Robotics until 2024 (Executive Order of the Government of the Russian Federation No. 2129-r dated August 19, 2020) specifies the current objective is to further develop mechanisms of civil, criminal, and administrative liability in case of harm caused by artificial intelligence and robotics systems with a high degree of autonomy when making decisions. This includes determining who will be held responsible for their actions, developing, if necessary, mechanisms of no-fault civil liability, and exploring ways to compensate for damage caused by actions of artificial intelligence and robotics systems (e.g., liability insurance, compensation funds, etc.). Consequently, the issue of legal liability in the use of artificial intelligence is of particular importance, including its use in the course of construction of fuel and energy infrastructure facilities.

Artificial intelligence is a set of technological solutions that allows for the imitation of human cognitive functions (including self-learning and search for solutions without a predetermined algorithm) and the obtaining of results comparable to those of human intellectual activity when performing specific tasks. The set of technological solutions includes information and communication infrastructure, software (including software that uses machine learning methods), processes, and services for data processing and search for solutions (Presidential Decree No. 490 on Development of Artificial Intelligence in the Russian Federation dated October 10, 2019).

In the existing civil law regulation, artificial intelligence can act as a thing, an object of copyright, or a source of enhanced danger [4]. However, there are no rules regulating the issues of liability for actions committed by artificial intelligence.

The doctrine identifies several models of liability for actions of autonomous robots. These include complete exemption from liability (force majeure), partial exemption from liability (compensation from an insurance fund or at the expense of the robot owner), liability depending on fault (e.g., developers in case of software problems, manufacturers in case of design flaws), limited no-fault liability, complete no-fault liability, robot personal liability (which involves giving the machine a legal personality), and a mixed liability regime (when a certain approach is applied depending on the robot's dangerousness and other characteristics) [5].

Article 127.4 of the draft Federal Law on Amendments to the Civil Code of the Russian Federation Improving the Legal Regulation of Relations in the Field of Robotics (Grishin's Law) proposes that compensation for damage caused by a robot be made at the expense of the property transferred into the possession of the robot. This is analogous to the independent civil liability of a legal entity.

The doctrine identifies three primary approaches to tort liability for harm caused by robots. These are

tort liability on general grounds stipulated by Article 1064 of the Civil Code of the Russian Federation, tort liability for harm caused by a source of enhanced danger (Art. 1079 of the Civil Code of the Russian Federation), tort liability for harm caused by defects in goods, works, or services (Art. 1095 of the Civil Code of the Russian Federation). It is noted that tort liability for harm caused by a robot should take place depending on the class of its danger and the degree of autonomy of the robot [6]. Some researchers have identified robots as a source of enhanced danger and have proposed that the issue of damage compensation be resolved in accordance with Article 1079 of the Civil Code of the Russian Federation [7].

In the context of tort liability, the following conditions are typically considered to be essential: wrongful conduct of the harm-doer; the occurrence of harm (losses); a causal relationship between the wrongful conduct and the harm; and fault. In accordance with Article 1079 of the Civil Code of the Russian Federation, harm caused to the life or health of citizens by activities that create an enhanced danger to others (a source of enhanced danger) shall be compensated by the owner of the source of enhanced danger, regardless of their fault (Resolution of the Plenum of the Supreme Court of the Russian Federation No. 1 on the Application by Courts of Civil Legislation Governing Relations under Obligations as a Consequence of Harm to the Life or Health of Citizens dated January 26, 2010).

Within the meaning of Article 1079 of the Civil Code of the Russian Federation, a source of enhanced danger is defined as any activity that creates an enhanced likelihood of harm due to the impossibility of full control over it by a person. This includes activities involving the use, transportation, and storage of things, substances, and other production, economic, or other facilities that possess similar properties (clause 18 of Resolution of the Plenum of the Supreme Court of the Russian Federation No. 1 dated January 26, 2010). In general, AI technologies can be considered a 'source of enhanced danger'.

The owner of a source of enhanced danger is defined as a legal entity or a citizen who uses the source by virtue of ownership rights, economic management rights, operational management rights, or other legal grounds.

The scientific literature identifies the following individuals who may be held liable for harm caused by artificial intelligence: 1) the author of the relevant invention or the programmer; 2) the legal entity that is the right holder of the software or the manufacturer of the relevant technical device; 3) the user/owner (as a legal entity or an individual); 4) a third party in case of wrongful possession of the robot or its reprogramming to cause harm [8]; 5) a person who receives profit from artificial intelligence [9].

Consequently, in the event that a robot causes damage, Articles 1064 and 1079 of the Civil Code of the Russian Federation may be applied to address the issue of liability. This is provided that the relevant technology is not fully autonomous and depends on the activities of specific people.

Another perspective suggests that when determining who is liable for harm caused by a robot, Article 1095 of the Civil Code of the Russian Federation on the sale of low-quality goods (a robot) should be applied. In this case, the party held liable is the seller or manufacturer [10].

In 2018, a precedent-setting case was investigated in the USA. On March 19, 2018, an unmanned Uber vehicle struck and killed a pedestrian who had violated traffic rules while undergoing a test. The vehicle was in autonomous mode, but a test driver was behind the wheel. The commission investigating the accident attributed blame to the test driver, the pedestrian, Uber, and state authorities for failing to prioritize safety checks of driverless vehicle testing programs on public roads. During the investigation, it was determined that the vehicle had detected the pedestrian almost six seconds prior to the collision. However, the emergency braking system was disabled and reconfigured, preventing the car from braking. The vehicle failed to recognize pedestrians outside of crosswalks. Additionally, the tester did not monitor traffic conditions.

In addition to the aforementioned guarantees, some sources propose the introduction of liability insurance for individuals using AI technologies [11]. The European Parliament Resolution on Civil Law Rules on Robotics of February 16, 2017, supports this position.

Furthermore, RBC has reported that the Ministry of Economic Development has developed a mechanism capable to ensure compensation for harm caused by the use of AI technologies under experimental legal regimes. The draft law on amendments to Federal Law No. 258-FZ on Experimental Legal Regimes in the Field of Digital Innovations in the Russian Federation dated July 31, 2020, was approved at the meeting of the Government's Commission on Legislative Activity on December 4, 2023.

The Draft Law introduces the following changes: parties involved in the experimental legal regime will maintain a register of individuals who have entered into legal relations with it; this register will contain information on those responsible for the use of AI solutions; the register will include information on individuals working with the technologies directly; participants will be required to insure civil liability for causing harm to the life, health, or property of other persons as a result of the use of AI solutions.

The relevant draft law has not yet been adopted, but if it is approved, the issue of liability for compensation for damage caused by artificial intelligence will be solved partially. This is because the effect of Federal Law No. 258-FZ dated July 31, 2020, is extremely limited (given the scope of the Federal Law). At the same time, experimental legal regimes in the field of digital innovations may be established in the following areas of development, testing, and implementation of digital innovations: architectural and construction design, construction, major repair, reconstruction, demolition of construction projects, and the operation of buildings and structures (Article 1 of the Federal Law on Experimental Legal Regimes in the Field of Digital Innovations in the Russian Federation).

The issue of liability for damage caused by artificial intelligence in construction and design can be resolved by amending the current legal framework with regard to liability insurance.

Another potential avenue for the application of digital technologies in construction is the use of smart contracts. According to the List of Instructions of the President of the Russian Federation Following the Meeting on the Use of Digital Technologies in the Financial Sector held on October 10, 2017, as part of the implementation of the Digital Economy of the Russian Federation program, the Government of the Russian Federation, together with the Bank of Russia, is directed to introduce amendments to the laws of the Russian Federation defining the status of digital technologies used in the financial sector and their concepts (including such concepts as "distributed ledger technology", "electronic letter of credit", "electronic mortgage", "cryptocurrency", "token", "smart contract") based on the binding nature of the ruble as the only legal means of payment in the Russian Federation.

The concept of a "smart contract" was first introduced by N. Szabo, who defines this contractual form as an electronic algorithm designed to automate the process of contract execution in blockchain [12].

Some countries have formalized the concept of a "smart contract" at the legislative level. For example, the Decree of the President of the Republic of Belarus No. 8 on Development of the Digital Economy of December 21, 2017, defines that a smart contract as a program code designed to function in a transaction block ledger (blockchain), any other distributed information system for the purpose of automated execution of transactions or performance of other legally significant actions.

Draft Federal Law No. 419059-7 on Digital Financial Assets defines a smart contract as an electronic agreement, which rights and obligations are fulfilled through the automatic execution of digital transactions in a distributed digital transaction ledger, in accordance with the sequence and circumstances defined by the agreement.

At the same time, the subject matter and scope of the Federal Law were defined as relations arising from the creation, issuance, storage, and circulation of digital financial assets, as well as the exercise of rights and fulfillment of obligations under smart contracts.

Subsequently, when Federal Law No. 259-FZ on Digital Financial Assets, Digital Currency, and Amendments to Certain Legislative Acts of the Russian Federation dated July 31, 2020, was adopted, the concept of a "smart contract" was excluded from the text of Federal Law No. 259 and included in clause 2 of Article 309 of the Civil Code of the Russian Federation in the current version.

The Bank of Russia's Digital Ruble Concept defines a smart contract as a transaction executed automatically upon the occurrence of conditions predetermined by the parties. A similar definition can be found in the Bank of Russia's Guidelines for the Development of the Financial Market of the Russian Federation for 2024 and the Period of 2025 and 2026.

There are currently instances of smart contracts being used in Russia. For example, in December 2016, Alfa Bank and S7 Airlines became the first entities in Russia to settle accounts with a counterparty using smart contracts. A pre-agreed amount was deposited with the bank servicing the airline. At the time of applying for a letter of credit, the account was debited. After the services were delivered and documents were submitted, the funds were credited to the contractor's account. The smart contract was prepared using Ethereum. Subsequently, S7 Airlines

created a blockchain platform to streamline trading transactions and launched a service on this platform for the purpose of settlements with agents who sell airline tickets. S7 Airlines entered into a smart contract with Gazpromneft-Aero, an aviation fuel market operator. The contract included information on the cost and required volume of fuel for the airline's aircraft. The aircraft commander then requested from the operator the exact amount of fuel required for the flight, and an online request was sent to Alfa Bank to reserve the appropriate amount. Refueling commenced upon the bank's immediate confirmation of the online request. Once the refueling process was complete, the funds were debited and the parties' commercial services were informed that the transaction was closed, along with all relevant documents. The smart contract was prepared on the Hyperledger blockchain platform [13].

According to clause 2 of Article 309 of the Civil Code of the Russian Federation, the terms and conditions of a transaction may stipulate that its parties fulfill obligations arising from it upon the occurrence of certain circumstances without a separate additional expression of will of its parties aimed at fulfilling the obligation through the use of information technologies determined by the terms and conditions of the transaction. The relevant amendments were introduced by Federal Law No. 34-FZ on Amendments to Parts One, Two and Article 1124 of Part Three of the Civil Code of the Russian Federation dated March 18, 2019.

The explanatory note to the draft law stated that, in order to execute transactions with digital rights ("smart contracts"), Article 309 of the Civil Code introduces the only rule requiring legislative formalization. This rule states that the fact of the execution of a transaction made by a computer program shall not be disputed (except in cases of interference with the program).

Once users are identified in the system, their subsequent behavior is subject to the algorithm of the computer program that oversees the network. In the event that the circumstances specified in the user agreement occur, a person who "buys" a particular virtual object (digital right) will receive this object automatically. For example, a certain individual is the holder of a digital right to a box of diamonds, which is identified by an individualizing number and is held by a professional custodian. In the information system, a transaction with this object will be executed "automatically", without additional orders or other expressions of will by the parties to the transaction. The seller will be debited with the digital right and the buyer will be debited with funds. As a general rule, it will be impossible to challenge these debits.

It should be noted that no additional rules are required for 'smart contracts'. In other respects, the current Civil Code is well-suited for regulating the relations of parties to such transactions, i.e. the legislator implies that the existing mechanisms for regulating contractual relations are sufficient, including when entering into smart contracts.

Upon analysis of the amendments made to paragraph 2 of Article 309 of the Civil Code of the Russian Federation, it can be concluded that it covers not only smart contracts as such, but also the automated execution of contracts (e.g., the purchase of services, goods, or works using online platforms) [14].

Currently, there are no examples of smart contracts in construction in the Russian system of justice. However, the amendments to the Civil Code of the Russian Federation permit the use of such form of contracts in any sector, including construction and design.

The existing challenges associated with the legal regulation of digitalization in construction of facilities of the fuel and energy complex, as outlined in this article, require a comprehensive solution that strikes a balance between economic development and effective legal regulation.

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Authors' information:
Yevgeniya A. Illarionova
Lawyer,
Gazpromneft Expert Solutions, LLC

Сведения об авторе:
Илларионова Евгения Алексеевна
Юрист, ООО "Газпромнефть Экспертные решения"

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