http://dx.doi.org/10.18623/rvd.v23.n4.4833

MODELS OF CIVIL LIABILITY FOR THE UNLAWFUL USE OF ARTIFICIAL INTELLIGENCE IN THE ECONOMY

MODELOS DE RESPONSABILIDADE CIVIL PELO USO ILEGAL DA INTELIGÊNCIA ARTIFICIAL NA ECONOMIA

Article received on: 10/9/2025
Article accepted on: 1/9/2026

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The authors declare that there is no conflict of interest

Abstract
The rapid development and widespread deployment of artificial intelligence outpace existing legislation and give rise to new legal challenges. This results in regulatory gaps across various sectors, including healthcare, transport, intellectual property, etc. In particular, uncertainty persists regarding the grounds for and subjects of civil liability for harm caused by the unlawful use of AI in the economic sphere. The objective of this study is to analyze possible models of civil liability for the use of AI in the

Resumo
O rápido desenvolvimento e a ampla implantação da inteligência artificial ultrapassam a legislação existente e dão origem a novos desafios jurídicos. Isso resulta em lacunas regulatórias em vários setores, incluindo saúde, transporte, propriedade intelectual, etc. Em particular, persiste a incerteza quanto aos fundamentos e aos sujeitos da responsabilidade civil por danos causados pelo uso ilegal da IA na esfera econômica. O objetivo deste estudo é analisar possíveis

economy. The research methodology included desk-based analysis of Russian and other legal sources, theoretical synthesis of the results, and an expert survey involving 41 specialists. Thus, a classification of civil liability models for the use of AI in the economy is proposed with due regard to the autonomy of AI systems and the fundamental principles of liability. Three core models are identified: the fault-based model, which treats AI as a tool; the risk-based model, which applies a liability regime for hazardous products; and the vicarious liability model, which attributes responsibility to the AI owner for the actions of an autonomous system. Expert assessment indicates that models grounded in the principle of risk and the vicarious liability model are the most preferable. It is also established that the main subject of liability is the person who commits unlawful acts using AI and gets benefit from them. Where many persons are involved, liability is joint and several, which necessitates the further improvement of legislation.

Keywords: Fault, Joint and Several Liability, Damage, Risk, Labor Market.

modelos de responsabilidade civil pelo uso da IA na economia. A metodologia de pesquisa incluiu análise documental de fontes jurídicas russas e outras, síntese teórica dos resultados e uma pesquisa com 41 especialistas. Assim, é proposta uma classificação dos modelos de responsabilidade civil pelo uso da IA na economia, levando em consideração a autonomia dos sistemas de IA e os princípios fundamentais da responsabilidade. São identificados três modelos principais: o modelo baseado na culpa, que trata a IA como uma ferramenta; o modelo baseado no risco, que aplica um regime de responsabilidade para produtos perigosos; e o modelo de responsabilidade indireta, que atribui responsabilidade ao proprietário da IA pelas ações de um sistema autônomo. A avaliação especializada indica que os modelos baseados no princípio do risco e o modelo de responsabilidade indireta são os mais preferíveis. Também se estabelece que o principal sujeito da responsabilidade é a pessoa que comete atos ilícitos utilizando IA e obtém benefícios deles. Quando muitas pessoas estão envolvidas, a responsabilidade é solidária, o que requer o aperfeiçoamento da legislação.

Palavras-chave: *Culpa, Responsabilidade Solidária, Danos, Risco, Mercado de Trabalho.*

1 INTRODUCTION

The dynamic development of new technologies and the widespread use of artificial intelligence affect many spheres of human life [47, 48] and cause legal consequences across many branches of law, including medical law, transport law, intellectual property law, as well as commercial and consumer law [1, 2].

Unfortunately, legislation fails to keep pace with technological advancement, and as a result, the use of AI in many areas gives rise to numerous legal challenges [3, 4]. For example, the application of AI in healthcare raises issues related to the attribution of liability for medical errors [6], while in transport, significant difficulties arise in determining liability for traffic accidents involving autonomous vehicles [3, 22, 23]. The use of AI in the judicial system may cause concerns regarding the independence, impartiality, and objectivity of robot judges [10, 12]. In commerce, questions emerge

regarding the contractual legal capacity of AI [5, 14, 15]. In human resources policy, fears may arise about unequal treatment of employees by AI systems [6]. In cases involving inventions or works of art created by AI, it remains unclear who should be recognized as the author and who is entitled to benefit from copyright [7, 19, 24]. These legal uncertainties necessitate amendments to regulatory acts in many specific areas, particularly within the field of economic law.

2 LITERATURE REVIEW

In legal literature, the topic of AI has been comprehensively studied in the book by Lance Eliot [8]. The position presented therein holds that, from a legal standpoint, there is no need to address the issue of AI self-awareness or genuine cognition. At the same time, scholars emphasize that certain characteristics of AI provide it with a real capacity to function autonomously within the legal sphere [9] and to generate legal consequences [25]. As argued in [11], the legal analysis of AI-related issues should focus on the legal consequences of AI operation.

According to scholars, the de facto capacity of AI to operate within the legal domain is defined by the following set of attributes:

1) The ability and capacity to engage in legal interactions [25];
2) The ability to act in such a way that legal events initiated by AI are not the result of instructions from a natural person [13];
3) The performance of actions that fall outside direct control, while allowing for subsequent oversight [26].

In conformity with these principles, AI may act as a participant in legal transactions regardless of whether it possesses self-awareness or merely its external manifestations [16, 27]. Within the extensive body of English-language literature devoted to the legal regulation of AI, particular attention should be paid to the perspective presented in [17], which proposes the definition of AI by identifying its decision-making capacity, as this capacity necessitates legal regulation.

Scholars argue that, for the purposes of legal regulation, AI-based systems capable of autonomous decision-making are of particular significance and may, in certain contexts, be considered through the prism of legal personality [18, 28]. AI-based tools

whose decisions are made mechanically cannot be regarded as independent subjects capable of producing legal consequences [29, 30].

Most studies indicate that civil liability typically arises when the following three conditions are met: 1) an event occurs that gives rise to an obligation under the legal system to compensate for damage; 2) damage is incurred; 3) a cause-and-effect relationship exists between the event and the damage [20, 31]. Accordingly, when developing models of civil liability, scholars rely on the fundamental principles of civil liability (the principle of fault, the principle of risk, and the principle of liability for the acts of others), as well as on established legal institutions [21, 32, 33].

The objective of this study is to analyze possible models of civil liability for the use of AI in the economic sphere.

The research tasks are as follows:

1. To identify the main models of civil liability for the use of AI in the economic sphere;
2. To analyze the subjects of civil liability for the use of AI in the economic sphere.

3 METHODS

The specific features of civil liability for the use of AI in the economic sphere were examined through desk-based research, involving an analysis of information sources relevant to the research topic, as well as an expert survey.

At the first stage of the study, the source base was defined and consisted of articles and monographs focused on analyzing the legal regulation of AI.

At the second stage, analysis of the source base, using methods of theoretical generalization, analysis, and synthesis, allowed us to obtain answers to the following research questions:

1. What are the main models of civil liability for the use of AI in the economic sphere?
2. Who is the subject of civil liability for the use of AI in the economic sphere?

At the third stage, an expert survey was conducted to assess the significance of the main models of civil liability and the subjects of liability for the use of AI in the economic sphere identified at the second stage of the research. For the purposes of the

study, an expert sample size of 45 individuals was deemed sufficient, and invitations to participate in the survey were sent to them by email. The criterion for selecting experts was the presence of at least three publications on the research topic in peer-reviewed journals. A total of 41 individuals agreed to participate in the survey. Based on the responses obtained, rankings and impacts were assigned to the models of civil liability for the use of AI in the economic sphere and to the subjects of liability for the use of AI in the economic sphere, with the resulting values reflecting their significance from an expert perspective.

4 RESULTS

For the purposes of this study, and drawing on the fundamental principles of civil liability, we proposed a classification of possible liability models for the use of AI in the economic sphere. This classification is based on the degree of AI autonomy within a given liability model and, as an auxiliary criterion, on the applicable principle of legal liability (Table 1).

Table 1

Models of civil liability for the use of AI in the economic sphere

Principle of liability	Models of liability	Ranking	Impact
Liability based on fault	AI as a tool	5	0.07
	Unintentional fault (negligence)	3	0.11
	Fault in the exercise of supervision (culpa in custodiendo)	4	0.10
Liability based on risk (liability regime for hazardous products)		1	0.34
Liability for the actions of others	Liability for subordinates	2	0.28
	Liability for damage caused by independent contractors (culpa in eligeendo)	6	0.06
	Liability for the actions of authorized representatives (by power of attorney)	7	0.04

According to the experts, among the solutions considered, the most advantageous are those based on the principle of risk, i.e., the liability regime for hazardous products, as well as the vicarious liability model.

These models address the principles of liability for the use of AI in the economic sphere but do not resolve the question of which specific actors should be regarded as liable subjects in each particular case. Potentially, the range of liable subjects may include

the owner, the de facto administrator, the service provider, the manufacturer, the programmer, the entity responsible for training AI, etc. (Table 2).

Table 2

Subject-based civil liability for the use of AI in the economic sphere

Subject of liability	Ranking	Impact
Liability of the owner/administrator	1	0.42
Liability of the manufacturer/programmer	3	0.26
Joint and several liability	2	0.32

Source: our own research and the results of the expert survey.

According to the experts, the primary liable party should be the person who engages in unlawful activities related to the operation of AI and gets benefit from them. Thus, determining the responsible party requires identifying who meets these criteria. However, the complex chain of actors involved in the functioning of AI may result in more than one subject satisfying the criteria for liability. In such cases, a regime of joint and several liability applies.

5 DISCUSSION

5.1 Models of civil liability for AI

Liability based on the principle of fault. A common feature of all fault-based liability models for one's actions is the treatment of AI as an object and the full identification of its operation with the rights and obligations of the user [34].

The simplest solution to the question of liability for the use of AI in the economic sphere is the adoption of the doctrine of AI as a tool, i.e., the recognition that AI is nothing more and nothing less than an instrument in human hands [35]. In this context, it is necessary to distinguish between the concepts of "AI administrator/owner" and "user." The administrator/owner is the party on whose behalf and in whose interests AI acts, as well as any individual who exercises control over the risks associated with the operation of AI. The user is any person who comes into contact with AI.

The general principle of the above-mentioned doctrine is that the person who owns the instrument (the administrator) bears full responsibility for the consequences of its use

since the instrument (AI) lacks independent will. Accordingly, all actions taken by AI are attributed to its owner, regardless of whether those actions are intentional or unintentional, predictable or unpredictable, controlled or uncontrolled. In the context of tort liability, this means that any AI actions having characteristics of a legal violation are directly attributed to its owner, as if the owner had performed them personally. With respect to contractual liability, this gives rise to the presumption that all declarations of intent made by AI are made by its owner/administrator and are binding on them.

This approach to contract formation using AI faces a significant objection: the absolute invalidity of a contract concluded by an autonomous system (AI). According to established doctrine, the validity of a legal act requires a conscious decision and the expression of will. When AI is tasked with concluding contracts, determining the *essentialia negotii* (essential elements of the transaction), and "deciding" to express a specific will on behalf of its owner, it is difficult to assert that the will was exercised consciously since the human owner did not actively participate in the process [36].

The problem inherent in the AI-as-a-tool doctrine (specifically, the defect of AI-generated expressions of will) is addressed through the so-called *doctrine of the unilateral offer*. This solution primarily concerns contractual liability and entails that the expression of intent by the person wishing to use AI in contract formation, along with the specification of the essential terms of the prospective contract, is made "in advance" in the form of an offer directed to all the parties involved. A contract is considered concluded at the moment the offeree performs the corresponding action, which is equivalent to acceptance of the offer. From that point, the contract becomes binding on both parties and requires no further legal actions from the offeror.

The doctrine of the unilateral offer effectively addresses the objection regarding contract invalidity due to the absence of a conscious decision and expression of will, as it allows the human party to make a deliberate declaration of intent to conclude a contract and specify its essential terms at an initial stage (before AI is involved in the contracting process). However, because the contract's essential elements are determined without the participation of AI, relatively few "intellectual" tasks remain for AI to perform, and the human user gains little practical convenience, as they still must complete the majority of the work themselves.

The difficulties outlined above that are associated with the doctrine of AI as a tool primarily concern contractual liability. With regard to tort liability, a relevant issue arises only when considering *unintentional fault (negligence)* on the part of the subject responsible for AI. According to legal doctrine, negligence denotes a failure to exercise the level of care required in a given type of legal relationship, i.e., conduct that deviates from the objective standard of behavior expected of any person in the same circumstances.

To apply the legal construct of negligence and identify the subject liable for damage caused by AI actions in the economic sphere, scholars propose the following analytical framework: 1) whether there exists a subject whose duty was to prevent the occurrence of harm; 2) whether this duty was breached; 3) whether the breach resulted in damage; 4) whether the damage was reasonably foreseeable [17]. An affirmative answer to all these questions allows us to impose liability based on negligence [37].

The legal construct of negligence is more flexible than models based on intentional fault. The advantage of this approach lies in its recognition that decisions made by AI may be difficult to predict. In such circumstances, attributing liability to a person based on intentional fault for damage caused by AI would be unjust [38].

In all the liability models discussed above, AI is treated as an instrument in human hands, with responsibility for the damage resulting from its use borne solely by the human actor. This approach has several advantages: it is simple, requires no substantial changes to the legal system, is readily accepted by society, and enables the prompt and unambiguous identification of the liable party [39]. At the same time, it may lead to the unfair imposition of liability on a party who is not actually at fault. For example, AI may operate based on defective software, or a self-learning algorithm may alter its decision-making process during development, leaving the administrator unable to foresee its behavior [40].

An attempt to overcome the above-mentioned difficulties is the approach based on the principle of *a presumption of fault in supervision* (culpa in custodiendo). In the context of AI, the application of culpa in custodiendo attributes fault for the failure to fulfill the duty of supervision to the person who is legally obliged to oversee the operation of AI. The fault of the administrator is excluded only in cases where the damage results from the actions of a third party, force majeure, or the conduct of the injured party itself.

Moreover, this approach affords the party responsible for supervision an opportunity to avoid liability in certain circumstances, which was difficult under earlier models in which the AI administrator was treated as the direct perpetrator of the harm.

Liability based on the principle of risk. When applying the principle of risk to civil liability for the use of AI in the economic sphere, the best approach is to adopt the liability regime for hazardous products.

Currently, two well-developed systems of product liability exist: the American system established under the Third Restatement of Torts in the United States, and the European system based on EEC Directive 85/374 of 21 July 1985 on the approximation of the laws, regulations, and administrative provisions of the Member States concerning liability for defective products.

Under these provisions, liability for damage caused by AI is imposed on the manufacturer from the moment the product is placed on the market (Article 1 of the Directive). In cases involving multiple obligated parties, they are jointly and severally liable.

Any person who suffers harm as a result of AI actions and can demonstrate the presence of a defect in the AI software, the resulting damage, and a cause-and-effect relationship between the defect and the damage is entitled to bring a claim for compensation against the manufacturer (Article 4 of the Directive). While the manufacturer's liability is broad, it is not absolute. Under certain circumstances, the manufacturer may be exempt. In particular, the manufacturer can demonstrate that: 1) the product was not placed on the market or was placed outside the scope of their commercial activity; 2) the state of scientific and technical knowledge at the time did not allow the defect to be discovered; 3) the defect did not exist at the time the product was placed on the market or arose subsequently.

According to experts, grounding liability for the use of AI in the economic sphere in the European framework of liability for defective products constitutes the most viable and effective solution.

Liability for the acts of others. An analysis of international legislation shows that civil law distinguishes three situations in which liability arises from delegating actions to another person [41]:

– Liability for damage caused by a subordinate (employee), relating to tort liability;

– Liability for damage caused by an independent contractor (culpa in eligendo);

– Liability of a principal for actions carried out by an agent.

In the case of *liability for damage caused by a subordinate*, a superior is responsible for harm caused by an employee acting negligently in the performance of their assigned duties. In practice, it is sufficient to demonstrate that the employee acted unlawfully.

The greatest advantage of this model is that it allows liability for the use of AI treated as a subordinate to extend to all its actual and legal actions, including those related to contract formation, thereby addressing both tort and contractual liability. An additional clear benefit is that the system can recognize the AI's autonomous decision-making (which was not possible in most previous fault-based models) without conferring legal personality on it [42].

The situation of *liability for damage caused by an independent contractor (culpa in eligendo)* is somewhat different, as it concerns liability for harm caused by an independent party entrusted with a specific task. Civil law in European countries establishes a general rule whereby the person who delegates a task to another is liable based on presumed fault in the selection of the contractor (culpa in eligendo) [43]. The delegating party can be exonerated from liability only if they can demonstrate that they exercised due diligence in selecting the contractor or entrusted the work to a professional who performs this type of activity.

To apply the above-mentioned construct to liability for the use of AI in the economic sphere, it would be necessary to assume that AI acts as an independent performer of tasks assigned to it by the administrator, who generally bears responsibility for the improper selection of software [44]. Such an approach appears to offer few advantages and creates numerous difficulties at the initial stage, since a model of liability for the use of AI in the economic sphere based on fault in selection leads to the need to subjectivize AI.

The independence and autonomy of AI are also recognized under another liability model, which treats *AI as an agent*. This approach is supported by S. Greenstein, who argues that where self-learning algorithms participate in trading, the rules on general agency should be applied to them [13]. Recognizing AI as an agent results in all legal acts performed by it within the scope of its authority being attributed directly to the principal,

as if the principal had carried them out personally. Unlike vicarious liability for a subordinate, which is characterized as liability for the acts of another, the liability of a principal for the legal acts of an agent performed within the scope of authority is treated as the principal's own conduct.

5.2 Subject-based liability

According to experts, the simplest solution is to assign liability to the party that uses AI in its activities, i.e., the so-called AI administrator. However, the AI administrator is not always the owner of the system, which creates evidentiary difficulties. Moreover, imposing exclusive liability for all the actions of AI on the administrator seems to be unduly burdensome, as the administrator may, for various reasons, be unable to predict the decisions made by AI or to prevent harmful outcomes resulting from its operation.

Under current EU legislation, liability for damage caused by AI is assigned to the manufacturer. According to experts, the main drawback of this approach is the risk of discouraging entrepreneurs from engaging in AI-related activities due to excessive liability exposure, which may ultimately slow down or even halt scientific and industrial development in the field of AI [46]. Nevertheless, this challenge can be mitigated, for example, through support programs for entrepreneurs engaged in activities related to new technologies and AI [45].

It is also possible to apply a regime of joint and several liability and, on this basis, extend joint and several liability for AI to all the parties involved in the enterprise that resulted in its placement on the market (the manufacturer, programmer, entity responsible for training the AI, distributor, owner, administrator, etc.). In this case, the injured party may bring a claim against any one of the jointly and severally liable subjects, and effectively seek full compensation for the damage from that party. Subsequently, the party that has compensated for the damage caused by AI may seek reimbursement from the co-debtors through a right of recourse (the so-called recourse claims). The main advantage of this approach lies in the protection of the injured party's interests since the claim will be satisfied regardless of which specific party is at fault.

6 CONCLUSIONS

The legal liability regime for the unlawful use of AI in the economy must be grounded in human responsibility. In this regard, civil liability should be defined in both its tort and contractual forms.

The following models of civil liability may be distinguished: 1) AI as a tool; 2) negligence; 3) fault in supervision (culpa in custodiendo); 4) liability for a hazardous product; 5) vicarious liability; 6) liability for an independent contractor (culpa in eligendo); 7) liability for an agent.

Among the solutions considered, those based on the principle of risk (the liability regime for hazardous products), as well as the vicarious liability model are the most preferable. These approaches allow to implement a comprehensive civil liability framework encompassing both tort and contractual liability, while also extending the scope of responsibility to include autonomous decisions made by AI systems. Both models offer a range of advantages, and the doctrine of vicarious liability has significant potential for adaptation to the new challenges posed by increasingly advanced AI systems. In our opinion, the adoption of the hazardous product liability model is the optimal solution.

The liable subject should, first and foremost, be the person who engages in unlawful activities related to the operation of AI and gets benefits from such activities. Accordingly, determining the responsible party requires identifying who meets these criteria. However, the complex chain of actors involved in the functioning of AI may result in more than one subject satisfying the criteria for liability. In such cases, a regime of joint and several liability applies.

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Authors' Contribution

All authors contributed equally to the development of this article.

Data availability

All datasets relevant to this study's findings are fully available within the article.

How to cite this article (APA)

Tursunbaeva, N., Turatbekova, C., Tukubasheva, A., Grundel, L., Kudryavtsev, V., & Shapovalov, A. (2026). MODELS OF CIVIL LIABILITY FOR THE UNLAWFUL USE OF ARTIFICIAL INTELLIGENCE IN THE ECONOMY. *Veredas Do Direito*, *23*(4), e234833. https://doi.org/10.18623/rvd.v23.n4.4833