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Integrating Smart Contracts with Hybrid Online Dispute Resolution Mechanisms in Cross-Border Commercial Transactions

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The increasing use of smart contracts in global trade has created both legal confusion and technological benefits. Smart contracts are self-executing agreements that provide cost savings, efficiency, and transparency through the blockchain. This brings up the question of whether they fulfil the basic principles of contract law, such as offer, acceptance, consideration, legal purpose, and enforceability. This paper examines whether code-only and hybrid smart contracts can be incorporated into the accepted legal theories in the United States, India, or other civil law systems, such as those of the United Arab Emirates. It discusses some shortcomings in current legal frameworks that struggle to address the unique challenges posed by smart contracts, particularly in terms of jurisdiction and due diligence.

To address this gap, the research proposes implementing Hybrid Online Dispute Resolution (ODR) methods within smart contract frameworks. These methods combine the speed of technology with the expertise of human mediators, providing a fair solution that acknowledges legal considerations while embracing digital innovation. Using examples from China, Europe, India, and platforms like Kleros, the paper evaluates the legality of these systems and identifies existing regulatory challenges and gaps. The paper concludes with a recommendation for reforms and developing an international treaty for enforcing smart contracts. It also argues that achieving legitimacy and legal clarity for hybrid smart contracts and ODR platforms requires legal reform, judicial recognition, and collaboration across sectors.

Keywords: *smart contracts, hybrid online dispute resolution, blockchain, contract law.*

INTRODUCTION

The digital economy of global trade has established novel methods for creating and enforcing contracts. This transition demands modifications in legal frameworks. One significant innovation is smart contracts. These are self-executing, independent agreements on platforms based on blockchain technology. They do not depend on intermediaries or people to enforce agreements because they have set obligations that run automatically when specific conditions are met. Smart contracts can offer efficiency, transparency, cost savings, and other benefits. However, the growing use of smart contracts raises many questions about their enforceability, party autonomy, jurisdiction, and legal remedies in international trade.

The doubts regarding the validity of smart contracts arise from their differing operation compared to conventional contracts. Traditional legal relationships rely on human interpretation, flexible remedies, and intentions stated in writing. In contrast, smart contracts involve coding, automatic enforcement, and often lack clear recovery measures. This is in clear contrast with the rules of offer, acceptance, consideration, and legal intent under domestic contract laws such as the Indian Contract Act 1872[1] and Uniform Commercial Code[2] in the United States, and comparable statutory provisions in civil law jurisdictions such as the UAE and Iraq.

Adding to this uncertainty in law is the issue of jurisdiction, which gets even more complex for smart contracts. Given that these are contracts executed on decentralised blockchain platforms that might be across multiple jurisdictions, it is hard to determine which law comes into play or which courts have authority in the event of a dispute. The decentralised and borderless character of smart contracts complicates resolving disputes through the conventional frameworks that depend upon delineated territorial borders. Executing on distributed blockchain networks, these contracts frequently involve pseudonymous participants and borderless execution that undermine the applicability of national legislation

[1] Indian Contract Act 1872
[2] Uniform Commercial Code 1952

and conventional arbitration frameworks.[3] For fully decentralised methods of dispute resolution, e.g., blockchain-based arbitration or algorithmic decision-making, these systems tend to be lacking in transparency, due process, and legal enforceability under agreements like the New York Convention.[4]

To address these challenges, this article proposes integrating Hybrid Online Dispute Resolution (ODR) mechanisms into smart contracts as a legally sound solution. These platforms blend arbitration or mediation led by humans with digital tools, maintaining the procedural fairness of traditional dispute resolution while benefiting from the speed and efficiency of technology. Hybrid ODR offers a practical middle ground that balances the strict logic of code with the adaptability of legal principles.

LEGAL NATURE OF SMART CONTRACTS

Definition and Technical Features: Self-Executing, Immutable, Blockchain-Based Code: Smart contracts are generally viewed as digital protocols that perform, control, or record legal actions on their own. These actions rely on terms written in code that both parties agree to. Originally introduced by Nick Szabo.[5] Smart contracts run on blockchain technology, which allows for decentralised, secure execution without intermediaries. Their main features are immutability, self-execution, and pseudonymity. Once a smart contract is deployed on a blockchain, it executes automatically when certain conditions are met, requiring no further human involvement. This brings efficiency, speed, and transparency to contracts, particularly those spanning across jurisdictions.[6]

However, the same technical features that make smart contracts effective also lead to legal challenges. Their immutability and automatic execution limit flexibility for unforeseen changes, errors in consent, or the need to re-negotiate terms after deployment. Smart contracts function differently from traditional contracts because they operate within a closed,

[3] Stefan Jovanović, 'Arbitration in Smart Contracts Disputes – A Look into the Future' (2023) 71(4) Annals: Belgrade Law Review <http://dx.doi.org/10.51204/Anali_PFBU_23405A> accessed 17 May 2025
[4] *Ibid*
[5] Ghassan Adhab Atiyah et al., 'Enforcement of Smart Contracts in Cross-Jurisdictional Transactions' (2024) International Journal of Law and Management <https://doi.org/10.1108/IJLMA-06-2024-0220> accessed 17 May 2025
[6] *Ibid*

coded system. This makes it hard to apply established legal principles like mistake, frustration, or misrepresentation.

Types of Smart Contracts: Code-Only v Ancillary Smart Contracts: Smart contracts can be divided into two types. Code-only contracts are written and executed entirely in code, without any accompanying natural language text. Ancillary or hybrid contracts include self-executing code along with traditional legal language, which allows for automated performance. The latter, sometimes referred to as Ricardian contracts, attempt to bridge the gap between legal enforceability and automation.[7] Ancillary contracts are more compatible with existing legal systems because they contain human-readable terms. In contrast, code-only contracts face serious enforceability issues. They often do not communicate legal obligations or remedies, especially for those who are not programmers. Smart contracts written purely in code cannot always convey or understand legal intentions, exceptions, or terms that depend on context, thus making them legally incomplete unless coupled with interpretive frameworks.[8]

Whether Smart Contracts Qualify as Contracts Under Traditional Law -

1. Offer and Acceptance: The key requirement for forming a contract is consensus ad idem, or a meeting of minds. This principle is vital for enforcing any agreement. In India, this is given under the Indian Contract Act 1872[9], and similarly, Article 125 of the UAE Civil Code[10] and under UCC Article 2 in the United States[11] recognise this. Smart contracts usually show acceptance from the offeree through actions triggered by the code. The typical example is sending cryptocurrency to the smart contract's designated address. While this suggests acceptance from a technical viewpoint, the legal system requires clarity that all actions demonstrate mutual consent. However, coded interactions might not always show informed agreement, especially if the offeree is unaware of the legal consequences of the code logic.[12] Smart contracts also lack the nuances necessary to handle counter-offers, partial acceptance, or revocation, which traditional legal systems manage well.[13]

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[7] Jovanović (n 3)
[8] *Ibid*
[9] Indian Contract Act 1872
[10] UAE Civil Code 1985, art 125
[11] Uniform Commercial Code 1952
[12] Jovanović (n 3)
[13] Atiyah (n 5)

2. Consideration: Consideration, defined under Section 2(d)[14], is the promise or act exchanged between parties to create a binding agreement. US law, through the UCC, also requires that this exchange be negotiated. In smart contracts, consideration generally exists within the transaction itself. For instance, one party sends digital currency and, in return, receives a token, access, or service. While this fulfils the functional requirement, there are still questions about whether the party understood the legal implications of that exchange, especially if the contract is solely code-based.[15] Ancillary contracts address this issue to some degree by clearly outlining the object and price terms in plain language.

3. Intention to Create Legal Relations: The courts usually assume that parties to a commercial agreement intend to create a legally binding contract. However, establishing this intent can be challenging in pseudonymous blockchain transactions. In many countries, there must be a clear intention; otherwise, the contract is invalid. Consent cannot be based on coercion, mistakes, or misrepresentation. The doctrine of intention is especially hard to apply in automated systems, where there is no chance for discussion, negotiation, or revision.[16] Smart contracts can set up and execute agreed terms and actions, but they do not allow for the flexibility of traditional legal agreements.

4. Capacity and Legality of Object: The validity of a contract also depends on the legal ability of the parties and the legality of the contract's subject matter. Section 11 of the Indian Contract Act[17] invalidates agreements entered into by minors, individuals who are mentally incapacitated, or those legally disqualified. Similar rules apply in the UAE and the US law. Smart contracts, using anonymous digital identities, make it nearly impossible to confirm whether a party has legal capacity. While places like the UAE now employ certification authorities for electronic identity verification, practical implementation varies.[18] The contract's object must also be legal. Smart contracts could unintentionally handle illegal transactions—like prohibited financial schemes or unlawful goods—without recognising the

[14] Indian Contract Act 1872, s 2(d)
[15] Sannidhi Agrawal, 'Smart Contracts: Functioning and Legal Enforceability in India' (2021) 3(2) International Journal of Legal Science and Affairs <https://doi.org/10.60143/ijls.v7.i1.2021.24> accessed 17 May 2025
[16] Atiyah (n 5)
[17] Indian Contract Act 1872
[18] Atiyah (n 5)

nature of the subject matter. Blockchain systems do not naturally distinguish between legal and illegal purposes, raising enforceability concerns if courts later find illegality.[19]

The legal status of smart contracts is not universally settled. While hybrid or ancillary contracts may meet traditional contractual standards and be enforceable in courts, purely code-based contracts often lack an adequate legal foundation in most jurisdictions. The regulations in India, the UAE, and the U.S. show that legal adjustments are needed to recognise and regulate smart contracts while ensuring fairness, legal intent, and party capacity. Until such changes occur, the legal enforceability of smart contracts will primarily rely on their ability to align with existing doctrines via hybrid designs and legal supplements.

ONLINE DISPUTE RESOLUTION (ODR) AND ITS EVOLUTION

From E-Commerce Disputes to ODR+ Models: Online Dispute Resolution (ODR) was created to resolve low-value e-commerce disputes. ODR aimed to address issues related to cross-border transactions, such as jurisdiction, procedural law, and enforcement. The traditional adjudication model was seen as too slow, expensive, and hard to access for parties involved in online or international transactions.[20]

In the early days of ODR, only a few rules allowed online communication between parties and neutral mediators or arbitrators. The rapid growth of ODR, driven by artificial intelligence, blockchain, and digital identity, will transform the entire dispute-resolution landscape. The new phase of ODR, known as ODR+, aims to apply technological advancements to improve efficiency, reduce bias, and ensure enforceability. ODR+ platforms increasingly use smart contracts, blockchain-based evidence storage, automated negotiation tools, and algorithmic decision-making systems.[21] These developments have opened the possibility of extending ODR beyond consumer disputes, making it a viable option for the complexities of smart contract disputes that involve pseudonymous parties or cross-border transactions.

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[19] Jovanović (n 3)

[20] Michael Ferrence, 'The New Handshake: Online Dispute Resolution and the Future of Consumer Protection' (2019) 11(1) Arbitration Law Review <https://insight.dickinsonlaw.psu.edu/cgi/viewcontent.cgi?article=1259&context=arbitrationlawreview> accessed 17 May 2025

[21] Julien Chaisse and Jamieson Kirkwood, 'Smart Courts, Smart Contracts, and the Future of Online Dispute Resolution' (2022) 5 Stanford Journal of Blockchain Law & Policy <https://stanford-jblp.pubpub.org/pub/future-of-odr/release/1> accessed 17 May 2025

Key Features of ODR in the Digital Age -

ODR systems vary widely, but newer ODR+ systems generally have several features that set them apart from traditional dispute resolution methods.

Decentralisation: Modern ODR systems do not rely on a central authority. Rather, technologies such as blockchain eliminate reliance on a sole authority. This addresses a major limitation in cross-border dispute resolution, the lack of a uniform and accepted legal forum. Decentralisation also improves transparency and data integrity by recording transaction history in a way that cannot be altered.

Algorithmic Decision-Making: Many ODR+ platforms use decision trees and machine learning models to recommend outcomes. If a dispute arises, the tools can aid resolution by reviewing contract terms, evidence, and past dispute patterns. While AI can enhance decision-making, its use in legal contexts raises concerns about procedural fairness, explainability, and compliance with due process under constitutional and human rights standards.

Automatic Escrow/Self-executing: The most noteworthy advancement in ODR+ is the introduction of smart escrow functionality. This feature holds disputed amounts in smart contracts, triggering payouts based on the ODR process results. This allows for the immediate implementation of decisions, reducing the need for separate litigation or enforcement processes. In cases with automated triggers, smart ODR can enforce decisions programmatically. However, these developments require careful evaluation to ensure they align with national legal standards concerning consent, reviewability, and

COMPARATIVE GLOBAL PRACTICES

China's Smart Courts: China is leading the global digital justice movement by developing Internet Courts in Hangzhou, Beijing, and Guangzhou. These courts integrate blockchain-based evidence systems and AI adjudication modules. Big data enables complete online adjudication, from filing to judgment, with evidence automatically verified through a timestamped blockchain ledger.[22] China's use of smart contracts and ODR represents a

[22] *Ibid*

government-driven approach to technology-led legal reform, helping overcome institutional resistance to adopting new technology.

European Union's ODR Framework: The European Union's ODR Regulation (EU) No 524/2013 created an online platform for resolving consumer disputes from cross-border e-commerce. This platform, run by the European Commission, connects consumers and traders with approved dispute resolution bodies. While it does not currently include blockchain or smart contracts, it illustrates the role of state-backed platforms in legitimising online dispute resolution. The EU's focus on legitimacy, including transparency, neutrality, and enforceability, offers an important reference point.[23]

India's SAMA Platform and Online Lok Adalats: ODR in India is still in its early stages, but has gained institutional recognition. For example, SAMA, developed with contributions from NITI Aayog and state legal services authorities, offers technology-assisted mediation and arbitration services for civil and commercial disputes. Online Lok Adalats, launched by State Legal Services Authorities during COVID-19, represent an innovative effort to digitise traditional alternative dispute resolution methods.[24] There are positive signs of institutional recognition of innovative approaches to enhance traditional dispute resolution. However, to effectively develop ODR within the context of smart contract enforcement, additional policy and statutory support are necessary.

ODR AND SMART CONTRACTS: LEGAL IMPERATIVE FOR INTEGRATION

The growth of smart contracts, especially in cross-border contexts, makes it clear that we cannot ignore the legal necessity of ODR mechanisms. Traditional litigation and arbitration face significant challenges, including (1) establishing competent jurisdiction, (2) adhering to due process in cross-border agreements, and (3) enforcing awards against anonymous parties. In contrast, ODR provides a platform for digital-native procedures that can align with the operational logic of smart contracts. Hybrid ODR mechanisms that combine

[23] Regulation (EU) 524/2013 of the European Parliament and of the Council of 21 May 2013 on online dispute resolution for consumer disputes and amending Regulation (EC) 2006/2004 and Directive 2009/22/EC (Regulation on consumer ODR) 2013
[24] Chaisse (n 21)

technological efficiency with legal reasoning are likely the most practical way to approach smart contracts in jurisdictions where courts are wary of code-based arrangements.[25]

These mechanisms, however, must be regulated and accountable to comply with the rule of law. ODR has evolved from an option for low-value consumer disputes to an agile system capable of managing large-scale, cross-border commercial disputes, particularly those involving smart contracts. The rapid advancement of ODR reflects a broader trend toward digitisation and decentralisation in legal processes. Nonetheless, to become a legitimate option in the smart contract ecosystem, ODR must integrate into national and international legal systems. The emerging comparative systems in China, the EU, and India highlight methods for implementing ODR that could indicate how codification might work. However, it is crucial to secure doctrinal clarity and institutional suitability as we embed these systems.

HYBRID SMART CONTRACTS AND ONLINE DISPUTE RESOLUTION (ODR) MECHANISMS

Concept and Structure of Hybrid Smart Contracts: A hybrid smart contract is a framework that combines both programmable code and legally binding written terms. Unlike a fully coded contract, hybrid smart contracts include standard text alongside code that executes specific obligations. This structure is legally valid because, when a human-readable provision is in question, courts and arbitrators can apply traditional interpretations while benefiting from the efficiencies of smart contracts.[26]

Hybrid contracts often contain elements like off-chain arbitration, coded performance triggers, and terms for dispute resolution that refer to conventional arbitration rules or specific online services. For example, a hybrid smart contract could automate payment for delivery while allowing disputes over quality or delays to be settled through human arbitration or mediation. The hybrid approach addresses the rigidity of purely coded contracts by restoring legal protections to the parties involved, offering interpretive

[25] Atiyah (n 5)
[26] Jovanović (n 3)

mechanisms, judicial review, and equitable remedies.[27] This flexibility aligns hybrid contracts more closely with current national and international legal systems.

Practical Examples of Hybrid Dispute Resolution Models –

The Kleros platform is a prime example of a hybrid model. It is a blockchain-based dispute resolution service that uses crowdsourced jurors and cryptographic evidence. Kleros acts as a trusted input through smart contracts, where the outcome of disputes is automatically agreed upon and executed.

While these are exciting technological developments, there are limitations:

- They are unable to present evidence.
- Parties may have no legal recourse in cases of mistaken identity or incorrect submission of evidence.
- A Kleros decision does not guarantee enforcement under the New York Convention unless confirmed by a traditional arbitration body.[28]

To address these limitations, hybrid systems have evolved for off-chain acknowledgement of on-chain processes. A notable dispute involving a smart contract with Kleros was ultimately resolved through traditional arbitration. The tribunal considered the Kleros decision and issued a final, enforceable award based on applicable arbitration law.[29]

LEGAL COMPATIBILITY AND JURISDICTIONAL CONSIDERATIONS

Hybrid smart contracts must meet several legal requirements for enforcement. The validity of the arbitration provision is essential. Many domestic and international laws, like the UNCITRAL Model Law and the New York Convention, mandate that arbitration agreements be in writing and express consent. Thus, hybrid contracts must ensure that any dispute resolution clause, regardless of whether it is enforced by code, is also presented in a clear

[27] Vidushi Vats and Shashi Bhushan, 'Smart Contracts and Legal Enforceability' (2024) 4(3) International Journal of Advanced Legal Research <https://ijalr.in/volume-4-issue-3/smart-contracts-and-legal-enforceability-vidushi-vats-shashi-bhushan/> accessed 17 May 2025
[28] *Ibid*
[29] Jovanović (n 3)

format that meets statutory requirements. Jurisdictional issues become more complicated due to the borderless and often pseudonymous nature of smart contracts.

The seat of arbitration and the relevant law might become ambiguous. Hybrid contracts should explicitly state the governing law and procedural rules in their legal text, even when enforcement occurs partly on-chain. Additionally, smart contracts can execute decisions immediately, but under most national laws, enforcement requires the decision-maker to act fairly and provide a written, reasoned award. Hybrid models that involve a human arbitrator or mediator, even if online, are more likely to satisfy these due process requirements, making them enforceable under the New York Convention. From a legal standpoint, hybrid contracts offer more procedural strength than code-only contracts, especially when designed to comply with existing arbitration laws.

CHALLENGES AND CRITICISMS

Smart contracts and hybrid ODR show great promise, but there are significant legal, procedural, and institutional challenges to their application. These raise concerns about the enforceability of these mechanisms under the law and how they compare to concepts of due process, transparency, and fairness.

Lack of Flexibility and Immutability: The main limitation of smart contracts is their lack of flexibility due to their immutability once they are on a blockchain. While this feature is often seen as a benefit, it can lead to problems if there are coding errors, unexpected changes, or fraud. The ability to change terms, terminate, or modify is not built into smart contracts as it is in standard contracts. If a code is unclear or performs unexpectedly, courts may not infer a party's intent for irrevocable execution.[30]

Jurisdictional Limitations to Recognition: Another ongoing issue is the uncertainty around jurisdiction with smart contracts. In digital, decentralised environments, smart contracts are executed between parties who often conceal their true identities and have no clear territorial connection. This complicates questions about applicable law, competent forum, and enforcement procedures.

[30] *Ibid*

Enforcement of blockchain-based arbitration awards, like those made through Kleros, typically will not be recognised under the New York Convention unless confirmed by an established arbitral institution. The legal community still struggles to create frameworks that legitimise this multi-level model. This uncertainty is heightened in jurisdictions that require specific formalities for arbitration agreements or where digital consent is not completely accounted for.

Procedural Fairness and Due Process: Hybrid ODR mechanisms, particularly those that involve decentralised juror selection or AI outcomes, raise concerns related to procedural fairness. Platforms like Kleros cannot compel discovery, ensure representation by parties, and produce reasoned decisions. Critics argue that relying on crypto-economic incentives and winner-takes-all verdicts contradicts basic due process standards found in both civil and common law.[31] Moreover, the inability to challenge or appeal decisions made on-chain may violate principles of natural justice. The lack of cross-examination, judicial oversight, and transparent reasoning processes makes these systems less trustworthy legally.

Data Security, Protection and Access to Justice: The intended transparency of blockchains could unintentionally threaten the confidentiality and privacy of legal proceedings. Immutable smart contracts may mean that once personal or sensitive data is included in contracts, there is little chance to delete it, which could have regulatory implications under data protection laws. Parties lacking sufficient legal knowledge may enter automated agreements unknowingly, without fully understanding or controlling the smart contract process. This knowledge gap diminishes the consensual foundation of contract law and may facilitate coercive contracting, leading parties to challenge agreements as unfair or based on unequal information.

Lack of Judicial and Regulatory Precedents: There is an institutional challenge due to the lack of strong case law or regulatory guidance about the enforceability and procedures of hybrid smart contracts. Courts seem reluctant to interpret coded agreements, and few jurisdictions have considered blockchain-based dispute resolution platforms. Although some arbitration tribunals have begun referencing results from systems like Kleros, their use is still

[31] *Ibid*

rare. The legitimacy of these systems depends on whether national courts and arbitral institutions are willing to formally recognise hybrid decision-making processes.[32]

Until this recognition happens, parties may be hesitant to use these mechanisms, especially for high-value contracts or complex transactions. The noted difficulties highlight the legal and institutional challenges that hybrid smart contracts and ODR mechanisms face. While these systems can provide efficient, transparent, and automated dispute resolutions, they might come at the expense of procedural detail and established legal protections. For these models to work effectively, they require legal reform, education, and regulatory recognition. Without these, the promise of smart legal infrastructure may remain only an innovative idea rather than a reality.

LEGAL AND REGULATORY PROPOSALS

The growing use of smart contracts and hybrid ODR mechanisms in cross-border trade is evolving much faster than the legal frameworks needed to support them. The issues of statutory recognition, jurisdictional clarity, and institutional monitoring have created problems with enforceability and legal certainty. National and international reforms are essential to ensure that technology-driven contracts and dispute resolution methods align with legal standards of fairness, enforceability, and access to justice.

Statutory Reform in Domestic Legal Systems: Specifically, within the Indian context, the Indian Contract Act[33] does not recognise contracts formed or executed through self-executing code. This results in uncertainty regarding the validity of smart contracts, especially those that involve non-verbal, pseudonymous, or automated acceptance. Amending Sections 10 and 11 of the Indian Contract Act to explicitly mention contracts formed through digital code, while ensuring key legal principles like offer, acceptance, intent, and lawful object are maintained, could help.

Indian lawmakers should also consider formally recognising hybrid dispute resolution clauses in smart contracts. Currently, the Arbitration and Conciliation Act 1996[34] does not accommodate digitally executed arbitration agreements. A proposed amendment could

[32] Jovanović (n 3)
[33] Indian Contract Act 1872
[34] Arbitration and Conciliation Act 1996

endorse arbitration clauses included in blockchain contracts, as long as the parties' consent can be traced and proven.

International Frameworks and Treaty-Based Recognition -

On the international stage, a unified legal approach to recognising and enforcing smart contracts could hinder broad acceptance. There can be a formation of a multilateral treaty that will specifically tackle the enforceability of smart contracts and blockchain-based arbitrations.[35]. This treaty could build upon the principles established by the UNCITRAL Model Law on Electronic Commerce, the UNCITRAL Technical Notes on ODR[36], and the New York Convention, but provide countries with binding commitments to recognise the performance of smart contracts and the outcomes of hybrid ODR across borders.

The framework of this instrument ought to provide for:

- A harmonised definition of smart contracts and hybrid ODR procedures;
- Minimum standards for consent, identity verification and fairness of procedure;
- A recognition mechanism for ODR outcomes that meet some institutional standards.

While some jurisdictions, like Singapore and the UK, have unilaterally recognised smart legal instruments, the absence of a harmonised treaty means that these outcomes are enforceable under domestic laws, which can be inconsistent in global commerce.[37]

Cross-Sectoral Collaboration and Legal Design: In addition to legal reforms, collaboration among lawyers, coders, and regulators must improve. Smart contracts merge expertly written legal terminology with programming knowledge. To ensure contracts are not only functionally accurate but also legally compliant, multidisciplinary design protocols must be adopted.

CONCLUSION

Smart contracts are changing the global business landscape. They enable automation, transparency, and efficiency. However, the legal enforceability of smart contracts is still

[35] Atiyah (n 5)
[36] 'Electronic Commerce Texts' (*United Nations Commission on International Trade Law*) <https://uncitral.un.org/en/texts/ecommerce> accessed 17 May 2025
[37] *Ibid*

unclear, especially in cross-border transactions, where jurisdiction and applicable law can be vague. Smart contracts that rely solely on code struggle to meet the basic requirements of traditional contract law, particularly when it comes to dispute resolution. Hybrid smart contracts, which combine code and natural language, provide a more realistic legal model. When these hybrid smart contracts are used with Online Dispute Resolution (ODR) tools like Kleros or with fallback arbitration clauses, they balance the efficiency of automation with the fairness of dispute resolution. Nevertheless, issues related to enforceability under various arbitration laws, judges who are not familiar with blockchain evidence, and the lack of clear legal recognition still exist. All countries need to pass laws on the use of hybrid digital contracts. Hybrid smart contracts and ODR are not perfect solutions; however, they represent important progress. Whether hybrid smart contracts and ODR will fit into legal systems depends on thoughtful regulation, institutional change, and continued international cooperation that focuses on legal certainty in the digital age.