



Research article

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Problems and Prospects of Regulating Relations within a Deal Effected with Participation of Artificial Intelligence

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Keywords

Artificial intelligence,
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Abstract

Objective: to research the problem of determining the subject of a legally relevant act effected with participation of artificial intelligence, as well as distribution of responsibility for the consequences of its performance.

Methods: to illustrate the problematic and practical significance of the issue of legal personality of artificial intelligence, we chose automated procurements for public and corporate needs; the methodological basis of the research is the set of methods of scientific cognition, including comparison, retrospective analysis, analogy, and synthesis.

Results: by the example of the sector of competitive procurements for public and corporate needs, the evolution of automation of economic relations up to artificial intelligence introduction was analyzed. Successfully tested reactions to the challenges of stage-by-stage introduction of digital technologies into economic relations were demonstrated, as well as the respective modifications of legal regulation. Based on the current level of technological development, the prospective questions are formulated, associated with the legal regulation of economic relations implemented with the use of artificial intelligence, first of all, the question of defining the subject of a deal effected with participation of artificial intelligence. As an invitation for discussion after analysis of jurists' conclusions about the probable variants of the legal status of artificial intelligence, the author proposes

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variants of answers to the question of its legal personality when effecting a deal. To solve the issue of responsibility for the decisions resulting from the implementation of algorithms of a software and hardware package, we propose several models of distributing such responsibility among its creator, owner, and other persons, whose actions might influence the results of such an algorithm functioning. The proposed conclusions may be used to develop normative regulation both as a set and individually.

Scientific novelty: based on the analysis of evolution of the practices of using digital technologies in procurement, the work formulates potential legal problems, determined by the constant automation of economic relations, and proposes legal constructs to solve such problems.

Practical significance: the conclusions and proposals of this work are of prospective significance for conceptual comprehension and normative regulation of electronic procurement tools both at corporate and national level.

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Introduction

Artificial intelligence becomes increasingly demanded in various spheres. The topicality of artificial intelligence is a logical and inevitable consequence of broad diffusion of digital technologies.

Digital technologies have long been used not only for everyday communication, but also for accompanying and today also for registering economic relations. Procurements in the corporate and public segments are a vivid example of rapid broadening of the sphere of information technologies application.

Today, however, digitalization rises to a new level: software and hardware package solves tasks and implement actions which were traditionally assumed as a human prerogative. These include creation of copyright items and actual contracting.

Such penetration of artificial intelligence into economic and then legal relations inevitably poses legal questions. For example, who is the author of a text created by artificial intelligence? Who is liable for the consequences of a deal, the legal existence of which is generated by the consequences of implementation of software and hardware package algorithms?

These issues acquire special topicality due to the fact that both digitalization in general and using artificial intelligence in particular are by no means a transitory tribute to fashion. Rational and consequential introduction of these technologies is actually capable of improving the efficiency of both production processes and business processes as a whole.

In this regard, one may expect only expanding and intensification of digital technologies. Hence, the legal science cannot evade the emerging questions. "This said, jurists are not obliged to apprehend the mathematical and technical secrets of digitalization; digitalization is not a subject of legal science. We have to write about it as many of those who devoted their research to digitalization ignore the fact that disciplines are divided into technical and social ones; legal sciences are social disciplines, and technical norms are not a subject of their analysis" (Lazarev, 2023).

Apparently, electronic technologies, like any other technologies, have limited areas of effective use. But, for example, competitive procurements B2B (business-to-business) and B2G (business-to-government) is the sphere where these technologies provide a qualitative increase of performance efficiency: digital technologies help to spend mere hours for the business processes which took weeks in the traditional paradigm.

Application of software and hardware packages is not at all limited to competitive procurements. However, it is this sphere that allows vividly illustrating both the stage-by-stage evolution of the digital technologies introduction which has logically led to using AI, and the accompanying legal agenda. Making no pretence of a comprehensive research of using automation technologies in economic activity, in this article we will consider, by the example of electronic competitive procurements, the issues posed before legal science by the synthesis of business and digital technologies.

Both in the B2G and, especially, in the B2B segment, during the first quarter of the 21st century competitive procurements rose from introduction of electronic document flow to testing the artificial intelligence technologies. This path comprised not only numerous experiments but also several qualitative transitions, each of which demands, at least, a comprehensive analysis from both organizational and legal viewpoints.

Such analysis provides an opportunity to trace the key transformations, each of which cardinally changed the role of digital technologies in procurement activity. The transformation

associated with the introduction of AI into routine business processes, which is currently taking place in this sphere, is not limited to the technology issues but largely refers to legal issues.

This said, it is important to remember that the previous transformations also did not go without formulating and introducing new legal constructs. Hence, we may rely on this experience to answer new questions.

1. Five digital transformations of competitive procurements

In one form or another, competitive procurements exist during more than one century. Before the end of the 20th century, they were conducted, with rare exceptions, without using digital technologies. However, in the first quarter of the 21st century, the use of digital technologies in procurement not only became widespread but also caused rapid change in the quality of using these technologies.

Despite rapid digitalization, in general one may assert its evolutionary character. This, in turn, allows us to trace the stages of the digital technologies introduction into procurement domain. For clarity, we present this evolution as five transformations, the result of each being a cardinal new role of digital technologies in procurement business processes.

It is also important to specify these transformations due to the fact that in practice it is extremely difficult to pass onto a new level of digital technologies introduction without a deep and consistent implementation of the previous level in routine procurement work. In other words, each previous transformation serves as a necessary condition for the next one.

1.1. Electronic procurements

The first digital transformation of competitive procurements is transfer of such procurements into electronic form.

An electronic competitive procurement can be in the very first approximation defined through a technological feature as a formalized procedure of a competitive choice of a counteragent, within which all relations between the procurement organizer and participants, including legally relevant document flow and real time bidding, are implemented exclusively in the Internet without using paper documents.

Apparently, not only bidding in the Internet but even a mere refusal of paper documents cannot be implemented without a “zero” step of introducing electronic document flow by economic subjects. For the electronic document to be recognized as legally relevant as the paper one, one needs a mechanism of certifying the legal relevance of an electronic document.

Such mechanism is electronic signature, which allowed sending a bargain offer as a file and guaranteeing it the status of a full-fledged offer in the civil-legal sense. At the beginning

of 2002, the Law “On electronic digital signature”¹ was adopted, and in 2011 it was substituted for the currently valid Law “On electronic signature”².

The issue of the types and order of using electronic signatures is beyond the frameworks of this article. For the topic under study, it is important that electronic signature assigns legal relevance to not only electronic document but also electronic information. In particular, such signature may certify an electronic image of a paper document or even a figure indicated as an auction rate. This, in turn, opens space for full-fledged bidding in electronic form.

The first electronic procurements were conducted by corporate clients in 2002, and by the end of the decade electronic auctions were also introduced for public clients³. Although the wide range of electronic procurement tools is not limited to auctions – for example, contests, request for proposals, and requests for quotation can also be conducted electronically, – but the novel on using electronic auctions for public procurement became pivotal for official recognition of electronic procurement technologies. A separate discussion should be devoted to the issue whether it is methodologically and practically expedient to select only electronic auction among the whole specter of available electronic tools, as the said auction dominates in the current Law “On contractual system”⁴.

Today, the electronic form is a norm for both public and commercial procurement. However, in practice the notion “electronic procurement” is interpreted by clients in varied ways. Some view it as publication of procurement documentation in the Internet and then collection of offers on electronic carriers. Others consider it to be a formalized procedure at a specialized platform called an electronic trading platform.

The chronological frameworks of using electronic technologies in procurement are also different. Traditionally, to be called an electronic procurement, it is sufficient to conduct on an electronic trading platform the part of business processes starting from a publication of the notion of procurement and finishing with an announcement of the procurement results.

However, in practice the complex of procurement business processes is much larger. It starts, long before announcing the procurement, with formalized work with the need for which the procurement is necessary, and the results of this work are included into the procurement plan. The procurement process finishes, much later than the choice of winner,

¹ On electronic digital signature: Federal Law of 10.01.2002 No. 1-FZ. *Collection of legislation of the Russian Federation*, 14.01.2002, No. 2. Article 127.

² On electronic signature: Federal Law of 06.04.2011 No. 63-FZ. *Collection of legislation of the Russian Federation*, 11.04.2011, No. 15. Article 2036.

³ On placing orders for supplying goods, executing works, rendering services for public and municipal needs: Federal Law of July 21, 2005 No. 94-FZ. *Collection of legislation of the Russian Federation*, 2005, No. 30. Article 3105.

⁴ On contractual system in the sphere of purchasing goods, works, services to provide for public and municipal needs: Federal Law of 05.04.2013 No. 44-FZ. *Collection of legislation of the Russian Federation*, 08.04.2013, No. 14. Article 1652.

with registering the supply results, and in developed procurement practices – with analysis of the quality of the initial need satisfaction with the supplied product.

Technically, all these business processes can long be implemented in electronic form. As practice shows, given due implementation, their transition to electronic form is expedient. However, that requires the next transformation, which can be conditionally called digitalization of procurement activity.

1.2. Digitalization of procurement activity

Digitalization of procurement means transition into electronic form of all formalized procurement business processes from procurement planning to acceptance of the product supplied. Such transformation, as a rule, requires creating a special portal providing execution of business processes in the digital environment.

If digitalization of procurement activity is successful, then all the external and internal document flow, associated with preparation and execution of procurement, is implemented in electronic form. Business processes are implemented along the routes suggested by the algorithms of a special portal. This, in turn, systematizes the procurement interaction and simplifies the work of a person who acquires the opportunity to focus not on the bureaucratic but on the substantive part of their activity.

Digitalization of procurement activity almost always implies stage-by-stage introduction of new technologies into the established business processes. All stages of such introduction can be conditionally united into two blocks: creating a digital environment, in which business processes will take place after their digitalization, and further development of the digital system to provide implementation of business processes in the electronic environment (Kazantsev, 2022). Apparently, these blocks can be implemented only consequentially, but within each of the two blocks individual stages can be developed also in parallel.

Creation of the digital environment is not limited to creation of a specialized portal. This block requires also solving a range of organizational and legal-technical issues, such as:

1. Systematizing procurement business processes with distribution of authorities and responsibilities, exclusion of extra links and addition of lacking elements.

2. Regulating procurement business processes in documents mandatory for all subjects of business processes. Such documents should exclude both differing interpretations and dissolved responsibility, uncertainty of terms and other legal-technical defects.

3. Describing procurement business processes in the form of algorithms for clear visualization of regulating documents and simplification of further digitalization of the regulated business processes.

4. Creating software for implementing procurement algorithms, as well as an intuitive interface for using this software.

5. User testing and adjusting the functionality of software for implementing procurement algorithms.

6. Testing the created digital environment in a pilot project to minimize the costs of further introduction of software for all business processes.

7. Modernizing the digital environment as a result of the pilot project and its expanding to all procurement business processes.

In the most general terms, development of the procurement digital system consists in expanding the area of its use in economic activity of a company by graduate transfer of all business processes into electronic form.

However, one should bear in mind that digitalization of procurement activity, with all its obvious conveniences, generally means just implementation of old processes in a new environment. By a famous saying, digitalization of chaos generates just chaos in an electronic form. In other words, digitalization of procurement – and any other – business processes should be started with their adjustment and optimization. One should not expect efficiency from introducing digital tools if excessive reconciliation or, on the contrary, areas of nontransparent decisions are preserved.

For the content of procurement activity to be qualitatively changed due to introduction of digital technologies, digitalization is not enough. Automation is needed.

The notion of automation should be strictly distinguished from the notion of digitalization. Digitalization precedes automation and is its necessary condition, but is by no means equal to it.

1.3. Automation of document production

While digitalization is executing classical business processes in an electronic environment, automation is involving the capacities of a software and hardware package to performing a part of tasks within these processes. This is not about tasks like document routing or notifications about a maturity. Automation implies using software and hardware package, inter alia, to produce such documents.

In the most general terms, under such division of labor a human just uploads initial data and controls the results, while a software and hardware package processes the data and forms the results. An authorized employee is still responsible for the results, including in the legal sense. However, under proper implementation, introduction of such technologies qualitatively reduces the amount of a human's routine work and increases its expert constituent.

The first step of such automation is to form a database including a constructor of electronic documents with preset forms. These forms may look like text fields, fields of numbers or dates, lists, formulas, etc. With the document constructor interface, an authorized employee inputs the source information into the preset forms. Based on the set of such information, the software and hardware package first selects the relevant form, and then fills in the variables in that form.

It is competitive procurements, due to their organizational features, that are a promising environment for automation of the document production processes. Normally, procurement

is carried out along a formalized, pre-regulated procedure, and the number of variants as templates of procurement documentation, just as templates of applications for participation in procurement is limited and, as a rule, rather small.

This creates an opportunity for using document templates, placed in the digital environment, for procurement automation, and in developed electronic systems – also filling in of these templates using the technology of data inheritance. Data inheritance from the viewpoint of business processes is understood as the possibility of automated prefilling of forms of documents, contracts, etc. Actually, a client preparing procurement only has to indicate, in the documentation “template”, the object of procurement, requirements to the product purchased, and the terms of the future supply.

With the document constructor, a form is created, which is necessary for the definite procurement procedure, and with the data inheritance, the variable fields are filled in.

In the most simplistic terms, the system of data inheritance in competitive procurement can be presented as follows:

1. The demand parameters are formulated as an electronic application for procurement.
2. The parameters of an agreed application are included into the procurement plan.
3. The data from the procurement plan are “pulled through” to the standard procurement documentation, which thus turns into a project documentation of a specific procurement.
4. The norms of procurement documentation are translated into the draft contract.
5. Contract terms are reflected in the closing documents.

Generally speaking, the current architecture of the digital environment of public procurements, first of all, the Unified information system in the sphere of procurements, is built along these approaches.

To effectively use such electronic system, a user should only have professional knowledge in their field. In other words, automation is only good if it releases an employee’s time but not makes one spend this time to study the order of using the functionality of the electronic portal.

That is why, *inter alia*, the system and interface design is practically one of the key factors of automation. In somewhat simplistic terms, one may formulate this principle as follows: the system is the better, the fewer keys a person must click to obtain a complex result.

The result of studying the data of previous documents must be prefilling of forms of further documents. For example, the title and amount of purchased goods have been established within the agreed application; in this case, the data inheritance technology must provide automated prefilling of the variables “title” and “amount” in the procurement plan, procurement documentation, draft contract, and draft acceptance documents. This said, data prefilling must leave an opportunity for a human to edit them because, as was mentioned above, it is a human that is ultimately responsible for the result.

Thus, after introduction of the automation tools of documents production, the source data, including the procurement parameters and variables, are specified by a human. Drafts of documents are created by the software and hardware package. As for legal relevance,

the documents acquire it through signing by an authorized employee with an electronic signature.

This said, the potential of automation in procurements is neither theoretically nor practically limited to producing the procurement documentation. We already see successful examples of automation of individual business processes, related to procurements.

1.4. Automation of business processes

Automation of business processes can be defined as providing their implementation using the algorithms of a software and hardware package. As a rule, this requires substantial organizational remodeling of these business processes while preserving their essence. After procurement automation, a human makes decisions only at key stages.

The automation opportunities allow implementing procurements also along completely new procedures, qualitatively reducing organizational costs of all parties of the procurement process while maintaining competitiveness and transparency of procurement per se (Kazantsev & Mikhaleva, 2020). The so called dynamic procurements are gaining popularity today, in which collection of suppliers' proposals and their ranking is de facto automated. This is the example of how automation requires organizational reconstruction of the traditional business processes.

For example, in a classical competitive procurement, the client first publishes a notification of procurements, than waits for one or several weeks for the suppliers to submit their proposals, then estimates and ranks these proposals, and only then formalizes the procurement results. Automation in dynamic procurement requires a different process: first the suppliers publish their proposals in a specialized portal and sign then with an electronic signature as offers addressed to an uncertain circle of potential clients; then the client, when procurement is needed, specifies the parameters of their demand in the relevant fields of the specialized portal interface; after that, the portal's software and hardware package performs an automated search for relevant offers among those uploaded by suppliers, immediately ranking them by the parameters set by the client.

Today, new variants of this model appear in the form of electronic market places and corporate Internet stores. These variants may sometimes have their own essential features: for example, a preliminary proposal may not have the status of an offer and choosing it means not an acceptance but just an invitation for negotiations. But even such specificity does not revoke the basic scheme of automation described above.

A tool for rapidly purchasing goods with automated selection of potential proposals is currently regulated by Part 12 of Article 93 of the Law "On contractual system"⁵ as a full-fledged means of finding a supplier (agent, executor). As a recommended tool, it also

⁵ On contractual system in the sphere of purchasing goods, works, services to provide for public and municipal needs: Federal Law of 05.04.2013 No. 44-FZ. Collection of legislation of the Russian Federation, 08.04.2013, No. 14. Article 1652.

occupied its position in procurements of public corporations and natural monopolies subjects⁶. As early as in 2014, a similar tool called “dynamic purchasing” was mentioned in the EU Directive “On public procurement”⁷, and in 2016 it became nearly the main means of choosing a supplier in the Procurement Code of Italy⁸.

Dynamic procurement is just one of the variants of the procurement business processes automation. Strictly speaking, in this case automation refers only to choosing the winner. It actually allows qualitatively reducing temporal costs. However, in competitive procurements, a deeper variant of automation may be implemented.

Such variant of automation is called end-to-end automation. It is based on the data inheritance technology described above, but is not limited to it. Schematically, it can be described as follows:

1. A client forms a database with libraries of standard procurement documentation, draft contracts, etc.

2. The database is integrated into a specialized portal together with categorical strategies of the client.

3. When a need for procurement occurs, an authorized employee specifies the key parameters of this need in the relevant fields of the specialized portal interface.

4. Based on the key parameters, the software and hardware package determines the categorical strategy.

5. Within this strategy, automated collection and processing of information are carried out, including the information about the market competitive condition, presence of qualified suppliers, market prices for the goods; then the most effective way of procurement is determined and a package of procurement documentation is formed.

6. An authorized employee approves drafts or inputs additional data to specify the results.

7. Based on the documentation approved by the authorized employee, the software and hardware package controls the terms and publishes or sends notifications about the procurement in the set time.

8. Depending on the chosen way of procurement, the software and hardware package selects proposals, previously published by suppliers for participation in the dynamic procurement, or sends invitations to qualified suppliers to submit their proposals.

9. After proposals are collected, the software and hardware package checks information about the suppliers in open sources, estimates the consistency of each proposal with the client’s need and ranks the proposals based on the criteria indicated by the client.

⁶ On the features of participation of small and middle business entities in purchasing goods, works, services by certain types of legal persons: Decree of the Russian Government of 11.12.2014 No. 1352. *Collection of legislation of the Russian Federation*, 22.12.2014, No. 51. Article 7438.

⁷ Directive 2014/24/EU of the European Parliament and of the Council of 26 February 2014 on public procurement. <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32014L0024>

⁸ *Codice dei contratti pubblici* (Decreto legislativo 18 aprile 2016, n. 50). https://www.bosettiegatti.eu/info/norme/statali/2016_0050.htm

10. The client accepts the ranking and chooses a winner, indicating additional data for a new procurement.

11. If a winner is announced, the software and hardware package compiles a draft contract and sends it first to the client for approval and then to the supplier for signing.

12. Based on the parameters of the contract signed, the software and hardware package controls the terms and volumes of the supply, including sending reminders about shipment and acceptance.

13. As a result of the supply, based on the contract data and the information uploaded by the client about the factual contract execution, the software and hardware package forms drafts of closing documents and sends them to the client and the supplier for signing (Kazancev, 2020).

This scheme comprises all the main stages of procurement work and allows using all the main means of procurement. It is important to note that a human is not removed from procurement work, as it is their electronic signature that assigns legal relevance to the key decisions and documents. But preparation of these decisions and documents, their routing, communications with the contractor and “bureaucratic’ elements of work are all implemented by the software and hardware package.

In this paradigm, not only labor costs of the authorized employee are reduced and the business processes are accelerated. Implementation of these processes by software and hardware package reduces the value of the so called human factor and bias in making decisions. A human being able to make amendments in the documents prepared by the software and hardware package does not negate the fact that each of these amendments is registered in the document history, which, in turn, simplifies retrospective control.

End-to-end automation creates conditions for forming the S2P system. Source-to-pay is applied automation of the whole complex of procurement work, including all interactions between a client and a supplier⁹. In this system, all business processes, related to procurement, take place in the digital environment and are implemented, inter alia, using artificial intelligence.

If properly integrated into the S2P system, artificial intelligence is capable of significantly broadening the potential of automation and individualizing the procurement scenarios depending on the unique parameters combining the client’s demands and the market of the goods purchased. In addition to the basic automation scheme described above, artificial intelligence – based on the analysis of big data both from open sources and its own archives of previously executed procurements – is capable of performing, at least, the following functions:

– forecasting demands. To do that, AI analyzes the client’s activity from the viewpoint of necessary resources, monitors the volume and contents of stock reserves, and execution

⁹ McCann, Jo. *How source-to-pay works*. <https://blog.routable.com/how-source-to-pay-works/>

of framework contracts. If there is a risk that a resource is about to be exhausted and cannot be replaced without a procurement, then AI informs the client about it, and ideally also proposes the optimal parameters of the future procurement. For example, it takes into account the factual supply terms. The more time a supplier needs to deliver goods, the more stock the producer has to keep¹⁰.

– determining the most effective procurement tool. Generally, this function is an expansion of the function of determining basic parameters. Based on the analysis of information about the condition of the regional market of the goods to be purchased, AI can assess what will be more efficient – to announce an auction, to conduct a dynamic procurement, or to offer a single supplier. For example, an attempt to conduct an auction, which is doomed to failure due to the absence of competition, will just mean additional organizational and temporal costs without any result.

– performing an expanded check of qualification and economic behavior of the supplier. AI can not only collect the data of official registers but also obtain feedback from other clients, information on litigations, and sometimes even information about the capacities, equipment, technologies, personnel qualification, etc. All these data are important for effecting a contract. Without AI, the client would need a lot more time to collect even a part of these data.

– determining and controlling the supply logistics. AI does not only calculate the optimal route, its costs and risks, but also allows the client, under minimal technological integration with the supplier and their navigation system, to trace the cargo movement in real time.

Implementation of these additional functions requires of the software and hardware package to collect and process big data and to have machine learning mechanisms. These features allow us to speak, if not in the specific then, at least, in the general sense, of using artificial intelligence for procurement automation.

1.5. Automation of decisions

So far, one cannot speak of a consensus on such a seemingly fundamental (for this discussion) issue as artificial intelligence.

For example, it is suggested to interpret it as a system capable of physically manifesting itself, including feeling, processing and influencing the external environment to a certain extent (Calo, 2015). Such definition prioritizes the physical manifestation of the results of artificial intelligence functioning. However, in practice the results of its functioning may remain in the electronic environment, and only the impact of these results of legal relations with participation of physical and legal persons will show itself in the external world.

¹⁰ Banker, Steve. (2022, April 1). One Multinational's Supply Chain Transformation Journey. *Forbes*. <https://www.forbes.com/sites/stevebanker/2022/04/01/one-multinationals-supply-chain-transformation-journey/?sh=87ff9516229c>

In the extreme, this approach is expressed in the concept of the so called strong artificial intelligence, which is understood as a technology identical to human conscience in mental properties and the character of processing available information, including in the aspect of comprehensive information interpretation, ability for creativity and intuition (Searle, 1990).

However, the most realistic today is the concept of artificial intelligence as a software and hardware package, having nothing in common with the human intelligence in the aspect of cognition essence, but capable of solving in general the tasks similar in complexity or more complex ones (Bokovnya et al., 2020). Assumably, it is this approach that corresponds today to both the level of technologies achieved, and the spheres of practical application of artificial intelligence.

In the expanded variant suggested by N. N. Chernogor, the definition of artificial intelligence within the said approach looks as follows: "The technology determining the ability of an informational system to correctly interpret, without a direct participation of a human, the external data (external information), specify the database (databases) with the account of those data, to learn from the mistakes made and to use the knowledge obtained to achieve specific goals through flexible adaptation under an ill-defined situation" (Chernogor, 2022).

Even today, the opportunities of artificial intelligence are to a greater or lesser extent exploited by clients to manage stock volumes and to work with supply logistics. The volume of the processed data and the speed of processing combined make the use of AI objectively feasible. However, that poses new questions of legal character.

By the example of the previous four transformations we have shown that the regulation development did not precede the introduction of electronic technologies into procurement activity, but always accompanied it. First, it was novels of general regulation devoted to electronic document flow and electronic signature, then novels of special legislation, regulating electronic means of procurement, then new bylaws devoted to rapid purchases based on automation patterns. State regulation was complemented and developed by corporate regulation – in the sphere of automation today, the largest amount of norms, as well as the depth of regulation, belongs not to laws and even not to departmental instructions but to corporate provisions and regulations.

This should be born in mind when discussing the issue of regulating the use of artificial intelligence in procurement work. AI is capable of not only analyzing stock reserves and delivery routes. The next step is choosing the optimal way of procurement based on the analysis of the data of market conditions. To do that, it is important not only to process big data, but also for the client to have multifactor categorical strategies of procurement management. This is because in order to determine the tools, big data about the market must be processed within a matrix of categorical strategies: AI collects and processes the data about whether the goods demanded by the client are sold in this region or delivered from neighboring regions, what the delivered price is, whether the characteristics comply with the client's demands, whether there are competing offers and whether the suppliers are ready for competition, etc.

However, if AI is capable of processing such data, then it can propose not only the optimal way of procurement, but also the winner candidature. And if one extrapolates this capability on the need for rapid procurement for continuous production, then the same AI based on the same data may autonomously send an application for delivery to the best supplier.

Even if AI sends the application not to a new supplier but to the one with whom the client had previously signed a framework agreement on delivery – such models of artificial intelligence integration into procurement are already used by some enterprises, – in this case too it is AI that forms the essential contract terms which generate a deal. It indicates the specific volume of the specific goods, which under the framework agreement automatically determines the delivery cost. Technically, even now artificial intelligence can do the same in the absence of a framework agreement previously signed between the client and the supplier.

Automated decision-making about the choice of a supplier and signing a deal with them is much quicker and more convenient than the classical tender. It completely eliminates bias and subjectivism in making a decision about the winner of procurement. But it also turns AI from a decision-making tool into a decision-making subject.

2. Legal personality of artificial intelligence

The cardinaly changed role of the software and hardware package in economic relations associated with procurements poses cardinaly new questions of legal character, which are no longer solved by the current regulation. The electronic document flow is already regulated, as well as the electronic procurements, conducted using the electronic document flow, and, up to a certain extent, digitalization of the whole process of procurement work, for which electronic procurement per se is just one of the stages. However, the status of artificial intelligence within digital procurement work is not regulated.

Today, this is not an issue of just theoretical value: in practice, the consequences of the artificial intelligence functioning lead to effecting deals and emerging contractual obligations. Moreover, one may assert that it is the emergence of contractual obligations as a result of artificial intelligence functioning that implies the genuine automation procurement work.

For example, the decision on choosing the procurement means refers directly to the client only (even if its consequences may indirectly touch upon the supplier). In this case, the software and hardware package, which offers the most effective procurement tool for the client, based on a set algorithm, performs though a comprehensive, but still auxiliary function. The subject of the decision who is responsible for its consequences is still an authorized employee of the client. Hence, complete automation of this business process is out of question so far.

However, a decision to send application for another batch of goods to the supplier places the software and hardware package into the position within economic relations, which actually allows saying that a robot signs a deal.

This said, and it is important, the software and hardware package does not “purloin” the authorities beyond the algorithm set to it. Its role of a deal subject follows exactly from the algorithm execution – because it is convenient for both the client and the supplier to use the robot to determine the terms, volume and object of delivery. This allows both the client and the supplier to release resources for the main production activity. But from the civil-legal viewpoint it is the results of the artificial intelligence functioning that generate mutual rights and obligations of the client and the supplier.

This circumstance poses the question about the legal personality of artificial intelligence per se, the answer to which is by no means obvious today. The results of a scientific discussion on this topic depend not only on the possible consensus, but also on the speed of the electronic technologies development.

The issue of the legal personality of artificial intelligence is solved based on the understanding of its essence, but is not limited to that. Hence, even if we do not attempt to find similarities between a human cognitive activity and artificial intelligence functioning, we can still find weighty arguments for endowing a software and hardware package with a legal personality, first, to clearly indicate its role in legal relations, and second, to protect the rights of other legal personalities.

This concept was most vividly expressed by E. V. Vavilin: “a legal personality of AI is necessary to restrict AI in its rights through a specific functional purpose” (Vavilin, 2021). However, he also did not mention that the legal personality of artificial intelligence can be similar with the legal personality of, for example, a legal person. The construct of AI legal personality is proposed exactly as a means to achieve the goal of limiting its rights. From this viewpoint, it is sufficient to endow AI with a specific set of rights and obligations, i. e. to stipulate a special technical legal personality.

However, this discourse leaves unsolved the issue of the practical implementation of such legal personality – in particular, the practical aspects of endowing responsibility. For example, how can one make AI reimburse for the damage incurred by the consequences of its functioning? Whatever legal fictions we use, de facto AI functioning in favor of one subject (for example, in favor of the subject to whom artificial intelligence incurred harm) means that it does not use a part of time or capacities to work in favor of another person (namely, its owner). Thus, compensation of harm in this situation is imposed of the AI owner, even if the compensation is performed using AI.

Under such circumstances, one should agree with V. K. Andreev that “application of digital technologies using artificial intelligence at the modern stage of its development does not mean advent of new public relations, qualitatively differing from the existing ones”, and “artificial intelligence does not act as a digital legal personality within the relations of digital rights circulation in the informational environment of the operator. The latter, using digital technologies in entrepreneurship, applies elements of artificial intelligence in business models, not generating digital legal relations” (Andreev, 2021).

Indeed, it is the owner, or the operator, of artificial intelligence that serves as the subject ultimately influencing the results of AI functioning and uses the results of its functioning. Hence, it is logical to imply their responsibility for these results.

Indeed, under any degree of digital technologies penetration and any model of using artificial intelligence, today it is hard to imagine AI acting completely independently from a human and assuming the rights and obligations, neither directly not indirectly stemming from the will and actions of the human. Hence, artificial intelligence today should be referred rather not to new legal subjects but to innovative tools requiring new legal regulation.

“The relations using artificial intelligence are always relations between legal subjects and about object of law. In any case, these are relations which at one stage or another initiated, programmed by a human – a legal subject with various levels of responsibility (including within the frameworks of legal persons’ activity). Expression of will of a human for certain actions of artificial intelligence may be expressed in various degrees: from AI actions fully controlled by a human will to autonomous actions of AI, also allowed and comprehended in their probable limits and consequences by a human (a group of humans)” (Shakhnazarov, 2022).

The degree of influence of the human expression of will on the results of artificial intelligence functioning must be taken into account when solving the issue of distributing responsibility for AI actions between the current legal subjects, which will be discussed below in more detail. The issue of the legal personality of artificial intelligence per se at the present stage of technological, as well as public and economic, development, one may rely on the position by S. E. Channov: “Endowing robots (artificial intelligence systems) with the status of a legal personality will not entail any explicitly negative consequences in the foreseeable future. At the same time, one can see no advantages of such decision compared to viewing robots (artificial intelligence systems) as quasi legal personalities. Stemming from the philosophical Occam’s razor principle not to multiply entities beyond necessity, we believe that introduction in the legal sphere of such a conceptually new legal personality as a robot (artificial intelligence system) is premature (although one cannot exclude that such necessity will emerge)” (Channov, 2022).

3. Legal status of a deal effected with participation of artificial intelligence

The conclusion that artificial intelligence today cannot be recognized as a legal personality does not remove, but actualizes the issues associated with the status of a deal effected using artificial intelligence. Such deals are already effected today, and their number will increase in the future.

What is the status of such a deal? What is the mechanism of its judicial protection? On what grounds can it be contestable? These and other questions are still to be answered by theorists of law. It is these answers that will become the basis of the “law of electronic relations” (Kenney & Zysman, 2016), which is being written about today. Assumingly, the future of legal regulation belongs to forming the law of electronic relations as a separate and integral branch of legal knowledge, not to endowing the status of a legal personality to artificial intelligence.

While endowing the status of a legal personality to artificial intelligence is premature, it is still necessary to solve the question of who is the subject of a legal relation implemented with participation of AI. Indeed, using AI personality per se should not lead to the deal contestability, to say nothing of voidness. Because if we allow presumption of a deal invalidity on the grounds of using AI technology during its execution, then this will inevitably create unjustifiable risks for the existing economic relations, the digitalization and automation of which was thoroughly discussed above. As any AI is backed by a physical or legal person, it is they that should share both the legal consequences and responsibility for artificial intelligence functioning.

The exact parameters of distributing responsibility should be elaborated by legal science during forming the law of electronic relations. As an invitation for discussion, we can suggest several variants of solving the question of responsibility for the consequences of the software and hardware package functioning within economic relations with a high degree of automation:

1. Owner's responsibility: whatever the results, responsibility for the AI actions and decisions shall be borne by the legal or physical person to whom the software and hardware package belongs or by whom it is legally used.

By a brilliant definition of S. F. Afanasyev, under such approach "the legal position of AI becomes identical or close to that of the Roman anthropomorphic collective organizations, or even more reduced – a slave, family members, children, including 'filius in potestate tua est' " (Afanasyev, 2022).

Such approach is intuitively comprehensible and, at first glance, maximally logical and utilitarian. However, it ignores the fact that the results of artificial intelligence functioning by no means always depend on the consequences of the expression of the will, actions or inaction of its owner.

For example, adverse results of AI functioning may be a consequence of not only its defective use, but also a consequence of its defective design. A legal construct seems dubious if it imposes on the owner responsibility for the functioning of a software code, analysis of which requires special and profound expertise – such as a bona fide user of the software and hardware package, as a rule, cannot and is not obliged to have.

2. Creator's responsibility: if a bona fide owner did not foresee the adverse consequences of the robot's actions and could not influence them, then it is logical to impose the obligations due to the harm inflicted not on them but on the developer of the algorithm, implementation of which caused the harm inflicted.

This should be highlighted: we are not talking about removing the AI owner from responsibility for the consequences of the AI functioning. We are only talking about the distribution of such responsibility as a result of proving guilt. For example, the owner's responsibility is presumed, but if their guilt was not proved, then the issue of identifying the developer's guilt is initiated.

However, this approach can be logically continues also in the case when the creator's guilt is not proved. If the results of AI functioning were influenced by a third person, for example, by modifying it or providing incorrect data for processing, then that third person will be liable.

3. Comprehensive approach: adverse consequences of AI functioning will be the responsibility of the person whose action or inaction ultimately caused the harm inflicted. In practice, the cause of adverse consequences of AI functioning within procurement business processes can be the developer's actions, the actions of the client as the software and hardware package owner, and even the actions of the supplier as its user.

The foreign doctrine considers even the issue of implementing the concept of criminal liability for the consequences of artificial intelligence functioning, which would take into account the actions and inaction of the developer, owner, users and other persons related to AI or having influenced the results of its functioning (Hallevy, 2013).

Actually, artificial intelligence makes decisions based on collecting and processing information, including open source information. Hence, if one of such sources contains a critical amount of incorrect information, then it may become the cause of artificial intelligence error and respective adverse consequences.

To distribute responsibility in this case, one may legislatively stipulate, for example, the presumption that the subject of obligations, emerging as a result of normal software and hardware package functioning, is its owner. It is they that will be obliged to prove the need to impose responsibility on another subject. This idea was proposed, in particular, by V. A. Laptev, who wrote about a subsidiary responsibility of the developer, owner, and user of artificial intelligence (Laptev, 2019).

This specter of solutions is not closed. One may construct other models of legal consequences for the relations emerging as a result of artificial intelligence functioning.

For example, another legal construction may be inclusion of AI into the sources of increased danger. According to A. A. Antonov, "legislative stipulation of new AI systems will require considering the issue of recognizing them as a source of increased danger, as an owner AI can be forced to compensate for the damage inflicted through court action only" (Antonov, 2020).

An alternative approach, also discussed in the foreign doctrine, is to endow artificial intelligence with a legal personality of a legal person with a similar distribution of responsibility for the consequences of its functioning (Chesterman, 2020).

In any case, regulation of the issue of a legal personality in the relations implemented using AI, as well as the issue of distributing responsibility in these relations, requires special normative regulation. This does not imply immediate changes in the legislation: regulatory tests may be performed through agreements, including norms of the AI status, between persons participating in such legal relations. After all, the very technologies of digitalization and automation of procurements, chosen as illustrative material for this article, were created and tested not in public but in commercial segment.

Conclusions

Not only we are witnessing the formation of informational law, but it may become a separate branch of law in the future – the very branch on which a significant part of economic relations is based. What is even more important, without formulating specialized norms of informational legislation in these relations, each year it will become harder and harder to speak of legal regulation. In other words, huge resources will be spent in economic activity without the possibility to accurately define mutual rights and obligations.

The experience of digitalization of B2B and B2G competitive procurements may help us trace the evolution of digital technologies penetration in the economic activity and the practice of introducing new legal mechanisms to solve the emerging problems. This experience shows that emergence of cardinal new technologies never means the principal impossibility of their regulation. Apparently, such regulation should reflect, but not substitute technological development.

This said, even in such specific sphere as competitive procurements, the ubiquitous penetration of digital technologies does not imply its evenness. In other words, while some clients undergo just the first digital transformation and still cannot abandon a paper contract with a handwritten signature, others constantly use automation procurement business processes and work out the introduction of artificial intelligence technologies.

Such unevenness does not depend on the sector specificity: the first digital transformation may become “a stumbling block” for large organizations in extremely knowledge-intensive industries, while the fifth digital transformation can be successfully tested by quite ordinary services. This returns us to the idea that procurement regulation in the aspects of digitalization is not a derivative from sector regulation, but is an independent and largely isolated range of issues, possessing an object unity. It is essential to take this specificity into account when developing normative regulation of economic relations using artificial intelligence.

Digital transformation is not limited to using new software. It also includes restructuring business processes and modernization of legal regulation. For example, “digitalization of public procurements is not just an issue of acquiring the most advanced technologies. It also requires changing the tools and means of procurement, which would allow the state to interact with the new technologies and effectively and rapidly integrate them into practice” (Shmeleva, 2019).

A logical continuation of the digital transformation of procurement work is its automation, including using artificial intelligence technologies. Using artificial intelligence does not mean removal of a human from procurement work. It just means increasing the expert level of this work. In other words, with introduction of artificial intelligence, the attention of a procurements specialist will become more and more focused on nonstandard, specific and especially important situations (Kazantsev, 2021).

This said, artificial intelligence per se remains so far a tool, not a subject of procurement work, even if decisions within this work are made by the software and hardware package without direct participation of a human. "From the ontological viewpoint, all advanced technologies are not subjects but objects, and there are no juridical grounds to make them legally liable. Even in the light of the existing rules of legal liability based on various legal criteria, it is always theoretically possible to identify the person who will be liable for the harm inflicted as a result of production or exploitation of a device with AI system" (Ivliev & Egorova, 2022).

As an invitation for discussion we may propose several models distributing responsibility within economic relations with a high degree of automation. It would be more correct to call them not models but points for formulating legal constructs.

For example, one may stem from the fact that a subject of such a deal de jure is a person who signed the framework agreement, for the implementation of which the order formalized by the robot was created. Thus, the responsibility for the decisions "made" by a robot to execute the algorithm is imposed on a human. But one cannot but notice that this is largely just a temporal measure. Even today, artificial intelligence technically may not just send the applications within the frameworks of previously signed agreements but also sign new independent agreements. In other words, acting as a subject of legal relations, a robot does not need a previously signed framework agreement.

Another approach stipulates that the owner is responsible for all actions of a robot. In other words, whatever the result of the algorithm execution, all actions and decisions of the robot will be a responsibility of the legal or physical person to whom the given software and hardware package belongs or by whom it is legally used. Essentially, such approach was worked out by Roman jurists for the cases of slave owning relations

One may link the responsibility for the consequences of the artificial intelligence functioning with the guilt of the subject, whose action or inaction influenced the occurrence of the definite result of the software and hardware package functioning.

Each approach is imperfect and deserves being discussed. The future task is to elaborate a solution based on these approaches but not limited to any of them. However, solutions in the sphere of legal regulation of the said issues are indispensable.

Informational law becomes an increasingly demanded branch of legal knowledge (Scassa, 2018). In the future, it almost certainly will become a separate branch of law. This branch of law will have to deal with relations in which technologies and business practices are of priority significance for elaborating legal norms. In other words, the new norm should harmonize, not create the digital reality.

This means that the new legal constructs also must adequately reflect and regulate the existing relations implemented, inter alia, with automation tools. It is this approach that makes feasible the task of legal regulation to minimize the risk of useful tools being misused by malevolent subjects.

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Проблемы и перспективы регулирования отношений в рамках сделки, совершенной с участием искусственного интеллекта

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Ключевые слова

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цифровизация,
цифровые технологии

Аннотация

Цель: исследование проблемы определения субъекта юридически значимого действия, совершенного с использованием искусственного интеллекта, а также распределения ответственности за последствия его работы.

Методы: для иллюстрации проблематики и практической значимости вопроса о правосубъектности искусственного интеллекта были выбраны автоматизированные закупки для государственных и корпоративных нужд, а методологическую основу исследования составила совокупность методов научного познания, используемых для теоретико-правовых исследований, в том числе сравнения, ретроспективного анализа, аналогии и синтеза.

Результаты: на примере отрасли конкурентных закупок для государственных и корпоративных нужд проанализирована эволюция автоматизации хозяйственных отношений вплоть до внедрения искусственного интеллекта. Продемонстрированы успешно апробированные ответы на вызовы, обусловленные поэтапным внедрением цифровых технологий в хозяйственные отношения, а также соответствующие модификации правового регулирования. На основании текущего уровня развития технологий сформулированы перспективные вопросы правового регулирования хозяйственных отношений, реализуемых с использованием искусственного интеллекта, и прежде всего вопрос определения субъекта сделки, совершенной с использованием искусственного интеллекта. В качестве приглашения к дискуссии после анализа выводов правоведов о возможных вариантах юридического статуса искусственного

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интеллекта предложены варианты ответа на вопрос о его правосубъектности при заключении сделки. Для решения вопроса об ответственности за решения, ставшие результатом реализации алгоритмов программно-аппаратного комплекса, предложено несколько моделей распределения такой ответственности между его создателем, его владельцем и иными лицами, действия которых могли повлиять на результаты работы такого алгоритма. Предложенные выводы могут использоваться для развития нормативного регулирования как в совокупности, так и по отдельности.

Научная новизна: в работе на основании анализа эволюции практик использования цифровых технологий в закупках сформулированы потенциальные проблемы правового порядка, обусловленные непрерывным процессом автоматизации хозяйственных отношений, а также предложены правовые конструкции для решения таких проблем.

Практическая значимость: выводы и предложения настоящей работы имеют перспективное значение для концептуального понимания и нормативного регулирования инструментов проведения закупок в электронной форме как на корпоративном, так и национальном уровне.

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