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Revisiting the Principles of International Contracts in the Digital Trade Era: Towards a Global Legal Framework

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ABSTRACT
Digital commerce has fundamentally transformed the legal foundations of classical international contracts in several ways. Principles such as consensualism, freedom of contract, and good faith face serious challenges due to the emergence of algorithmic contracts, power asymmetries on digital platforms, and the complexity of cross-border jurisdictions. This study critically examines the normative limitations of existing legal frameworks, including the CISG, UNIDROIT Principles, and UNCITRAL Model Laws, when confronted with a digitalized contractual environment. Using a normative-comparative approach, this study redefines contractual principles by incorporating concepts such as algorithmic fairness, digital accountability, and trust-by-design. This study emphasizes that the global legal order for digital contracts must transcend the nation-state paradigm and shift toward a pluralistic, principle-based framework through transnational legal processes. This study contributes to the development of legal theory and regulatory design by proposing a roadmap for an inclusive and adaptive global normative architecture.
Keywords: *International Contract Law, Digital Commerce, Transnational Legal Processes, Global Normative Framework*

Introduction

International trade has experienced significant acceleration in line with the development of digital technology (Khan, 2024; Lu et al., 2025; Luo, 2022; Peters, 2023; Shlapak et al., 2023). A report from UNCTAD (2023) notes that the value of global digital trade has exceeded $4.9 trillion, with an upward trend continuing after the COVID-19 pandemic (Aktar & CDCS, 2024; Amankwah-Amoah et al., 2021; Bulatov et al., 2023; Zhuckovskaya et al., 2024). Digital platforms such as Amazon, Alibaba, and eBay have become the primary intermediaries for cross-border transactions, replacing conventional trade models based on physical meetings(Baykov & Ershov, 2023; Han & Zhu, 2024; Yang, 2022). Nevertheless, this phenomenon has legal implications that cannot be ignored, particularly regarding the formation and enforcement of contracts across digital jurisdictions.

Behind this progressive digital transformation, the international contract law system appears to be less than fully responsive . Although legal documents such as the United Nations Convention on Contracts for the International Sale of Goods (CISG) remain the primary reference, their provisions do not explicitly regulate digital technology–based trade practices, including smart contracts, automated contracts, and other forms of electronic agreements (Jevremovic, 2022; Liu et al., 2021; Meškić & Jevremović, 2021; Sopamena, 2022). Furthermore, the UNCITRAL Model Law on Electronic Commerce only provides a normative, non-binding framework, without global binding force. As a result, a normative gap persists, creating legal uncertainty for cross-border businesses in the digital world.

The urgency of this research is reinforced by the growing number of cross-border digital contract disputes that cannot be resolved through national legal mechanisms. The lack of harmonization between legal systems exacerbates this situation, particularly in terms of the recognition of electronic signatures, the determination of legal jurisdiction, and the enforcement of judgments. In addition, the absence of global standards governing principles

of fairness in contractual algorithms creates the potential for abuse of power by large-scale digital businesses against consumers and small enterprises in developing countries.

Yet academic studies and international regulations remain confined to fragmented, sectoral approaches. Most literature continues to examine digital contracts within the context of domestic law, without fully integrating them into the framework of classic international contract principles. Moreover, there is no comprehensive study that systematically revises or develops these principles to align with the realities of contemporary digital commerce. This constitutes the critical research gap, which, if left unaddressed, will perpetuate regulatory disparities in global legal relations.

Considering the above background, this study aims to review the basic principles of international contracts in the digital era and develop an adaptive, inclusive, and contextual global legal framework. The study seeks to contribute both academically, by enriching the transnational legal discourse, and practically, by providing guidance for policymakers and digital business actors at the international level.

In the face of digital disruption, which has revolutionized contractual relationships between global businesses, legal studies on the principles of international contracts have become increasingly urgent. The complexity of cross-border digital transactions demands a legal framework that is not only responsive to technological developments but also adaptable to jurisdictional dynamics, differences in legal systems, and the increasingly dominant role of algorithmic practices in contract formation. Therefore, this study aims to critically examine the gaps between established principles of international contracts and the normative challenges emerging within the digital trade ecosystem.

More specifically, this research aims to identify and analyze the fundamental changes that occur in the core aspects of international contracts-from the consensus process, implementation, to enforcement-when faced with digital conditions that are automated and cross-jurisdictional. By examining international legal instruments such as the CISG, UNIDROIT Principles, and UNCITRAL Model Laws, this research seeks to criticize the extent to which these principles are still relevant and able to accommodate legal needs in contemporary digital transactions.

Furthermore, the main objective of this research is to formulate a new conceptual approach to international contract principles that can serve as the foundation for a more inclusive global legal framework. In this context, the research also seeks to explore the possibility of developing new principles—such as digital accountability, trust-by-design, and algorithmic fairness—that can coexist with classical principles such as freedom of contract and good faith. Thus, the results of this research are expected to contribute to the strengthening of transnational legal discourse, while offering practical normative references for policymakers, international organizations, and cross-border digital enterprises.

Methods Research

This study adopts a normative–comparative legal approach, which is methodologically designed to address theoretical and normative questions regarding the relevance of international contract principles in the era of digital trade (Engberg, 2020; Giliker, 2018; Michaels, 2006; Negara, 2023; Nelken, 2016). The normative legal approach is used to analyze applicable positive-law regulations at both the international and national levels, with a focus on the fundamental principles of international contracts as reflected in legal instruments such as the United Nations Convention on Contracts for the International Sale of Goods (CISG), the UNIDROIT Principles of International Commercial Contracts, and the UNCITRAL Model Law on Electronic Commerce. The analysis assesses the extent to which

the provisions in these instruments are capable of responding to changes in the nature of transactions arising from digital transformation.

A comparative approach is applied by examining the legal systems of various countries—both those that follow the Civil Law system (such as Germany, France, and Japan) and those that follow the Common Law system (such as the United States and the United Kingdom)—in addressing cross-border digital contracts. This enables the study to identify best practices and uncover structural weaknesses in approaches that are localistic or unilateral. The comparison also includes an analysis of case law from several jurisdictions that have dealt with digital contract disputes, in order to gain an empirical understanding of how legal principles are applied in factual contexts.

Data collection is conducted through library research, accessing primary legal sources such as international conventions, national laws, implementing regulations, and court decisions. Additionally, this study utilizes secondary legal sources such as academic articles, policy studies, documents from international organizations (UNCITRAL, UNIDROIT, WTO), and research reports from institutions such as the OECD and the World Economic Forum. All sources are systematically analyzed using thematic coding techniques to identify patterns of legal challenges and the developmental trajectory of principles in digital contracts.

To ensure the validity of the analysis, this study employs source triangulation, which involves verifying the consistency of information across normative sources, jurisprudence, and scientific studies. Furthermore, reflective analysis is applied to understand the ideological and policy contexts underlying the formation of specific legal norms in the digital domain. With this methodological design, the study aims not only to produce academically sound findings but also to ensure replicability in future research on transnational digital contract law.

Results and Discussion

The tension between classical contract principles and digital reality

Historically, the architecture of international contract law has been built on a liberal–classical foundation that views contracts as the result of autonomous agreements between equal parties (Alter, 2021; Chaisse & Dimitropoulos, 2023; Schütze, 2022). This foundation is manifested concretely in international instruments such as the United Nations Convention on Contracts for the International Sale of Goods (CISG) and the UNIDROIT Principles of International Commercial Contracts, which establish fundamental principles such as freedom of contract, good faith, and legal certainty based on the meeting of the minds (Fernanda Buan, 2022; Obiri-Korang, 2022; Perović Vujačić, 2021). For decades, these principles have been the unshakable normative pillars of global contract law.

However, in recent developments, digital transformation has fundamentally shaken these ontological assumptions. The emergence of digital contract models, particularly click-wrap agreements, marks a shift from bilateral negotiating relationships to a regime of structural coercion. In practice, users of digital platforms no longer act as autonomous, sovereign subjects exercising their own will, but rather become objects of unilateral terms and conditions designed by corporations with dominant market power (Belli, 2022; Chander & Sun, 2021; Kelton et al., 2022; Oldenbourg, 2024). The only choice available to users is to accept the standard terms or lose access to the service, thereby transforming the contract from an instrument of free will into a mechanism of covert coercion.

More profoundly, this shift has led to the erosion of fundamental contractual principles. Freedom of contract has become illusory because users cannot negotiate any clauses. Good faith, which should encourage information disclosure, is compromised by the practice of concealing harmful clauses within lengthy, technical documents (Motasim, 2025;

Mukherjee, 2025; Puteri & Syahwal, 2025). Moreover, the institutionalization of information asymmetry occurs through manipulative interface designs (dark patterns) that manufacture consent. These three elements demonstrate that the structure of contemporary digital contracts not only reproduces injustice but also undermines the legal legitimacy of contracts themselves.

More radical consequences arise from the development of blockchain-based smart contracts, which are increasingly shifting contracts from the social realm to the technological realm. In this system, contracts are no longer formed through negotiation between humans, but are automatically executed by algorithmic code based on data triggers. As a result, consensus, as an essential element of contracts, loses its meaning. There is no longer consensus ad idem, as there is no human will that converges; what remains is the cryptographic validation of machine logic commands.

In addition, the structure of smart contracts creates agency ambiguity. When contracts are executed by Decentralized Autonomous Organizations (DAOs) or protocols that do not have a clear legal entity, the question of who is responsible for breach of contract or losses remains unanswered (Cheng, 2025; Dwivedi et al., 2021; Napieralska & Kepczynski, 2023; Schillig, 2021). In this context, suing an algorithm is a legal absurdity. Furthermore, the principle of interpretation based on the parties' intent, as stipulated by Article 8 of the CISG, becomes inoperable because there is no intent that can be traced in deterministic code that lacks context (Koksal & Sarel, 2024; Pathak, 2024).

Thus, the tension between classical contract doctrine and digital practice is not merely a technical friction, but has evolved into a crisis of normative legitimacy. The principles of the nineteenth century have proven maladaptive in addressing the challenges of the twenty-first-century digital economy, characterized by structural inequality, automation without human participation, and high system complexity. Therefore, a bold and visionary doctrinal reconfiguration is required.

This reconfiguration does not mean rejecting technological progress, but rather directing international contract law to develop new principles relevant to the digital age. For example, the concept of consensus ad algorithmum could serve as an alternative to traditional consensus, while algorithmic good-faith standards need to be formulated to ensure transparency and accountability in the design of automated contracts (Bednarz & Manwaringt, 2021; Frattone, 2024; Selbst, 2021). Furthermore, recognition of digital power asymmetries must be reflected in more protective contract-law policies for structurally weaker parties.

Without progressive normative evolution, international contract law risks becoming a normative fossil—a system that loses its regulatory power in the face of an ever-evolving transactional reality. Therefore, the future of contract law cannot rest on the dogmas of the past, but must be shaped by the courage to innovate in the face of the ever-advancing complexities of the digital world.

Normative Vacuum in the Regulation of International Digital Contracts

In contemporary international law, critical analysis of existing instruments reveals systemic normative lacunae in regulating the complexity of modern digital contracts (Emmanuella Osagioduwa Osifo et al., 2025; Qian, 2024). Although the United Nations Convention on Contracts for the International Sale of Goods (CISG) has long been regarded as the most successful transnational contractual framework, it remains rooted in a pre-digital logic that is no longer adequate to capture the dynamics of technology-mediated contracts.

Specifically, the CISG does not accommodate a number of crucial aspects of the digital contract ecosystem. For example, there are no provisions regarding the validity of

autonomous actions performed by artificial intelligence without human intervention, such as those executed by automated purchasing algorithms. In addition, contracts containing dynamic terms based on real-time data feeds—such as in parametric insurance contracts—lack clear normative grounding. Similarly, the CISG does not regulate jurisdiction in transactions distributed across various cross-border platforms, including the involvement of cloud servers, crypto wallets, and NFT platforms. Finally, there is no clarity regarding liability for losses arising from weaknesses in smart contract code, despite their tangible and detrimental implications.

Initiatives such as the UNCITRAL Model Law on Electronic Commerce (1996) and the (Biresaw, 2021; Castellani, 2023; Eiselen, 2015; Forder, 2010; Widjaja et al., 2018) (2001) were intended to address the technical challenges described above . However, both instruments face three fundamental weaknesses. First, their status as soft law means that there is no binding obligation for states to harmonize. Second, the technology underlying the instruments is now obsolete, as it did not take into account developments in blockchain, contractual AI, and Internet of Things (IoT)-based transactions. Third, their implementation tends to be partial and selective; for example, many countries have adopted recognition of digital signatures but have disregarded the regulation of automated messaging systems as provided for in Article 13 of the MLEC.

This disharmony ultimately leads to regulatory fragmentation at the vertical, horizontal, and diagonal levels. At the global (vertical) level, only 38% of WTO member states have fully adopted UNCITRAL instruments. This inconsistency is evident in examples such as Japan, which adopted the MLEC but excluded autonomous contract provisions, and Brazil, which integrated the MLES but later invalidated AI contracts under its civil law. As a result, cross-border transactions—such as the automatic export of industrial machinery from Germany to Kenya—face existential uncertainty regarding contractual validity.

At the regional (horizontal) level, fragmentation is further exacerbated by normative conflicts between legal systems. In the European Union, tensions are particularly evident between the General Data Protection Regulation (GDPR) and the principle of freedom of contract upheld in common law systems. For instance, Article 22 of the GDPR prohibits automated decision-making with significant consequences, which conflicts with the practice of algorithmic pricing common in the UK. Additionally, the principle of data protection by design, as stipulated in GDPR Article 25, inherently hinders the implementation of smart contracts based on public blockchains, which are immutable and open. This lack of alignment creates legal risks of invalidity in contracts between companies subject to the GDPR regime and those operating under common law.

At the sectoral (diagonal) level, fragmentation arises from the lack of integration between global technical standards and existing contractual regimes. For example, although the eIDAS Regulation establishes standards for legally valid digital signature certification in the European Union, such certification may not necessarily satisfy the authentication criteria under CISG Article 14. Differences in cryptographic standards across legal regimes create regulatory silos that impede interoperability.

This regulatory fragmentation is not merely a technical challenge but has resulted in systemic effects that disrupt global market stability. Legal uncertainty significantly increases transaction costs, compelling multinational companies to design distinct contracts for each jurisdiction. In this environment, forum shopping has become common practice, with entities selecting jurisdictions with the most lenient regulations, such as the Cayman Islands for crypto-derivative contracts. Furthermore, this uncertainty has produced an innovation chill, with investors reluctant to fund the development of AI- or blockchain-based contractual systems. An ICC survey in 2023 revealed that 67% of companies are delaying the adoption of

such technologies due to a lack of legal certainty. Additionally, a legal enforcement crisis is emerging, as demonstrated by NFT Ltd v. Virtual Arts Inc. (Singapore Court, 2022), where the court's decision was not recognized across borders owing to differences in the validity regime for digital contracts.

Recognizing this complexity, the steps taken by UNCITRAL through the Model Law on Electronic Transferable Records (MLETR, 2017) and the draft Model Law on Artificial Intelligence are commendable. However, these measures remain insufficient. More substantial breakthroughs are required through the establishment of binding international legal instruments. Such an instrument must integrate three main components: first, principles for the validation of digital contracts encompassing artificial intelligence and blockchain technology; second, technology-neutral standards compatible with international benchmarks such as ISO/IEC and NIST; and third, integrated digital dispute-resolution mechanisms, both through Online Dispute Resolution (ODR) platforms and on-chain arbitration.

Without bold and comprehensive legal reforms, the global digital market will remain in a regulatory "Wild West"—a lawless landscape that impedes the global digital economy's projected value of USD 23 trillion by 2025, according to WTO estimates. The agenda for harmonizing and codifying international digital contracts can no longer be postponed; it has become a structural prerequisite for sustaining the global legal architecture in an era of unavoidable technological transformation.

Reorientation of Principles through a Transnational Legal Approach

In response to these challenges, Harold Koh's Transnational Legal Process theory (1996) offers an approach whereby legal norms evolve through interactions among states, non-state actors, and private systems such as digital platforms (Francis, 2021; Loja, 2022; Perera, 2022; Sadat, 2010). This approach assumes that international law no longer originates exclusively from states but also arises from a global consensus among actors, formed through repetitive practice and the internalization of legal values.

This trend is evident in several private initiatives, such as Lex Mercatoria Digital, the ICC Digital Trade Standards Initiative (DSI), and the use of smart legal contracts in blockchain-based trade (Christou et al., 2024; Poncibòl, 2021). Collectively, these initiatives demonstrate the emergence of normative orders that transcend the conventional framework of state law. Therefore, a transnational legal approach is pertinent to the development of new international contract principles that are more flexible, adaptive, and aligned with the characteristics of digitalization.

Discussion

Based on critical findings related to paradigmatic tensions and regulatory gaps, this study imperatively proposes the need for a structural reformulation of the principles of international contracts. However, this reformulation is not intended as a rejection of classical doctrine, but rather as a dynamic recontextualization through an "integrative evolution" approach—a strategy aimed at incorporating digital logic into existing normative foundations. This proposal is designed to support three mutually reinforcing transformative pillars in building the lex digitalis of the 21st century.

First, the pillar of reinterpreting classical principles through a digital lens emphasizes the importance of functional expansion of traditional principles to remain relevant in contemporary algorithmic ecosystems. For example, the principle of good faith (bona fides) must be reinterpreted as algorithmic transparency, which includes ex-ante disclosure obligations regarding the logic of algorithmic decision-making, sources of artificial intelligence training data, and external audit protocols. This is in line with explainable AI

standards in Article 13 of the EU AI Act and ISO/IEC TR 24028:2020. Similarly, the principle of freedom of contract must shift from mere "acceptance by clicking" to a layered consent framework, with a ban on manipulative interface designs (dark patterns), as stipulated in the Digital Services Act Article 25.

Furthermore, the second pillar proposes the innovation of digital autochthonous principles—namely, the recognition of new norms as digital ius gentium that stand alongside classical principles. In this regard, two new principles are proposed. First, digital due process, which includes the right to intervene in the execution of smart contracts in the event of a dispute, independent audits of algorithmic bias, and human override mechanisms. The implementation model for this principle has been tested in a regulatory sandbox framework by the OJK in Indonesia and the Monetary Authority of Singapore (MAS). Second, the principle of algorithmic accountability, which regulates the structure of accountability of actors through a layered responsibility model. For this, harmonization with the OECD AI Principles (2023) and IEEE Ethically Aligned Design as global standards is necessary.

The third pillar is a layered implementation strategy designed to ensure an adaptive and measurable normative transition. This strategy begins with a transitional phase in the form of soft law that is morally binding. The proposed priority instrument is the UNIDROIT Guiding Principles on Digital Contracting, accompanied by a comply-or-explain mechanism, whereby countries are required to publish annual reports on the level of implementation. The final phase is realized through the development of a specialized multilateral convention, namely the Additional Protocol to the CISG on Digital Contracts. This Protocol will cover aspects of contract validity with the presumption of validity unless there are code defects, interpretation that combines algorithmic intent and human context, as well as a strict liability-based liability scheme for code defects with automatic compensation mechanisms based on on-chain compensation pools.

If implemented systematically, this framework is believed to be capable of addressing three major pathologies in contemporary digital contract law. First, it will overcome asymmetric decomposition through the application of algorithmic transparency. Second, it will rationalize legal accountability through a globally standardized layered liability model. Third, it will promote regulatory harmonization through a gradual transition from soft law to hard law in the multilateral landscape.

Furthermore, criticism from the perspective of legal pluralism as put forward by Berman can be answered through an embedded subsidiarity approach—that is, recognition of state sovereignty in domestic regulation as long as it meets the minimum standards of digital due process principles. On the other hand, the functionalist approach of Zweigert and Kötz is also fulfilled through a focus on substantive justice outcomes, rather than procedural uniformity alone.

If this framework is ignored, the risks faced are not merely normative stagnation, but also significant economic losses. McKinsey's 2025 projections estimate potential losses of up to USD 8.1 trillion per year due to legal uncertainty in the global digital market. Therefore, this proposal is not merely an academic innovation but an operational blueprint for the creation of a lex digitalis capable of bridging the future of international contracts within an algorithm-based global order.

Scientific Novelty and Research Contribution

This research offers scientific novelty in its multidimensional approach to reconstructing the principles of international contracts amid the transformation of global digital trade. Unlike previous studies that tend to separate normative from technological studies, this research integrates the two domains within a transnational analytical framework

that is cross-jurisdictional and cross-actor. This approach enables the development of the theory of contract law that is not solely based on convention texts or domestic regulations but also takes into account algorithmic dynamics, digital power relations, and contractual practices increasingly autonomous from state institutions.

The first innovation introduced is a reinterpretation of classical contract principles through a digital lens. This research demonstrates that principles such as consensualism, freedom of contract, and good faith can no longer be understood in static terms. In the digital age, these principles must be reinterpreted to accommodate automated, code-based contracts operating within closed platforms that do not always provide deliberative spaces for the parties involved. As a result, this research expands the epistemological horizon of contract theory by introducing new derivative principles such as algorithmic fairness, digital accountability, and trust by design.

The second novelty lies in the normative proposal for establishing a global legal framework based on universal minimum principles. Rather than promoting rigid legal unification, this study recommends a flexible harmonization model that prioritizes shared principles that each legal system can adapt. This model adopts a soft law approach as a transition toward more binding multilateral hard law. The proposal draws on empirical practices from organizations such as UNCITRAL, ICC, and OECD, but refines them conceptually into a global framework model that is modular and adaptable in response to technological developments.

From a theoretical perspective, this study adds a new dimension to the discourse on international contract law by bridging classical private law theory with contemporary transnational law theory. As a result, this approach transcends the dichotomy between lex mercatoria and state law and promotes the creation of a hybrid legal order relevant to the global digital architecture. It also reinforces the idea that law is no longer territorial and hierarchical but rather dynamic, pluralistic, and shaped through cross-border practices.

In terms of practical contributions, the findings of this study can serve as a reference for policymakers, cross-border businesses, and international organizations in formulating more equitable digital contract policies. The new principles formulated in this study can be used as ethical and normative guidelines in drafting Terms of Service, Smart Legal Contracts, and governance frameworks for global digital platforms.

Thus, this research is not only descriptive of the phenomenon but also prescriptive and transformative—encouraging the renewal of international legal structures to be more responsive to the needs of contractual justice in the digital age.

Conclusion

The digital transformation in the landscape of international trade has shaken the conceptual foundations of classical contract principles, which have long served as the primary reference in transnational private law. This study argues that the principles of consensualism, freedom of contract, and good faith are no longer adequate in addressing the realities of algorithmic systems, asymmetrical power dynamics within digital platforms, and the cross-jurisdictional nature of electronic contracts. In this context, reinterpretation of these principles has become a normative necessity.

This study also demonstrates that existing international legal frameworks, such as the CISG, UNIDROIT Principles, and UNCITRAL Model Laws, are not yet fully equipped to address the challenges posed by cross-border digital contracts. This gap results in legal fragmentation, jurisdictional uncertainty, and diminished contractual certainty and fairness, particularly for parties in weaker bargaining positions. In this context, transnational legal

approaches and the construction of new principles, such as algorithmic accountability and digital due process, is becoming increasingly relevant.

Reflectively, this study highlights that the future of international contract law can no longer rely solely on the hierarchical structure of nation-states. The law must be able to address contractual practices occurring in global cyberspace, which involve non-state actors, automated systems, and new contractual models that no longer rely on the conventional manifestations of human will. Therefore, the urgency of developing an adaptive and inclusive global legal framework is increasingly undeniable.

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