



LEGAL IMPLICATIONS OF SMART CONTRACTS IN INTERNATIONAL COMMERCIAL LAW

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Abstract

Smart contracts—self-executing agreements encoded on blockchain—have emerged as transformative tools in international commercial transactions. By automating performance and reducing reliance on intermediaries, they promise efficiency, transparency, and reduced transaction costs. However, their integration into international commercial law presents complex legal challenges, particularly regarding enforceability, jurisdiction, consumer protection, and dispute resolution. This article examines the legal implications of smart contracts within international commercial law, analyzing their compatibility with traditional contract doctrines and international instruments such as the United Nations Convention on Contracts for the International Sale of Goods (CISG). It further explores comparative regulatory approaches, highlighting the need for harmonized legal frameworks to balance innovation with legal certainty.

Introduction

The globalization of trade and the rapid development of digital technologies have significantly reshaped the landscape of international commercial law. Among the most innovative developments is the rise of smart contracts—digitally coded agreements stored on blockchain platforms that automatically execute contractual obligations when predetermined conditions are met. These contracts, first conceptualized by Nick Szabo in the 1990s, have now become central to modern debates about the future of commerce, finance, and transnational trade [1].

Smart contracts offer multiple advantages, including automation, efficiency, immutability, and transparency. By eliminating intermediaries such as banks, notaries, or brokers, they reduce transaction costs and minimize risks of fraud or non-performance. This makes them especially attractive in cross-border trade, where enforcement and verification often pose significant challenges.

However, their adoption also raises critical legal questions. Traditional contract law relies on doctrines of offer, acceptance, consideration, and mutual consent, often requiring interpretation of human intention and context. By contrast, smart contracts function through rigid code and algorithms, which may not adequately capture nuances of human negotiation, ambiguity, or equitable relief. Furthermore, questions of jurisdiction, applicable law, and dispute resolution become more complex in decentralized blockchain environments where transactions transcend territorial boundaries [2].

At the international level, existing instruments such as the United Nations Convention on Contracts for the International Sale of Goods (CISG) and principles of *lex mercatoria* provide a framework for contractual relations, but their adaptability to smart contracts remains contested. Similarly, regulatory bodies in the EU, US, and Asia are experimenting with different approaches, leading to potential fragmentation in global legal standards [3].



This article explores the legal implications of smart contracts in international commercial law, analyzing their compatibility with established doctrines, challenges in enforceability, comparative regulatory practices, and prospects for harmonized legal frameworks.

Definitional Framework and Nature of Smart Contracts

Smart contracts are commonly defined as self-executing agreements encoded in computer language, where contractual obligations are automatically triggered once predefined conditions are met. Unlike traditional contracts that rely on textual interpretation and judicial enforcement, smart contracts are embedded in blockchain technology, making them immutable and transparent [4].

Although the term “contract” is widely used, scholars debate whether smart contracts always qualify as legal contracts. A legal contract requires the presence of essential elements—offer, acceptance, consideration, and intent to create legal relations. In contrast, some smart contracts may function purely as automated scripts without reflecting actual consensus or legal intent. This distinction is crucial in international trade, where parties may operate across different jurisdictions with varying requirements for contractual validity [5].

From a technical perspective, smart contracts consist of if-then logic coded into decentralized platforms such as Ethereum. For instance, in an international sales agreement, payment may be automatically released once blockchain verifies delivery of goods. This automated execution reduces reliance on intermediaries and enhances trust among parties who may have no prior relationship. However, the rigidity of code limits the flexibility available in conventional contracts, where courts can interpret ambiguities or grant equitable remedies [6].

Moreover, smart contracts raise the question of hybrid contractual forms, where traditional written agreements incorporate coded clauses. This dual nature reflects a transitional phase in international commercial law, where the law must adapt to technological realities without abandoning core contractual principles.

Enforceability of Smart Contracts under International Commercial Law

One of the most pressing legal issues surrounding smart contracts is their enforceability within established frameworks of international commercial law. Traditional contracts are evaluated through doctrines of consent, capacity, legality, and certainty of terms. Smart contracts, however, present challenges because their terms are written in computer code, which may not always be comprehensible to judges, arbitrators, or even the contracting parties themselves [7].

International instruments such as the United Nations Convention on Contracts for the International Sale of Goods (CISG) do not explicitly address smart contracts, but their general principles remain applicable. For instance, Article 11 of the CISG recognizes the validity of contracts concluded by any means, including electronic communications. This flexibility suggests that smart contracts may be enforceable provided they reflect mutual consent and clear obligations [8].

Nevertheless, enforceability faces obstacles in cross-border contexts. Jurisdictional issues arise because blockchain networks are decentralized and transactions may be executed simultaneously across multiple states. Determining the applicable law, competent forum, and governing enforcement mechanisms becomes complex when neither party can easily identify the locus of contract formation or performance [9].

Courts and arbitral institutions are beginning to respond to these challenges. Some jurisdictions, such as Singapore and certain states in the United States, have introduced legislative recognition of blockchain-based contracts. Similarly, the International Chamber of Commerce (ICC) has



acknowledged the role of digital technologies in commercial transactions, suggesting that arbitral practices may evolve to accommodate disputes arising from smart contracts [10].

Thus, while enforceability under international commercial law is not inherently excluded, the lack of harmonized global standards creates uncertainty, underscoring the need for international guidelines and consistent jurisprudence.

Jurisdictional and Conflict of Laws Issues

The decentralized nature of blockchain technology, which underpins smart contracts, creates profound challenges in determining jurisdiction and resolving conflict of laws questions. Unlike traditional contracts, which can be traced to a specific place of negotiation or performance, smart contracts may be executed simultaneously across multiple nodes in different states. This makes it extremely difficult to identify the locus contractus (place of contract formation) or locus solutionis (place of contract performance) [11].

In international commercial disputes, jurisdiction is typically established by party agreement or by applying private international law principles such as the closest connection test. However, in smart contracts, parties may not explicitly agree on governing law or forum, leaving courts and arbitral tribunals with the difficult task of determining which jurisdiction's laws should apply. The Brussels I Regulation (Recast) in the European Union, for example, bases jurisdiction on domicile or performance, criteria that are often ambiguous in blockchain-based transactions [12].

Conflict of laws issues are further complicated by the anonymity of blockchain transactions. Without clear identification of the parties' nationality or residence, courts may struggle to apply traditional connecting factors such as domicile, habitual residence, or place of business. Moreover, decentralized autonomous organizations (DAOs), which increasingly utilize smart contracts for international trade, often lack legal personality, creating uncertainty regarding liability and enforceability [13].

To address these challenges, some scholars propose the incorporation of choice-of-law and choice-of-forum clauses directly into smart contracts, either in natural language agreements supplementing the code or through coded governance mechanisms. Arbitral institutions, such as the London Court of International Arbitration (LCIA) and the Singapore International Arbitration Centre (SIAC), are also exploring how to accommodate blockchain-related disputes within existing procedural frameworks [14].

Ultimately, jurisdictional uncertainty threatens the predictability and stability of international commerce. Without harmonized conflict-of-laws rules tailored for digital transactions, parties may face costly litigation and inconsistent outcomes across different jurisdictions.

Consumer Protection and Risk Allocation

While smart contracts offer efficiency and automation, they also raise significant concerns regarding consumer protection and the allocation of risk in international commercial transactions. Traditional contract law often contains safeguards to protect weaker parties, such as provisions addressing unfair terms, misrepresentation, and unconscionability. However, the rigidity of code in smart contracts limits opportunities for judicial interpretation or equitable relief, potentially exposing consumers to exploitation [15].

A major issue arises from the information asymmetry between parties. Many consumers engaging in blockchain transactions may lack the technical expertise to fully understand the terms encoded in smart contracts. This undermines the principle of informed consent, a cornerstone of contractual



fairness. Furthermore, once deployed, smart contracts are immutable, meaning errors in coding or unforeseen circumstances cannot be easily rectified without agreement from all parties—or even the intervention of developers rather than legal authorities [16].

Risk allocation is also problematic. In conventional contracts, liability for breach may be negotiated and adjusted based on fault, negligence, or impossibility of performance. In smart contracts, however, performance is automated, and failures often result from technical glitches, cyberattacks, or vulnerabilities in blockchain protocols. Determining liability in such cases—whether it lies with the developer, the platform, or the contracting parties—is a matter still unresolved under international commercial law [17].

Certain jurisdictions, such as the European Union, are beginning to integrate consumer protection principles into their regulatory approach to blockchain and smart contracts, emphasizing requirements of transparency, fairness, and the possibility of redress. Internationally, however, the lack of harmonized standards may result in uneven protection across borders, creating uncertainty for businesses and consumers alike [18].

Therefore, ensuring adequate consumer protection and balanced risk allocation requires both technological safeguards—such as auditable smart contract templates—and legal frameworks that allow courts and arbitral tribunals to intervene where necessary to uphold fairness in international commerce.

Toward Harmonized International Frameworks for Smart Contracts

The increasing adoption of smart contracts in international commerce highlights the urgent need for harmonized legal frameworks that can bridge the gap between technological innovation and established legal doctrines. At present, regulatory approaches remain fragmented: some jurisdictions, such as the United States and Singapore, have taken proactive steps to recognize blockchain-based agreements, while others continue to treat them with caution due to uncertainties about enforceability, consumer protection, and jurisdiction [19].

International commercial law traditionally relies on 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. These frameworks provide a basis for adapting to technological developments but do not yet specifically address the unique features of smart contracts, such as immutability of code, decentralized execution, and algorithmic enforcement [20].

Several scholars and institutions advocate for the development of *lex digitalis*—an international set of principles governing blockchain and smart contracts, similar to the way *lex mercatoria* historically facilitated cross-border trade. Such principles could provide consistency in areas like jurisdiction, dispute resolution, and risk allocation, reducing uncertainty for businesses and consumers engaged in smart contract-based transactions [21].

Arbitration also plays a critical role in creating a harmonized framework. The adaptability of arbitral institutions, such as the International Chamber of Commerce (ICC) and the Singapore International Arbitration Centre (SIAC), makes them well-positioned to establish best practices for resolving disputes arising from smart contracts. In addition, integrating standardized smart contract templates—audited for fairness and compliance with international legal norms—could ensure predictability and trust in cross-border commerce [22].



In conclusion, the pathway toward harmonized frameworks requires cooperation between international organizations, national legislatures, and private stakeholders, ensuring that smart contracts are not only technologically robust but also legally enforceable and aligned with principles of fairness and justice.

Conclusion

The integration of smart contracts into international commercial law represents both a paradigm shift and a legal challenge. On one hand, smart contracts offer unprecedented efficiency, automation, and transparency in cross-border transactions. On the other hand, their reliance on immutable code, decentralized execution, and algorithmic enforcement raises critical questions regarding enforceability, jurisdiction, consumer protection, and risk allocation.

The analysis demonstrates that while existing international instruments such as the CISG, UNIDROIT Principles, and UNCITRAL frameworks provide some flexibility, they are insufficient to fully accommodate the unique features of smart contracts. Jurisdictional ambiguity, the potential imbalance of power between technically skilled parties and ordinary consumers, and the absence of harmonized standards all contribute to uncertainty in global trade.

A sustainable solution lies in the development of harmonized international frameworks that combine technological innovation with legal safeguards. International organizations, arbitral institutions, and national legislatures must collaborate to establish principles of *lex digitalis*, ensuring that smart contracts are not only technologically reliable but also legally enforceable, fair, and globally consistent.

Ultimately, the promise of smart contracts in international commerce will only be realized if legal systems evolve in tandem with technological progress. By striking a balance between efficiency and fairness, international commercial law can harness the benefits of blockchain while safeguarding the rights of all parties engaged in digital trade.

References

1. Nick Szabo. "Smart Contracts: Building Blocks for Digital Markets." *Extropy: The Journal of Transhumanist Thought* 16 (1996).
2. Kevin Werbach and Nicolas Cornell. "Contracts Ex Machina." *Duke Law Journal* 67, no. 2 (2017): 313–382.
3. Larry A. DiMatteo et al. "Smart Contracts and Contract Law." *Ohio State Technology Law Journal* 24, no. 2 (2018): 1–54.
4. Primavera De Filippi and Aaron Wright. *Blockchain and the Law: The Rule of Code*. Cambridge, MA: Harvard University Press, 2018.
5. Michele Finck. *Smart Contracts: Legal Framework and Applications*. Oxford: Oxford University Press, 2019.
6. Max Raskin. "The Law and Legality of Smart Contracts." *Georgetown Law Technology Review* 1, no. 2 (2017): 305–341.
7. Karen E. C. Levy. "Book-Smart, Not Street-Smart: Blockchain-Based Smart Contracts and the Social Workings of Law." *Engaging Science, Technology, and Society* 3 (2017): 1–15.
8. Ingeborg Schwenzer, ed. *Commentary on the UN Convention on the International Sale of Goods (CISG)*. 5th ed. Oxford: Oxford University Press, 2022.
9. Fabio Morosini and Michelle Ratton Sanchez Badin. *Reconciling Law and Smart Contracts: Jurisdictional Challenges in Blockchain Transactions*. São Paulo: FGV Direito, 2020.



10. International Chamber of Commerce. "ICC Digital Economy Commission Report." Paris: ICC Publishing, 2021.
11. Gabriella M. Ruseva. "Jurisdiction in Blockchain Disputes: Rethinking Locus Contractus in a Decentralized World." *Journal of Private International Law* 16, no. 2 (2020): 341–368.
12. Trevor C. Hartley. *International Commercial Litigation: Text, Cases, and Materials on Private International Law*. Cambridge: Cambridge University Press, 2020.
13. Aaron Wright and Primavera De Filippi. "Decentralized Blockchain Technology and the Rise of Lex Cryptographia." *SSRN Electronic Journal* (2015).
14. London Court of International Arbitration (LCIA). "Blockchain and Arbitration: Emerging Practices." LCIA Report, 2021.
15. Christopher Reed. *Making Laws for Cyberspace*. Oxford: Oxford University Press, 2012.
16. James Grimmelman. "All Smart Contracts Are Ambiguous." *University of Chicago Law Review Online* 71 (2019): 1–14.
17. Karen Yeung. "Regulation by Blockchain: The Emerging Battle for Supremacy Between the Code of Law and the Code of Technology." *Modern Law Review* 82, no. 2 (2019): 207–239.
18. European Parliament. "Resolution on Blockchain and Distributed Ledger Technologies." Strasbourg: Official Journal of the European Union, 2019.
19. U.S. State of Arizona. HB 2417: Recognizing Blockchain Signatures and Smart Contracts. Phoenix: Arizona State Legislature, 2017.
20. UNCITRAL. *Model Law on Electronic Commerce with Guide to Enactment*. New York: United Nations, 1999.
21. Larry A. DiMatteo and Cristina Poncibò. "Smart Contracts and International Commercial Law: The Need for Global Standards." *Law and Contemporary Problems* 81, no. 2 (2018): 1–29.
22. International Chamber of Commerce. "Smart Contracts and Arbitration: Emerging Best Practices." ICC Commission Report, Paris, 2022.