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DIGITAL TRANSFORMATION OF CONTRACT LAW IN UKRAINE

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Abstract

The rapid digitalization of society has fundamentally reshaped how contracts are concluded, executed, and disputed, particularly accelerating during the COVID-19 pandemic. While legal scholarship has addressed isolated aspects, such as the validity of smart contracts, electronic signatures, or digital property rights, there remains a significant gap in analyzing how digital tools collectively transform all stages of contractual relations. This study addresses that gap by systematically examining the legal challenges arising from digitalization, including party identification, verification of intent, probative value of electronic evidence, and liability for algorithmic decision-making. The novelty of this work lies in its integrated and comparative approach: combining doctrinal analysis of Ukrainian law, empirical case studies, and benchmarking against international standards such as the EU eIDAS Regulation and the UN Convention on Electronic Communications. The study contributes to legal science and practice by identifying inconsistencies in current regulation, evaluating the adaptability of Ukraine's legal system to global digital standards, and proposing targeted reforms to strengthen contract law in the digital age. These findings are intended to support policymakers, practitioners, and academics in developing a more flexible, secure, and harmonized framework for digital contractual relations.

Keywords: *Civil Law Contract; Contract Conclusion; Contract Execution; Electronic Transaction; Digital Environment.*

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1. Introduction

On a global scale, the conclusion, implementation, and resolution of disputes related to agreements have undergone significant changes as a result of the digital revolution in contractual interactions. The traditional legal framework governing contracts is evolving due to the rapid development of technologies, including qualified electronic signatures (QEPs), digital identification systems, blockchain, and artificial intelligence. Although the COVID-19 epidemic has accelerated the transition to remote communication and digital processes, the speed of change has far outstripped the adaptability of legal systems.[1]

Despite notable progress in scientific and legislative discourse, significant research gaps remain. Most current research focuses on specific aspects of digitalization, such as the legality of

[1] Diana Furman et al., "Motivation and Incentives for Employees of domestic Enterprises." *Journal of Law and Sustainable Development* 11, no. 3 (2023): e0815. https://doi.org/10.55908/sdgs.v11i3.815; Dmytro Zahorodnii et al., "Civil-Law Regulation of Electronic Contracts: Current Challenges in Marketing and the Digital Economy." *Legal Horizons* 25, no. 2 (2025): 35–46. https://doi.org/10.54477/LH.25192353.2025.2.pp.35-46

smart contracts,[2] how personal non-property rights are classified in the digital environment,[3] or how public and financial law is digitized.[4] However, the simultaneous impact of digital tools on all phases of contractual relations, from creation to enforcement and dispute resolution, has not been thoroughly investigated, especially in view of new technologies and cross-border contacts. By providing a methodical analysis of the impact of digitalization on civil law contractual procedures, this article fills these gaps. Enforcement of electronic contracts, the probative value of digital communications, the legality of smart contracts, and the liability associated with algorithmic decision-making during contract execution are among the primary legal issues under consideration.

Comparative studies, such as those by Lundstedt and Garcia-Teruel et al. examined digitalization and tokenization of contractual rights in the context of the EU's Digital Single Market, emphasizing cross-border enforcement and property aspects rather than procedural or evidentiary challenges.[5] Lendvai concentrated on algorithmic bias and AI ethics in contract enforcement, without connecting those insights to national civil law adaptation.[6]

At the same time, new comparative works highlight narrower aspects of digital legal transformation. Pfeifer-Chomiczewska examined how Polish civil law addresses contractual liability for artificial intelligence systems, analyzing the difficulties of assigning responsibility for "black box" decisions and errors made by autonomous systems.[7] However, this study remains confined to liability questions and does not address how AI affects contract formation, performance, or electronic evidence across jurisdictions. Similarly, Tran analyzed electronic evidence in civil and commercial dispute resolution under UNCITRAL, EU, German, and Vietnamese law, providing valuable insights into evidentiary admissibility but not integrating broader contract-law doctrines such as intent, consent, or algorithmic enforcement.[8]

Unlike these studies, the scientific novelty of this article lies in its integrated and comparative focus on all stages of contractual relations (from formation, through execution, to dispute resolution) within a single analytical framework. The inclusion of algorithmic liability, probative value of digital evidence, and AI-based decision-making also distinguishes this research from prior literature that treated these issues separately.

Theoretical contribution of this article includes reinterpreting classical principles, such as autonomy of will, freedom of contract, and equality of parties, under conditions of automated and AI-assisted contracting. It develops a conceptual model for understanding algorithmic

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2 Vitalii L. Yarotsky et al., "Counter-Contractual Obligations in the Digital Segment of Civil Turnover under the Legislation of Ukraine." *Academic Visions* 32 (2024): 1–7. https://doi.org/10.5281/zenodo.13898913

3 Mariia V. Menzhul et al., "Approaches to the Classification of Personal Non-Property Rights in the Context of Digitalization." *Analytical and Comparative Jurisprudence* 5 (2023): 235–39. https://doi.org/10.24144/2788-6018.2023.05.41

4 Dmytro A. Dryga, "Mechanism of Formation of Levers of Regulation of Legal Norms in Conditions of Digitalization." *Modern Scientific Journal* 3, no. 1 (2024): 101–107; Denys I. Popov et al., "Transformation of Financial Law of Ukraine in the Context of Digitalization: Problems and Prospects of Legal Regulation." *Bulletin of the University of Lviv. Legal Sciences* 16 (2024): 16–24. https://doi.org/10.32782/2616-7611-2024-16-03

5 Lydia Lundstedt, "DSM Contract Rules in a Cross-Border Context: A Swedish Perspective." IIC: International Review of Intellectual Property and Competition Law, 2025. https://doi.org/10.1007/s40319-025-01581-w; Rosa M. Garcia-Teruel et al., "The Digital Tokenization of Property Rights: A Comparative Perspective." *Computer Law & Security Review* 41 (2021): 105543. https://doi.org/10.1016/j.clsr.2021.105543

6 Gergely Ferenc Lendvai, et al., "Algorithmic Bias as a Core Legal Dilemma in the Age of Artificial Intelligence: Conceptual Basis and the Current State of Regulation." *Laws* 14, no. 3 (2025): 41.

7 Katarzyna Pfeifer-Chomiczewska, "Artificial Intelligence and contractual liability under Polish law. Selected issues." *Studia Prawno-Ekonomiczne* 124 (2022): 59-80. https://doi.org/10.26485/SPE/2022/124/4

8 Quynh Anh Tran, "The Legal Sources of UNCITRAL, the EU, Germany and Vietnam on Electronic Evidence in Civil and Commercial Dispute Resolution." *European Yearbook of International Economic Law* 27 (2022): 9-35. https://doi.org/10.1007/978-3-031-18572-4_2

performance and digital evidence as structurally embedded elements of modern contractual doctrine.

The findings have practical implications as they provide concrete guidance for legislators, courts, and practitioners by clarifying standards for electronic consent, evidentiary evaluation, and liability in algorithmic environments.

2. Method

To investigate the impact of digitalization on contractual legal relations, this study used a systematic and consistent research process that combined traditional legal methodologies with modern analytical methods. To create a valid legal framework for digital contracts, the process began with a doctrinal review of Ukraine's civil legislation, relevant secondary laws, and judicial practice. To establish a regulatory framework for benchmarking, this phase also included a study of international agreements, in particular the United Nations Convention on Electronic

Communications and the eIDAS Regulation. Building on this, essential components of digital contractual interactions, such as smart contracts, electronic contracts, digital products, and electronic identification, have been categorized through abstraction and generalization. The methods used in the US, EU, and other jurisdictions were then compared using benchmarking, which revealed both areas of agreement and differences that could affect the Ukrainian legal system. The next stage of the study was legal analysis based on court cases. To identify recurring trends and emerging issues in legal and commercial practice, individual cases involving electronic agreements, digital evidence, and algorithmically generated contracts have been investigated using inductive reasoning. To test the established concepts of autonomy of will, equality of parties, and freedom of contract, taking into account the realities of digital transactions and algorithmic enforcement mechanisms, these findings were further tested using dialectical and logical methodology.

Successful regulatory and procedural decisions from other countries were also adapted to Ukrainian conditions using the method of analogy. The synthesis and integration of the results of doctrinal, comparative, and thematic analyses were essential for the final phase of the study. This stage enabled the formulation of targeted proposals for modernizing the legal framework, enhancing conflict resolution procedures, and aligning national legislation with international norms. The results and recommendations are based on a thorough and methodologically sound study of the theoretical foundations and practical achievements in digital contract law, utilizing an integrated and consistent methodology.

3. Results and Discussion

3.1. Digital Transformation of Civil Contracts in Ukraine

Digitalization transformed the methods for resolving, implementing, and regulating conflicts in contractual legal relations. Information technology is now a separate element that creates a new legal reality and is also a tool for optimizing procedures. Thanks to the use of electronic signatures, online platforms, CRM systems, specialized document exchange services, etc., the parties can now conclude contracts without the need for a personal meeting. As a result, contracts are gradually moving from paper to electronic format, which requires the adjustment of laws, judicial procedures, and legal knowledge of the parties.

This process is quite active in Ukraine. The COVID-19 epidemic, which forced civil servants, businesses, and individuals to quickly switch to remote communication systems, has become the main catalyst for the digitalization of contracts. In particular, a large number of state-owned enterprises, including Ukrposhta, Naftogaz, and Ukrenergo, have widely introduced electronic document management and electronic signing of contracts with counterparties. Such transactions are now legally valid due to the widespread use of qualified electronic signatures (QES) by the

Law of Ukraine “On Electronic Trust Services.” Cloud services that allow you to quickly and securely sign and store documents, such as “Time” and “SEDO,” have also grown in popularity.[9]

The norms of national legislation regulate relations relating to the conclusion, execution, and termination of civil law contracts in Ukraine. The basis for regulating contractual relations in Ukraine is the Constitution of Ukraine, which enshrines the principle of the rule of law (Article 8), defines the types and legal basis of ownership (Articles 13, 41, 92, 116, 138, 142, 143), enshrines the principle of equal rights (Article 24), etc. The Civil Code of Ukraine is the main legislative act regulating contractual relations in Ukraine. Article 626 of the Code defines a "contract" as an agreement between two or more parties to establish, modify, or terminate civil rights and obligations.[10]

In addition, since the provision of this article indicates the right of the parties to conclude a contract that is not provided for by acts of civil law, but corresponds to the general principles of civil law, article 6 of the Code provides that a civil contract can be a source of regulation of private relations. In addition, the provisions of the Law of Ukraine “On Private International Law” dictate the scope of application of contract law. For example, article 47 of the legislation defines the scope of application of law to a contract containing a foreign element.[11]

Having studied Ukrainian legal standards, we conclude that the requirements for a civil contract are present both in the private and public spheres. Therefore, the Land Code of Ukraine, the Housing Code of Ukraine, the Electoral Code of Ukraine, the Commercial Code of Ukraine, the Family Code of Ukraine, and other Ukrainian laws and bylaws adopted for their implementation contain norms on the contract, which have the signs of a civil contract. The position of the Constitutional Court of Ukraine, which states that the criteria of fairness, integrity, proportionality and reasonableness determine the limits of the principle of freedom of contract, should be taken into account in its implementation in the electoral process.

Digital technologies have significantly affected civil legal relations in many aspects. One of the biggest advantages of digital technologies is the ability to use electronic documents and electronic signatures to execute transactions. This simplifies the process of concluding transactions and implementing other civil legal relations, reducing the need for paper documents. According to Part 2 of paragraph 2 of Art. Article 639 of the Civil Code of Ukraine, an agreement concluded using information and communication systems with the consent of both parties, is considered to be concluded in writing.

The contract is concluded by the Civil Code of Ukraine, taking into account the characteristics provided by the Commercial Code of Ukraine, if you pay attention to the requirements of Part 1 of Article 181 of the Commercial Code of Ukraine. Paragraph 5 of Part 1 of Article 3 of the Law of Ukraine “On Electronic Commerce” defines an electronic contract as an agreement between two or more parties concluded in electronic form and aimed at establishing, changing or terminating civil rights and obligations. As a result, an electronic contract is considered to be concluded in writing.[12]

Thus, while Ukrainian legislation provides a general legal framework for the conclusion and validity of electronic contracts, a number of practical and conceptual challenges remain in the digital environment. The table below summarizes the key legal issues that arise in digital contractual relations, together with their treatment under Ukrainian law and relevant international or EU benchmarks.

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9 Ahmad Awwad et al., “The Impact of Digital Transformation on civil Action Procedures.” In *Artificial Intelligence (AI) and Finance*, edited by B. A. M. Alareeni and I. Elgedawy, Vol. 488, 368–76. Cham: Springer Nature Switzerland, 2023. https://doi.org/10.1007/978-3-031-39158-3_35

10 Verkhovna Rada of Ukraine. (2026). Civil Code of Ukraine. Retrieved from Official Website of Verkhovna Rada of Ukraine: https://zakon.rada.gov.ua/laws/show/435-15#Text

11 Natalia V. Atamanova, “Peculiarities of Legal Regulation of Virtual Space.” *Lawful State* 55 (2024): 11–19. https://doi.org/10.18524/2411-2054.2024.55.311948

12 Garcia-Teruel et al., “The Digital Tokenization of Property Rights: A Comparative Perspective.”

Table 1.
Key legal challenges in digital contractual relations

Legal Challenge	Description and Risks	Ukrainian Legal Context	International / EU Benchmark
1. Identification of Parties	Ensuring accurate authentication of the contracting parties in online transactions; risks include impersonation, use of unauthorized e-signatures, and weak verification systems.	Regulated by the Law of Ukraine "On Electronic Trust Services" (Arts. 18–22) which defines qualified electronic identification[13]; practical gaps remain in interoperability of national and foreign trust providers.	EU eIDAS Regulation (Art. 6–8) establishes mutual recognition of electronic identification schemes; cross-border eID interoperability remains a challenge.
2. Verification of Intent (Consent)	Distinguishing between genuine consent and automatic or accidental "click-agreement"; absence of clear standards for algorithmic or AI-assisted contract formation.	Civil Code of Ukraine, Art. 203 and 638–639, defines free expression of will but lacks criteria for digital "intent."	UN Convention on the Use of Electronic Communications in International Contracts, Art. 11–12, confirms that intent may be expressed electronically if reliably attributable.[14]
3. Probative Value of Electronic Evidence	Determining authenticity, integrity, and admissibility of electronic files, emails, and blockchain records as legal proof.	Recognized under Law of Ukraine "On Electronic Documents and Electronic Document Flow"[15]; courts inconsistently evaluate metadata and digital logs.	Council of Europe Guidelines on Electronic Evidence and EU Regulation 2022/868 (Data Governance Act) promote standardization and technical verification of e-evidence.[16]
4. Liability for Algorithmic Decision-Making	Assigning responsibility for contractual breaches or damages caused by autonomous systems, smart contracts, or AI-driven decisions.	Ukrainian legislation lacks explicit norms; general fault-based liability (Civil Code, Art. 614–625) applies by analogy; doctrinal debate continues.	EU Artificial Intelligence Act introduces accountability and risk-classification for high-risk AI systems in contractual and judicial use.

Source: developed by the authors

The following table lists the primary legal issues pertaining to digital contractual relationships in order to organize the major conclusions. These difficulties, which range from party identity to algorithmic decision-making culpability, show how traditional contract law concepts and

[13] Verkhovna Rada of Ukraine. (2024). Law of Ukraine "On Electronic Trust Services." Retrieved from Official Website of Verkhovna Rada of Ukraine: https://zakon.rada.gov.ua/laws/show/2155-19#Text

[14] United Nations. (2013). Convention on the Use of Electronic Communications in International Contracts. Retrieved from Official Website of United Nations: https://uncitral.un.org/en/texts/ecommerce/conventions/electronic_communications

[15] Verkhovna Rada of Ukraine. (2023). Law of Ukraine "On Electronic Documents and Electronic Document Flow." Retrieved from Official Website of Verkhovna Rada of Ukraine: https://zakon.rada.gov.ua/laws/show/851-15#Text

[16] European Parliament and of the Council. (2022). Regulation (EU) 2022/868 on European data governance and amending Regulation (EU) 2018/1724 (Data Governance Act). Retrieved from Official Website of the European Union: https://eur-lex.europa.eu/eli/reg/2022/868/oj/eng

technology progress collide. The table highlights areas where national law needs more consistency with EU and international norms by outlining the practical hazards of each problem, how it is currently treated under Ukrainian law, and pertinent foreign benchmarks.

3.2. E-Commerce, Smart Contracts, and Doctrinal Challenges

The ability to use electronic documents and electronic signatures to carry out transactions is another example of how digital technologies can be applied in civil law relations. One of the most important achievements in the field of digital technologies is the development of e-commerce. People can transact and shop online through online shopping, electronic payment methods, and online payments. This requires new legal standards to protect consumers and control the interaction of the parties. Thus, digital technologies contribute to the development of e-commerce, which has become an important aspect of civil legal relations. Electronic platforms and online payments allow parties to transactions to trade and make payments over the Internet.[17]

It is crucial to define what an electronic or digital contract is before examining how digitalization has affected contractual relationships. Digital-based contracts are often categorized into three groups according to comparative legal theory. The first is electronic contracts that are signed and carried out, such smart contracts or end-to-end e-commerce transactions, where every step takes place in digital systems and frequently includes automated enforcement mechanisms. Second, traditional (written or verbal) contracts that are implemented digitally, such as through online payment, electronic document exchange, or electronic invoicing, where the performance phase is largely impacted by digitization. Third, agreements signed online but carried out traditionally, such an online service agreement that is subsequently carried out by physical labor or offline delivery. Each category has unique procedural and evidential implications: the first focuses on confirming digital permission, the second on traceability of execution, and the third on regulating algorithmic performance and data authenticity. In order to ensure that hybrid digital contracts are treated coherently and to bring Ukrainian legislation into compliance with EU norms, it is imperative that these categories be recognized.[18]

However, despite these advantages, customers face certain dangers associated with potential rights violations by dishonest companies operating in the e-commerce sector. These businesses may violate other legal requirements in their dealings with customers, offer non-payment items, and not provide payment documents.

As for the regulation of relations regarding the conclusion, operation and termination of civil law contracts using information and communication systems, in this area one should pay attention to the norms of the Law of Ukraine “On e-commerce,” which determine the organizational and legal foundations of activities in the field of e-commerce in Ukraine, establish the procedure for concluding electronic transactions using information and communication systems, and also provide for the rights and obligations of participants in relations in the field of e-commerce.[19]

It is well known that the form of a civil law contract can be oral or written (Article 205 of the Civil Code of Ukraine). According to Article 639 of the present Code, if the parties agree to conclude an agreement using information and communication systems, it is considered to be concluded in writing. The contract cannot be declared invalid due to its conclusion in electronic form, unless otherwise provided by law (Article 5 of the Law of Ukraine “On Electronic Commerce”). The meaning of the term "electronic contract" as an agreement of two or more parties aimed at establishing, changing, or terminating civil rights and obligations and drawn up in electronic form is disclosed in Article 3 of the Law of Ukraine “On Electronic Commerce.”

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[17] Oksana M. Vinnyk, “The Impact of Challenges of the Modern Era on the Legal Regulation of Social Relations.” *Current Problems of Law: Theory and Practice* 41 (2021): 167–77. https://doi.org/10.33216/2218-5461-2021-41-1-166-177

[18] Garcia-Teruel et al., “The Digital Tokenization of Property Rights: A Comparative Perspective.”

[19] Joseph MacPherson et al., “Future Agricultural Systems and the Role of Digitalization for Achieving Sustainability Goals: A Review.” *Agronomy for Sustainable Development* 42 (2022): 70. https://doi.org/10.1007/s13593-022-00792-6

At the level of contract execution, digital tools have made it possible to optimize operational processes. In particular, CRM systems (for example, Bitrix24, Zoho, Salesforce), ERP solutions, online payment, and electronic document management services allow you to automate payments, control deadlines, send reminders, and generate reports. Ukrainian companies Rozetka, Prom.ua, and Epicentr use similar technologies to quickly process thousands of orders, control logistics, and exchange warranty documentation. This reduces the burden on staff and, at the same time, creates a reliable digital footprint that can be used in case of disputes.[20]

Internationally, an example of deep digital integration is the use of the DocuSign platform in the US, Canada, and the EU countries. Companies like Microsoft, IBM, Pfizer, and Salesforce sign thousands of contracts with partners, employees, and customers every day without using physical media. In 2022, a New York state court in a case between a developer and a contractor upheld the validity of a contract awarded by DocuSign, an important reference point for similar cases. Importantly, such systems typically capture the date, time, IP address, and digital fingerprint of the document, making it easier to authenticate the signature.

In world practice, smart contracts are already actively used - self-executing programs encoded on the blockchain, which automatically implement the terms of the transaction after the onset of certain events. For example, Amazon uses algorithmic modules that automatically return funds to the client in case of non-delivery of goods. Thus, the fulfilment of the contractual obligation no longer depends on the human factor.[21]

It is worth noting that smart contracts are interesting for theory and legal practice as a kind of civil contract. Scientists rightly note that at the doctrinal level there is no single view of the nature of such a phenomenon, which is defined on the pages of scientific periodicals as: an independent type of contract; auxiliary contractual structure; a contract with a special (automated) way of fulfilling contractual obligations; evidence confirming the conclusion of the contract orally; electronic protocols and/or programs, program codes that are prepared using a programming language, allow you to track the fulfilment of contractual obligations and ensure the automatic collection of fines for their violation.

In this regard, we note that the widespread use of smart contracts in the world occurred with the advent of the Bitcoin cryptocurrency, which was introduced by Satoshi Nakamoto in 2009. We support scientists in the fact that today it is advisable to legislatively determine the general principles of concluding, acting, and terminating smart contracts using blockchain technologies, taking into account the development of market relations and international experience. We believe that the formation and development of relations regarding the conclusion, operation, and termination of smart contracts (smart contracts) affects the development of law, requiring individual specialists who are simultaneously competent in the fields of programming and jurisprudence.[22] …

Judicial practice with regard to digital consent and electronic evidence supports these doctrinal conclusions. Ukrainian courts have consistently ruled that electronic correspondence, including messenger communications, may be admissible electronic evidence if it permits the participants to be identified, the substance to be reconstructed, and the context of the communication to be verified. The Grand Chamber of the Supreme Court of Ukraine specifically

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[20] Maksym Getmantsev, “Implementation of Civil Justice Tasks through the Prism of Digitalization of Justice.” *Collection of Scientific Papers “Private Law and Business”* 24, no. 1 (2024): 142–147. https://doi.org/10.32849/2409-9201.2024.24.19; Marco Giacalone et al., “Digitalisation of the European Small Claims Procedure through Blockchain.” *Revista Ítalo-española De Derecho Procesal*, no. 1 (2025): 143–168. https://doi.org/10.37417/rivitsproc/2916

[21] János Szinek, “The Impact of Digital Platforms and Social Media on Freedom of Expression and Pluralism – in Specific Terms.” *Prawo w Działaniu* 49 (2022): 134–51. https://doi.org/10.32041/pwd.4910

[22] Nadya Mironova et al., “Modeling the Selection of Innovative Strategy for Development of Industrial Enterprises.” *WSEAS Transactions on Business and Economics* 19 (2022): 278–91. https://doi.org/10.37394/23207.2022.19.26

stressed that messenger correspondence may only be evaluated as evidence in connection with other case documents and subject to authorship and integrity verification.[23]

In order to prove the existence and fulfillment of contractual duties, courts rely on digital traces such messenger conversations, electronic records, and relevant contextual evidence, as illustrative civil practice further shows.[24] The integrity of electronic contracting workflows, such as the use of qualified electronic signatures, electronic seals, and electronic document management platforms, are also evaluated by Ukrainian courts in commercial disputes as critical elements for establishing the date of contract formation and the extent of parties' obligations.[25]

Similar methods are validated by comparative judicial practice. As long as normal authentication standards are met, courts in other jurisdictions—including the US—recognize electronically performed agreements as functionally comparable to traditional paper contracts.[26] Formal textual signatures are replaced in this context by audit trails, signing logs, and technical verification methods. As a result, the doctrinal assertions in this part are supported not only by theoretical analysis but also by comparative case-law patterns and convergent judicial reasoning.

3.3. Digital Objects, Risks, and Cross-Border Issues

Another interesting and new phenomenon of the modern world is the regulation of relations in the field of digital services, as well as the conclusion of civil law contracts, the subject of which is the digital thing. According to Art. Article 177 of the Civil Code of Ukraine, a new object of civil rights is a digital thing, which in Art. 1791 of the Code means a good that is created and exists exclusively in the digital environment and has a property value. The digital thing is virtual assets, digital content, and other goods to which the provisions of part one of this article apply. Features of the legal regime of digital things are determined by law. That is, a digital thing can be the subject of a civil contract.

For example, the Law of Ukraine “On Digital Content and Digital Services” allows concluding civil contracts for the continuous provision of digital content and/or digital services, as well as contracts for the one-time or multiple provision of digital content and/or digital services (Article 6). It also establishes the consumer's right to refuse the contract (Article 13), establishes legal consequences for the executor (Article 14), establishes legal consequences for the consumer (Article 15), etc.

At the same time, in the science of civil law, scientists rightly ask themselves: do classical classifications of contracts apply to objects of digital technology? For example, if we are talking about the classification of contracts for paid and gratuitous, fixed-term, service and work contracts, and on the transfer of ownership, the classic classifiers of contracts existing in the legislation, are, in our opinion, acceptable for civil contracts concluded using information and communication systems, but it is also necessary to take into account the features of digital technology objects as intangible objects in civil law.[27]

But the changes in civil law relations caused by digitalization also create several new issues that go beyond purely legal or technological and include ethical, security, and interstate issues.[28] The legal nature and legal force of various forms of electronic signatures is one of the main issues. Does a simple electronic signature generated by clicking on the "I Agree" button have the same

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[23] Supreme Court of Ukraine, Grand Chamber. (2023). Decision in case No. 916/3027/21. Retrieved from https://pravo.ua/vp-vs-vkazala-v-iakykh-vypadkakh-perepyska-v-mesendzheri-mozhe-rozhliadatysia-sudom-iak-dokaz/

[24] Primorsky District Court of Odesa. (2022). Decision in case No. 522/17548/21. Retrieved from https://youcontrol.com.ua/ru/catalog/court-document/102778909/

[25] Commercial Court of Dnipropetrovsk Region. (2023). Decision in case No. 904/6725/23. Retrieved from https://youcontrol.com.ua/ru/catalog/court-document/131805722/

[26] Civil Court of the City of New York, Queens County. (2025). 47-05 Center SPE LLC v. Hack. Retrieved from https://law.justia.com/cases/new-york/other-courts/2025/2025-ny-slip-op-25129.html

[27] Dryga, “Mechanism of Formation of Levers of Regulation of Legal Norms in Conditions of Digitalization.”

[28] Inna. Sylantieva, “Features of International Practice of Interaction between Political Authority and Civil Society.” *Legal Horizons* 20, no. 1 (2024): 71–78. https://doi.org/10.54477/LH.25192353.2024.1.pp.71-78

legal force as a qualified electronic signature issued by a recognized center that meets the requirements of the law? In Ukraine, as in most EU countries, there is a distinction between three types of electronic signatures (simple, extended, and qualified), but in real practice, the parties often neglect this division, relying on any form of confirmation of consent. This leads to legal ambiguity and makes it difficult to defend their rights in court, especially if one of the parties denies that an agreement was reached at all.

Analyzing digital communication through chat apps like Telegram, WhatsApp, or Viber can also be challenging. Can conversation be considered proof of agreement? Does pressing the "like" button under the message have legal meaning? Verification of the sender of the message is still an unresolved issue. In addition, it is difficult to verify the authenticity of screenshots and logs of messages without a digital signature or metadata, although some courts are already beginning to accept them as supporting evidence.[29]

Even more complicated is the situation in the field of international law. Different countries have quite diverse laws and technological standards regarding electronic signatures. An electronic signature that is accepted in Poland, for example, cannot be legally applicable in China or the United States. In addition to forcing the parties to invest more in ensuring the compatibility of national rules, this leads to legal gaps in cross-border transactions. Often, there is a scenario where an electronic contract is recognized in the country of one party, but not in the other, which complicates effective enforcement.[30]

In addition to legal dangers, there are technological problems. For example, a contract can be automatically rejected or information about its conditions can be lost due to a server failure or an algorithmic error in data processing. Cyber threats, in particular phishing attacks, address spoofing, cloning sites, are a serious challenge to trust in electronic communication. In case of leakage of personal data or violation of confidentiality, the electronic agreement may lose its validity or be questioned. There is also a question of responsibility for the actions of algorithms and artificial intelligence, which can independently generate contracts or decide on the fulfillment/non-fulfillment of obligations - the legal regulation of such situations is still being formed.

Another problem is the limited flexibility of automated systems. For example, an algorithm programmed to strictly enforce conditions can automatically cancel a customer's order simply because of a minor technical error or delay, without regard to human factors or force majeure. This can lead to lawsuits for unfair performance of the contract or discriminatory consequences for the consumer.

The issue of judicial protection of rights in the digital environment deserves special attention. The traditional judicial system is often slow and poorly equipped to evaluate digital evidence. Judges face problems authenticating electronic files, checking metadata, and distinguishing fake screenshots from genuine ones. Analysis of digital material is often necessary, which requires some expertise and additional resources. However, there are already several successful examples. For example, in 2021, the Economic Court of Kyiv declared valid an agreement concluded by e-mail using an electronic register, taking into account not only the signature itself, but also technical information about the method of its creation and confirmation of the fact of shipment.[31]

In the United States, the case of JBB Investment Partners Ltd v. Fair is considered one of the key cases in the recognition of electronic transactions. The court concluded that the parties can be legally bound by the terms of the agreement even in the absence of an official signature,

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[29] Imeda A. Tsindeliani et al.,"Digital Transformation of the Banking System in the Context of Sustainable Development." *Journal of Money Laundering Control* 25, no. 1 (2022): 165–80. https://doi.org/10.1108/JMLC-02-2021-0011

[30] Tetiana Kurman et al., "Online Dispute Resolution As An Alternative Way of dispute Settlement Involving Agribusiness Entities." In *Lecture Notes in Networks and Systems*, Vol. 996, edited by M. Nechyporuk, V. Pavlikov, and D. Krytskyi, 146–53. Cham: Springer, 2024. https://doi.org/10.1007/978-3-031-60549-9_12

[31] Serhii S. Lukash et al., "On the Issue of the Impact of Digitalization on Civil, Economic and Labor Legal Relations." *Bulletin of the Criminological Association of Ukraine* 33, no. 3 (2024): 569–578. https://doi.org/10.32631/vca.2024.3.52

if they report their intentions electronically. This establishes a new legal theory according to which essence and intention are as important as form and instrument. Given these challenges, alternative forms of dispute resolution are beginning to develop actively. Online arbitration allows the parties to agree on a neutral digital platform, where the dispute will be considered within a few days, not months or years. Online mediation allows you to reach a compromise in real time with the participation of a mediator, which reduces conflicts and costs. Automated customer complaint modules have already been implemented by platforms such as eBay, Amazon, and PayPal. For example, if the supplier does not deliver the goods, the system automatically reimburses the buyer based on digital records.[32]

In addition, the use of artificial intelligence in civil law disputes is becoming increasingly important and creates new opportunities and difficulties for legal control. Thus, artificial intelligence can be used to automate the processes of signing and executing agreements, which can increase efficiency and reduce the cost of managing civil law relations; support consumers and users online, responding to their requests and offering advice; analysis and processing of large volumes of documents and contracts, identifying important aspects and risks for the parties; and the development of ethical and legal standards to enforce laws and protect consumer rights and data.[33]

Ukraine hopes to join the European Union on June 23, 2022. The Law of Ukraine "On the National Program for the Adaptation of Ukrainian Legislation to the Legislation of the European Union" states that Ukraine is gradually bringing its legislation in line with EU legislation. Therefore, the draft Law on Artificial Intelligence (AI Law), which is being discussed by the member states of the European Union, is of interest both from a theoretical and from a practical point of view. The norms of the Law on AI, in particular, are aimed at regulating contractual relations to prevent prohibited practices by the artificial intelligence system. For example, to substantially distort people's behavior in a way that could cause them or others psychological or physical harm, prohibitions are provided to cover practices that have significant potential to manipulate people through subconscious methods outside their consciousness or to exploit the vulnerabilities of certain vulnerable groups, such as children or people with disabilities.

In this regard, we note that there is currently no single definition of the term "artificial intelligence"; the only official definition that can be found in Ukrainian legislation is contained in the Concept, which defines artificial intelligence as an organized set of information technologies that allow performing complex tasks using a system of scientific research methods and algorithms for processing information created independently or obtained during work. In addition, you can create and use your knowledge bases, decision-making models, and algorithms for working with information, as well as independently determine how to perform the tasks.[34]

We believe that the idea of "artificial intelligence" is controversial and may be the subject of future research. We support researchers who have determined that artificial intelligence can: learn and adapt to the experience without human help; independently make decisions and act even in situations that are not programmed by a person; process information much faster than people; manipulate information; serve as an auxiliary tool, but the scope of its functioning requires verification and modification by science, etc.

We strongly believe that the use of artificial intelligence should be based on compliance with standardized recommendations and standards for the use of artificial intelligence worldwide. It should also take into account the Guidelines of the Committee of Ministers of the Council of Europe on online dispute resolution mechanisms in civil and administrative courts (2021) 3, the Recommendation of the Parliamentary Assembly of the Council of Europe on technological convergence, artificial intelligence and human rights - Recommendation 2102 (2017) and the

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[32] Oleh M. Omelchuk et al., "Analysis of the Activities of Law Enforcement Authorities in the Field of Combating Crime and Corruption Offences." *Journal of Money Laundering Control* 25, no. 3 (2022): 700–16. https://doi.org/10.1108/JMLC-07-2021-0073

[33] Mariia V. Menzhul, "Bank Loan Agreement in Conditions of Digitalization." *Analytical and Comparative Jurisprudence* 4 (2024): 404–8. https://doi.org/10.24144/2788-6018.2024.04.66

[34] Menzhul et al., "Approaches to the Classification of Personal Non-Property Rights in the Context of Digitalization."

provisions of Recommendation CM/Rec (2020) 1 on the impact of algorithmic systems on human rights, which was adopted by the Committee of Ministers Council of Europe 8 April 2020.[35]

After studying the work of artificial intelligence systems, we came to the conclusion that they can be used for: providing legal advice; automatic comparison of the text of the contract with national and international legislation; identifying possible problems in contracts and proposing appropriate solutions to solve them; translation of the document into another language; and identifying emotional states associated with, for example, the true intent of the contract and understanding of the terms of the contract, among others. It is also important to remember that people need to be informed about the situation when they interact with artificial intelligence systems or when automated methods are used to determine their emotions or traits.

The new contract type must be assigned to the appropriate systematization group; any norms must be constructed according to an institutional line that runs from general to specific. The legislator is not obliged to strictly control this interpretation in the code to apply the concept of freedom of contract. Therefore, even in the absence of a special norm, such civil law instruments as freedom of contract, analogy, belonging to a certain group of contracts, and the pandect principle of regulation allow the parties to find answers to all questions that arise in the process of fulfilling contractual obligations. Judicial practice is the main indicator for determining the scope of regulatory norms enshrined in the code.

3.4. Artificial Intelligence, Ethics, and International Perspectives

Algorithmic bias is a problem with smart contracts, which are self-executing programs that work automatically without human intervention. When biases or inequalities found in training data or in developers' design decisions are reflected in code or algorithms, this is known as algorithmic bias. For example, a smart contract can yield biased results if it utilizes AI input or historical data that exhibits discriminatory tendencies. Biased historical statistics, a lack of diversity among developers, resulting in limited coding perspectives, and insufficient fairness testing are all potential sources of bias.[36]

Uncontrolled algorithmic bias in smart contracts can have negative consequences. For example, in the context of financial services or insurance, where automated decision-making limits the benefits of protected groups, biased smart contracts can lead to unfair or unequal treatment of specific individuals or groups. If people believe that the results are unfair, it not only harms the parties involved but also undermines the credibility of blockchain-based processes. Importantly, these situations create new legal difficulties because, while parties may seek compensation for choices made by opaque code, there are currently no clearly defined legal procedures to correct or prevent algorithmic bias.[37] Traditional non-discrimination rules cannot be easily applied to decisions made by the autonomous code, and current regulatory frameworks are lagging. Algorithmic bias can exacerbate existing inequalities under the guise of technological impartiality, particularly in the absence of consistent norms or controls.

An increasing number of researchers are calling for interdisciplinary collaboration and revisions to laws to ensure the creation and fair verification of smart contracts. This involves having a variety of development teams, conducting rigorous bias testing, and requiring openness about how algorithms work and process data. Justice cannot be ensured by automation alone; deliberate legislative protection measures are needed to prevent programmed prejudices from harming people in the real world.[38]

From AI-powered arbitration to court case analytics, the expanded use of AI technology in conflict resolution also highlights moral dilemmas and vague legal issues. One of the primary

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[35] Mykhailo V. Parasyuk, "Procedural Good Faith and Electronic Technologies in Civil Law." *Analytical and Comparative Jurisprudence* 3 (2024): 155–59. https://doi.org/10.24144/2788-6018.2024.03.25

[36] Carlos Molina-Jimenez et al., "On the Use of Smart Hybrid Contracts to Provide Flexibility in Algorithmic Governance." *Data & Policy* 6 (2024): e8. https://doi.org/10.1017/dap.2023.49

[37] Lundstedt, "DSM Contract Rules in a Cross-Border Context: A Swedish Perspective."

[38] Ferenc Lendvai, et al., "Algorithmic Bias as a Core Legal Dilemma in the Age of Artificial Intelligence: Conceptual Basis and the Current State of Regulation."

concerns is that AI systems can undermine justice by introducing bias or errors into court or arbitration awards. The parties' right to an impartial hearing can be compromised if an AI-powered platform distorts facts or exhibits hidden biases, such as consistently favoring one party's profile over another. However, most countries lack explicit laws controlling the use of AI by judges or arbitrators in decision-making, leaving few institutional standards for accountability, accuracy, and openness.

This situation raises several ethical concerns. The first is the problem of «black box»: complex models of artificial intelligence often function opaquely without providing clear justifications for their results. This lack of openness could compromise due process and accountability. Clear reasoning is necessary for court decisions, but neither judges nor parties to the case can successfully consider or challenge a proposal for an artificial intelligence tool unless it can be expressed in human terms. In the worst-case scenario, the judge or mediator may be imperceptibly exposed to an inaccurate or biased algorithmic recommendation, and the parties will not be able to determine how or why this exposure occurred. Therefore, ensuring explainability and openness in artificial intelligence technologies is not only a technological problem, but also a moral and legal one.[39]

Liability and responsibility – are additional issues. It remains unclear who should be held responsible if a party loses a case due to a flawed recommendation made by an artificial intelligence system used to resolve disputes. Lawyers who depend on imperfect AI performance risk responsibility and ethical obligations to their clients.[40] Similarly, there are concerns about whether AI creators should be responsible for the results of their creations. Although there are currently no generally accepted norms, some have proposed contract risk sharing or specialized insurance to address such circumstances. This ambiguity highlights the urgent need for robust legal norms governing AI-powered conflict resolution.[41]

Human surveillance is still a vital security measure. The idea that artificial intelligence should complement human judgment, but never replace it, is increasingly emphasized in international guidelines. For example, proposed regulations in Europe classify artificial intelligence systems used by courts or alternative dispute resolution organizations as being at high risk because they may affect fundamental rights, requiring strict controls, transparency and accuracy verification procedures. This illustrates the broad agreement that while AI can increase productivity and offer strong analytical skills, it cannot replace the complex thinking and moral sense of decision-makers.[42]

The issues raised in this study are not specific to Ukraine; rather, they are a topic of global discussion. Different jurisdictions have different methods, according to comparative legal assessments. While the US relies on a combination of existing laws and industry self-regulation, the EU is developing comprehensive AI legislation that prioritizes risk minimization, user protection, and accountability. According to scientists, biased algorithms will continue to perpetuate systemic injustice unless standardized criteria are established.

There is a growing need for interdisciplinary input, cross-border cooperation and common international rules. A review of the world's scientific literature reveals creative approaches to solving these problems. Clear requirements for openness and human control in high-risk applications are established by EU legislation such as the Artificial Intelligence Act. In the US and

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[39] Yarotsky et al., “Counter-Contractual Obligations in the Digital Segment of Civil Turnover under the Legislation of Ukraine.”

[40] Serhii Myroslavskyi, “The Role of AI in Standardizating Contracts and Its Impact on Business Process Optimization.” *Legal Horizons* 25, no. 2 (2025): 47–62. https://doi.org/10.54477/LH.25192353.2025.2.pp.47-62

[41] Daniel Urías Socol de la Osa et al., “Artificial Intelligence at the Bench: Legal and Ethical Challenges of Informing—or Misinforming—Judicial Decision-Making through Generative AI.” *Data & Policy* 6 (2024): e59. https://doi.org/10.1017/dap.2024.53

[42] Jochen Teizer et al., “Relationship between Subcontracting Models and Adoption of Innovative Methods in Construction Safety.” *Journal of Legal Affairs and Dispute Resolution in Engineering and Construction* 16, no. 4 (2025): 04524022. https://doi.org/10.1061/JLADAH.LADR-1050; Zahorodnii et al., “Civil-Law Regulation of Electronic Contracts: Current Challenges in Marketing and the Digital Economy.”

the UK, the legal debate focuses on systems of responsibility and the balance between innovation and accountability. These international perspectives not only confirm the urgency of reforms but also offer practical models that can serve as the basis for modernizing Ukrainian legislation.[43]

This article provides a critical examination of the legal gaps created by the digital revolution in contract law, rather than merely reiterating the findings. Ethical problems with artificial intelligence in dispute resolution and algorithmic bias in smart contracts show that technological advances often outperform legal adaptation. New laws, binding moral principles and ongoing research will be needed to bridge this gap. In the digital age, stakeholders can ensure that automation promotes, rather than diminishes, fairness, equality, and accountability only by taking proactive measures that combine strict oversight with technological protection.

Contractual relationships are profoundly and multifacetedly impacted by digitalization, which also affects how agreements are made, carried out, and challenged. Distance contracting is now both legally safe and operationally efficient at the contract conclusion stage thanks to technical aids like digital identity, certified electronic signatures, and automated drafting systems; however, they also reinterpret what consent and purpose in civil law have traditionally meant. Legislators must specify how true consent and contractual purpose are confirmed in the digital sphere as the distinction between informed will and automated participation is blurred when contracts are created or approved using algorithmic systems or “click-wrap” processes.[44]

Real-time performance tracking, digital timestamping, and automatic enforcement of contractual obligations are made possible throughout the contract execution phase by automation, blockchain-based registries, and ERP or CRM systems. These developments lower transaction costs and human error, but they also limit flexibility in unanticipated circumstances like force majeure or system outages. They create a new level of legal accountability for algorithmic mistakes, cybersecurity lapses, or data loss that is shared by developers, service providers, and contracting parties. In order to preserve proportionality and equity in automated execution, the European regulatory framework is coming to realize the necessity of “human-in-the-loop” monitoring.

Lastly, conflict resolution procedures have been significantly impacted by digitization. Online dispute resolution (ODR) systems provide quicker, more affordable options for both local and international disputes, while courts and arbitral institutions are progressively incorporating digital correspondence, blockchain records, and electronic evidence into evidentiary standards. However, these systems also bring up issues with algorithmic bias in AI-supported decision-making, data authenticity, and procedural rights protection. One of the main challenges for contemporary procedural law is to ensure that such mechanisms are explainable, transparent, and accountable.[45]

All things considered, digitalization necessitates a hybrid regulatory framework that strikes a balance between innovation and the core values of justice, equality of parties, and legal certainty. Legislators and practitioners should work to align national laws with EU tools like eIDAS and the upcoming AI Act, especially Ukraine's Civil Code, the Law on Electronic Commerce, and the Law on Electronic Trust Services. The digital revolution of contracts can only strengthen the legitimacy and trust that underlie private law relations by fusing technology standards with legal protections.

4. Conclusion

The whole nature of legal relations is gradually but inevitably replaced by digitalization, which transforms them from formally structured and paper-based to flexible, automated, and interactive forms of communication between the parties. With the rapid development of information and communication technologies, an increasing number of transactions are achieved

[43] Popov et al., “Transformation of Financial Law of Ukraine in the Context of Digitalization: Problems and Prospects of Legal Regulation.”
[44] Ferenc Lendvai, et al., “Algorithmic Bias as a Core Legal Dilemma in the Age of Artificial Intelligence: Conceptual Basis and the Current State of Regulation.”
[45] Lundstedt, “DSM Contract Rules in a Cross-Border Context: A Swedish Perspective.”

through electronic means, ranging from simple online forms to complex electronic document management systems, smart contracts, and algorithmic regulation. Significant opportunities are now available to speed up contractual procedures, reduce transaction costs, increase transparency, and control the implementation of obligations.

At the same time, digital change creates new and complex issues for the legal system. It is vital to strike a balance between freedom of contract and the legal clarity, efficiency, and security of digital transactions. To resolve issues of identification of the parties, the reliability of electronic evidence, and guilt in the event of an algorithm failure or unfair activity of the parties, both thorough theoretical knowledge and clearly defined legislative means are necessary. Regulation of digital objects, algorithmic solutions, smart contracts, and cross-border transactions requires special attention.

Ukraine, as a state moving towards integration into the European legal space, has a unique chance to adapt its contractual legislation to the advanced EU standards. The Law “On Electronic Commerce,” “On Electronic Trust Services,” as well as the norms of the Civil Code of Ukraine, already create the basis for the legal registration of electronic transactions. However, for the full legal support of the digital contractual sphere, further improvement of the regulatory framework is necessary, taking into account international experience, European norms, technological progress, and the challenges facing the participants in legal relations.

In addition, an important task is the formation of a digital legal culture. Successful digital transformation of contractual relationships is impossible without the willingness of the parties to trust the electronic format, the ability to use digital tools, and an understanding of the legal force of electronic actions and evidence. Judicial practice, as an indicator of the real state of law enforcement, plays a key role in the interpretation of the latest forms of transactions, in particular in matters of the validity of electronic transactions, the evidential power of electronic correspondence, the legality of automatic decisions, etc.

As a result, digitalization not only changes the structure of contracts; it also introduces new professions at the intersection of law and technology, changes fundamental approaches to legal interaction, and puts on the agenda a new quality of the legal system: it is digital, flexible, adaptive, and transparent. Ukraine can create a secure and effective contractual infrastructure of the digital age only through an integrated approach that combines legal regulation, technological standards, educational initiatives, and international cooperation.

From a policy-making standpoint, putting these ideas into practice necessitates assigning institutional accountability and clearly prioritizing reform initiatives. Legislators and regulatory bodies should prioritize defining evidentiary standards for digital communications and electronic contracts as these matters already create a great deal of judicial ambiguity. Concurrently, consistent technical and procedural rules for the use of electronic signatures, audit trails, and electronic document management systems should be developed by executive authorities in charge of digital transformation. Smart contract regulation and AI-assisted decision-making are examples of more complicated reforms that should come later and be implemented gradually based on pilot projects and regulatory impact analyses.

The concerns of overregulation in quickly evolving digital markets must also be taken into consideration in policy responses. Overly strict legislative requirements can hinder technical innovation, raise the cost of compliance for companies, and make it more difficult for small and medium-sized businesses to enter the market. Premature or excessively thorough regulation may quickly become outdated and compromise legal flexibility in the setting of rapidly developing digital contractual technology. Therefore, rather than using comprehensive legislative prescriptions, regulatory interventions should be proportionate, technology-neutral, and flexible. They should also, if feasible, depend on principles-based regulation and soft-law tools.

Therefore, before regulating complex algorithmic systems, a successful policy response should: (1) prioritize legal certainty regarding consent and electronic evidence; (2) assign clear institutional responsibilities among legislators, courts, and digital transformation authorities; and (3) strike a balance between innovation-friendly regulatory models and legal safeguards, particularly in cross-border and platform-based contracting.

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