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Smart Contracts, Commercial Certainty, and Indian Contract Law: Enforceability and Remedies in Code-Based Automated Transactions

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ABSTRACT

This paper critically examines the legal status and enforceability of smart contracts under Indian law, with particular reference to their implications for commercial certainty and remedial jurisprudence. Smart contracts are blockchain-based applications that generally run on self-executing code and are capable of enforcing contractual obligations once specified conditions are met. Their legal validity in India falls to be determined under the Indian Contract Act, 1872 and the Information Technology Act, 2000, notwithstanding their technological determinism and efficiency. The paper examines how the essential elements of a valid contract, offer, acceptance, lawful consideration, capacity, and free consent, may be satisfied in decentralised and pseudonymous blockchain environments. It also considers evidentiary recognition in digital law, the inter-jurisdictional issues that arise from borderless networks, and the tension between inflexible automated execution and fair judicial redress such as damages and restitution. Drawing on statutory law, judicial precedent, and academic literature, the paper argues that smart contracts are not inherently inconsistent with Indian contract law. Rather, interpretive adaptation and hybrid contractual frameworks that combine code with traditional legal drafting offer a pragmatic means of balancing technological innovation against doctrinal consistency and commercial predictability.

Keywords: *Smart Contracts; Blockchain Technology; Commercial Certainty; Indian Contract Act, 1872; Information Technology Act, 2000; Automated Transactions; Contract Enforcement*

I. INTRODUCTION

Smart contracts mark a significant change in contractual practice, employing self-executing blockchain code to embed legally binding obligations. These digital agreements operate on decentralised networks such as Ethereum and automatically perform pre-set conditions without

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intermediaries, lowering transaction costs and improving operational efficiency. Because they are immutable, transparent, and deterministic, their technical features enhance commercial reliability by ensuring that contracts perform as intended. In business ecosystems where trust is eroded by delay, opportunistic breach, and high enforcement costs, smart contracts offer a paradigm of algorithmic certainty. Their promise of automation, however, simultaneously generates doctrinal tension when assessed within conventional legal frameworks premised on human agency, interpretive adaptability, and equitable judgment.

The Indian Contract Act, 1872 is the principal statute governing the enforceability of contracts in India. It requires an offer, acceptance, lawful consideration, free consent, competent parties, and a lawful object. Smart contracts can technically replicate these features through recorded interactions and digital asset transfers. Yet it can be difficult to establish intention, verify capacity in pseudonymous settings, and correct errors embedded in immutable code. The Information Technology Act, 2000 confers legal status on electronic records and digital authentication, rendering blockchain-based agreements capable of binding effect. It does not, however, fully address the problems that arise in decentralised systems, such as coding errors ('bugs'), dependence on external data inputs (oracles), and uncertainty over jurisdiction.

Integrating smart contracts into Indian law requires adaptation at the interpretive level rather than a comprehensive legislative overhaul. Where automated execution does not evidence genuine intention, established remedial doctrines, including damages for breach, restitution, and specific performance, remain available. Courts may not always be able to reverse actions recorded on the blockchain, but they can award monetary or equitable relief. A coherent approach that preserves doctrinal integrity while accommodating technological advancement would strengthen commercial certainty and foster trust in India's developing digital economy.[1]

II. RESEARCH METHODOLOGY

This study adopts a doctrinal and analytical approach that relies exclusively on published secondary sources. Statutory texts, including the Indian Contract Act, 1872, the Information Technology Act, 2000 and its amendments, and the provisions of the Indian Evidence Act, 1872, form the primary material. Interpretive trends were examined through the rulings of the Supreme Court and the High Courts on electronic contracts and digital signatures. Peer-reviewed journal articles, legal commentaries, books, law commission reports, and policy papers on blockchain technology and smart contracts were systematically reviewed.

[1] Saloni Khanderia, *Termination for Breach: The Prospects of the UNIDROIT Principles of International Commercial Contracts to Interpret and Supplement the Indian Law of Contract*, UNIFORM LAW REVIEW (2022).

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Comparative insights were drawn from international jurisprudence and academic debate in order to situate Indian developments within the global regulatory discourse. To ensure the authenticity and reliability of the sources, online legal databases such as SCC Online, Manupatra, HeinOnline, and Google Scholar were used. The materials gathered were then subjected to critical analysis to identify existing doctrinal gaps, interpretive difficulties, and emerging legal norms governing code-based automated transactions in India.

III. CONCEPTUAL FRAMEWORK

A. Smart contracts in the Indian legal system

In the digital economy, smart contracts significantly alter the way commercial transactions are conceived, performed, and enforced. They are self-executing agreements that operate on blockchain systems, translating contractual obligations into code that performs automatically once specified conditions are met. Their analysis under Indian law must rest on existing statutes, particularly the Indian Contract Act, 1872, and must also account for related legislation such as the Information Technology Act, 2000 and the Indian Evidence Act, 1872.

Indian contract law rests on the premises of human intention, mutual agreement, and judicial enforceability. Smart contracts challenge this framework by substituting human choice with deterministic machine execution. Automation does not, however, render a contract invalid. Where offer, acceptance, lawful consideration, capacity, free consent, and a lawful object are all present, the fact that performance occurs automatically does not vitiate the agreement. Indian courts have long adopted a pragmatic approach to technology, as demonstrated by their acceptance of digital signatures and electronic records. This receptiveness allows smart contracts to be accommodated within the existing legal framework.

Smart contracts are gaining importance in India in light of governmental efforts to promote digitisation, transparency, and efficiency. Automated transactions have practical applications in supply chain management, debt settlement, insurance claim disbursement, and land record management. Because blockchain is decentralised and often borderless, however, it raises questions of jurisdiction, liability, and dispute resolution. Indian law must therefore reconcile its territorially grounded legal system with transactions that lack a clear physical nexus.

Ultimately, smart contracts do not exist in a legal vacuum. They operate at the intersection of private law principles and emerging technological realities. Rather than requiring an entirely new body of contract law, their use in India calls for established legal principles to be interpreted

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so as to keep the law clear, fair, and enforceable in an increasingly automated commercial environment.[2,3]

Smart contracts are commonly understood as blockchain-based programs that automatically perform contractual terms once specified criteria are satisfied. The foundation for the concept was laid by Nick Szabo in the 1990s, who described them as computerised transaction protocols that execute the terms of a contract, thereby reducing the need for intermediaries. Szabo's conception emphasised the use of technology, rather than law, to enforce obligations, with the aim of improving efficiency, lowering transaction costs, and building trust.

Blockchain technology made it possible to implement this idea, particularly following the launch of Ethereum in 2015. Ethereum's Turing-complete scripting language enabled the creation of programmable smart contracts capable of autonomous execution and complex conditional logic. Earlier digital contracts depended on centralised platforms and conventional means of legal enforcement. Smart contracts, by contrast, execute on distributed networks, which makes them difficult to alter or censor unilaterally.

In India, the development of smart contracts must be understood against the prior legal recognition of electronic contracts. The Information Technology Act, 2000 gave legal validity to electronic records and digital signatures, laying the groundwork for online contracting. Smart contracts build on this architecture but go further by embedding performance directly within the code. As blockchain adoption grows, Indian institutions are exploring its use in areas such as property registries, trade finance, and public service delivery, where automation and immutability can address long-standing problems of fraud and inefficiency.

Despite these technological advances, the Indian legal system has yet to define or regulate smart contracts clearly. Their evolution is therefore driven largely by the market and private innovation rather than by legislative action. This organic growth underscores the importance of doctrinal clarity, so that the law can evolve alongside technology without stifling innovation or undermining established principles of contractual fairness.[4,5,6]

B. The principal components of smart contracts

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[2] Adarsh Vijayakumaran, *Legally Blocked: The Evolution and Legality of Smart Contracts*, SSRN ELECTRONIC JOURNAL (2019).

[3] Shilpa Singh Jaswant & Prajakta Kale, *Smart Contracts and Blockchain: Legal Issues and Implications for Indian Contract Law*, INTERNATIONAL REVIEW OF LAW, COMPUTERS & TECHNOLOGY (2022).

[4] Archana Sahai & Rajiv Pandey, *Smart Contract Definition for Land Registry in Blockchain*, in PROCEEDINGS OF THE 2020 IEEE 9TH INTERNATIONAL CONFERENCE ON COMMUNICATION SYSTEMS AND NETWORK TECHNOLOGIES (CSNT) (2020).

[5] Megha Ravindranath, *Legality of Blockchain and Smart Contracts in India*, INTERNATIONAL JOURNAL FOR MULTIDISCIPLINARY RESEARCH (2024).

[6] Vijayakumaran (n 2).

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Smart contracts comprise three components: code, blockchain infrastructure, and automation. These elements distinguish smart contracts from ordinary written or electronic agreements and render them both powerful and legally complex.

Code is the first and most important component. Instead of natural language, smart contracts use programming language to express contractual terms. The code sets out conditions, triggers, and consequences in strict logical sequence, leaving little room for interpretation. This precision enhances certainty but reduces flexibility. Errors, defects, or poorly drafted code may produce unintended effects, raising questions of liability and remedy under contract law. In India, where courts are accustomed to construing written agreements, accepting code as a legally binding expression of intention may be difficult to prove and interpret.

The second component is the blockchain itself, a decentralised, distributed ledger that records transactions in an immutable and transparent manner. Once a smart contract is deployed, the blockchain ensures that it cannot be altered and that outcomes are as specified. This immutability fosters trust between parties who may not previously have known one another. In India, considerable attention has been given to the potential use of blockchain for land records, public distribution systems, and supply chains, where data integrity is a persistent concern. Decentralisation, however, complicates questions of control, liability, and applicable law, particularly where nodes are distributed across several jurisdictions.

The third component is automation. Once the specified conditions are met, smart contracts perform their terms automatically, without the intervention of banks, brokers, or escrow agents. This feature improves efficiency and lowers transaction costs, but it also limits the scope for intervention where a dispute, mistake, or supervening event arises. Indian contract law has always allowed for equitable considerations and judicial discretion in enforcing agreements. Automation, by contrast, privileges certainty over flexibility, producing a tension between technical determinism and legal fairness.[7,8]

Taken together, these components transform the manner in which contracts are formed and performed, requiring careful attention from practitioners to ensure that both justice and efficiency are served.

C. Legal theory and commercial certainty

[7] Jaswant & Kale (n 3).

[8] Garima Singh & Chandra Shekhar, *Integrating Blockchain and Smart Contracts for Land Registry Systems in India: Legal, Regulatory, and Technological Challenges*, INTERNATIONAL JOURNAL FOR MULTIDISCIPLINARY RESEARCH (2025).

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Commercial certainty is a foundational principle of contract law, ensuring that parties can anticipate the legal consequences of their agreements and rely on their enforcement. In commercial dealings, certainty builds trust, reduces risk, and encourages investment. Smart contracts are frequently presented as instruments that enhance commercial certainty by removing ambiguity, automating performance, and reducing disputes arising from non-performance or delay.

Smart contracts are an attractive option in the Indian commercial environment, where judicial delay and difficulties in enforcing contracts are well documented. Automated execution ensures that obligations are performed exactly as programmed, reducing the need to resort to the courts for enforcement. This is particularly significant for e-commerce, digital finance, and supply chain activities involving high volumes of low-value transactions. The code that provides commercial certainty must nonetheless conform to the Indian law that provides legal certainty. Predictability of performance does not guarantee predictability of the legal outcome in the event of a dispute.[9,10]

Several legal doctrines are significant in analysing smart contracts under Indian contract law. The deployment of, and engagement with, code may reshape the offer-and-acceptance model. Publishing a smart contract may be treated as an offer, and interacting with it as acceptance. The intention to create legal relations, traditionally inferred from conduct and context, must be reassessed in settings where the parties transact pseudonymously. The concept of performance is similarly altered, as obligations are discharged automatically rather than voluntarily.

Further difficulties arise in relation to modification, termination, and jurisdiction. Once deployed, smart contracts are frequently immutable, making it difficult for the parties to vary their terms. Decentralised execution across borders further complicates the identification of the applicable jurisdiction. Indian legal debate increasingly favours an interpretive evolution of existing doctrines rather than the creation of an entirely new legal regime. By adapting the rules governing consent, performance, and remedies to automated settings, Indian contract law can protect commercial certainty while remaining open to technological innovation.[11]

IV. SMART CONTRACTS AND TRADITIONAL CONTRACT LAW

A. The essential elements of a valid contract

[9] Simon Raj & Bhavya Rathore, *An Appraisal of the Indian Contract Act: Loopholes, Ambiguities, and Reform Imperatives*, INTERNATIONAL JOURNAL FOR RESEARCH IN APPLIED SCIENCE AND ENGINEERING TECHNOLOGY (2025).
[10] Jaswant & Kale (n 3).
[11] Vijayakumaran (n 2).

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Section 10 of the Indian Contract Act, 1872 (ICA) provides that agreements are contracts if they are made by parties competent to contract, with free consent, for a lawful consideration and a lawful object, and are not expressly declared to be void. These requirements apply regardless of the form of the contract. Even though smart contracts are written in code and operate on blockchain systems such as Ethereum, they must satisfy these criteria.

Indian courts are technology-neutral. The Information Technology Act, 2000 recognises the validity of electronic records and digital signatures, which assists in establishing the authenticity of blockchain transactions. Admissibility in evidence, however, does not by itself establish the validity of the contract. The parties must still demonstrate consensus ad idem, a lawful object, and capacity to contract.

The principal difficulty lies not in any doctrinal inconsistency but in evidentiary proof, particularly in identifying the persons behind pseudonymous wallet addresses and in showing that the coded terms accurately reflect the intentions of both parties.[12]

B. Offer, acceptance, and consideration in code-based transactions

A contract is formed when one party makes an offer and the other accepts it, in accordance with Sections 2(a) and 2(b) of the ICA. In smart contracts, the deployment of code on a blockchain may constitute a standing offer on fixed terms. When another party interacts with the code, whether by transferring cryptocurrency or invoking a function, acceptance occurs and execution begins. The blockchain record serves as proof that this acceptance is final.

Section 2(d) recognises consideration in the form of a digital exchange of value, such as bitcoin, tokens, or automated service delivery. Indian law does not require a contract to be formally signed where the intention of the parties is apparent. In *Trimex International FZE Ltd. v. Vedanta Aluminium Ltd.*, the Supreme Court held that communication by electronic means can give rise to legally binding agreements, affirming that substance prevails over form.

Indian courts are therefore likely to recognise the validity of a smart contract where it demonstrates clear intention, mutual obligations, and identifiable consideration, provided there is evidence of genuine consent.[13]

C. Capacity, consent, and legality

[12] Aman Kakkar & Shilpa Mehrotra, *The Role of Contract Laws in Corporate Transactions*, INTERNATIONAL JOURNAL FOR MULTIDISCIPLINARY RESEARCH (2024).
[13] Saloni Khanderia, *Commercial Impracticability under the Indian Law of Contract: The UNIDROIT Principles as the Way Forward?*, UCL JOURNAL OF LAW AND JURISPRUDENCE (2018).

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Sections 11 and 12 of the ICA require that the parties be adults of sound mind who are not disqualified from contracting by law. Smart contracts operate through digital wallets, which do not automatically verify a party's age or mental capacity. Where a minor, or a person otherwise incompetent to contract, enters into a blockchain transaction, enforceability may be affected, since such agreements are void ab initio under Indian law.

Section 14 provides that consent is free when it is not caused by coercion, undue influence, fraud, misrepresentation, or mistake (Sections 15 to 22). Blockchain automation reduces the coercive pressure typically exerted during performance, but coding errors, misleading interfaces, or dishonest smart contract design may still vitiate consent. Even where execution is automated, courts may examine the surrounding circumstances.

Section 23 renders agreements with an unlawful object void. Smart contracts that facilitate unlawful activity, such as unregulated financial schemes, remain invalid notwithstanding their technological execution. Regulatory authorities such as the Reserve Bank of India scrutinise cryptocurrency transactions to ensure compliance with financial and anti-money-laundering norms. Technology cannot override the law.[14]

D. Formation: performance and execution

Traditional contracts draw a clear distinction between formation (consensus and signature) and performance (the fulfilment of obligations). Under Section 37 of the ICA, the parties must perform, or offer to perform, their respective obligations. Sections 73 to 75 provide remedies for breach, including compensation for loss or damage.

Smart contracts collapse the formation and performance of a contract into a single technical event. Once deployed and triggered, obligations are performed automatically; for example, escrowed payments are released upon confirmation of delivery. This automation enhances certainty and lowers enforcement costs. Immutability, however, constrains the flexibility of remedies. Where performance results from defective code or from erroneous data supplied by oracles (external data feeds), it may not be possible to reverse it through technological means.

Even where on-chain execution cannot be undone, Indian courts retain the power to ascertain intention and award damages. Smart contracts therefore alter the mechanics of performance without displacing the statutory remedies under the ICA; they merely shift disputes from performance failure to questions of intention, coding accuracy, and restitution.[15]

[14] Kakkar & Mehrotra (n 12).
[15] Khanderia (n 13).

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V. INDIAN CONTRACT LAW: AN OVERVIEW

The Indian Contract Act, 1872 is the principal statute governing contracts in India. Enacted during British rule and based on English common law, it applies throughout the country, including Jammu and Kashmir following the constitutional changes of 2019, and came into force on 1 September 1872. The Act originally contained 266 sections. It now deals largely with general principles (Sections 1 to 75), the provisions concerning the sale of goods and partnerships having been enacted as separate legislation.

A. The Indian Contract Act, 1872: principal features

The Act emphasises that contracts should be fair, certain, and enforceable. Its principal features are as follows:

- Under Section 2(h), a contract is 'an agreement enforceable by law.'
- Voluntary and free agreement: a contract is formed when the parties agree freely, without coercion, fraud, or undue influence.
- Lawful consideration and object: a valid agreement must have lawful consideration (something of value exchanged) and a lawful object. Agreements that are immoral, unlawful, or opposed to public policy are void.
- Competent parties: the parties must be competent to contract (for example, adults of sound mind who are not disqualified by law).
- Classification of agreements: the Act distinguishes valid contracts, void agreements (which are unenforceable), voidable contracts (enforceable at the option of one party), and unlawful agreements.
- Remedies for breach: these include damages, specific performance, and injunctions.
- Electronic recognition: supplemented by later legislation to keep the Act contemporary.

The Act promotes transparency and guards against unfair commercial practices, giving it the flexibility to meet evolving business needs.[16]

B. Requirements for validity under Indian law

Section 10 of the Indian Contract Act, 1872 provides that 'All agreements are contracts if they are made by the free consent of parties competent to contract, for a lawful consideration and with a lawful object, and are not hereby expressly declared to be void.' An agreement meeting these requirements is a valid and enforceable contract.

[16] Cedrick Cabaluna, *Everything You Need to Know About India's Contract Law*, LEXAGLE (2026), https://www.lexagle.com/blog-en-sg/indian-contract-law-1872.

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The principal requirements are as follows:

- Offer and acceptance: a valid proposal (Section 2(a)) must be accepted unequivocally (Section 2(b)), subject to the rules on communication (Sections 3 to 9).
- Intention to create legal relations: the parties must intend the promises to be legally binding rather than merely social or domestic.
- Lawful consideration: something the promisor does or abstains from doing at the promisee's desire (Section 2(d)). It must be real and lawful (Section 23).
- Capacity: the parties must be competent under Section 11 (adults, of sound mind, and not disqualified). Agreements made by minors are void (*Mohori Bibee v. Dharmodas Ghose*).
- Free consent: consent must be free from coercion (Section 15), undue influence (Section 16), fraud (Section 17), misrepresentation (Section 18), and mistake (Sections 20 to 22). A contract is voidable where consent is not free (Section 19).
- Lawful object: the object must not be unlawful, immoral, opposed to public policy, or fraudulent (Section 23).
- Certainty and possibility of performance: the terms must be certain (Section 29) and capable of performance.
- Not expressly declared void: the agreement must not fall within the categories of void agreements (for example, restraint of trade under Section 27 or restraint of marriage under Section 26).[17]

Where these conditions are satisfied, the contract is enforceable in a court of law.

C. Digital signatures and electronic contracts

The Information Technology Act, 2000 (IT Act), as amended in 2008, provides that electronic contracts and digital signatures are as valid as their physical counterparts.

- Section 10A of the IT Act provides that a contract formed through electronic means, including a proposal and acceptance expressed in electronic form, is not void merely on that ground. Where the essentials of offer, acceptance, and the like are present, the contract accords with the Indian Contract Act.
- Section 2(1)(ta) of the IT Act defines an electronic signature as authentication by electronic means. Section 3A addresses electronic signatures generally, and Section 5

[17] Magaonkar Revati Umashankar, *Essential Elements for Forming a Valid Contract under the Indian Contract Act 1872*, INTERNATIONAL JOURNAL OF LAW MANAGEMENT & HUMANITIES (2020).

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provides that they are legally valid where they satisfy the prescribed conditions (such as being unique to the signatory, under the signatory's control, and capable of detecting any subsequent alteration).

- Digital signatures: a secure form of authentication using public key infrastructure and asymmetric cryptography (Section 3), issued by licensed Certifying Authorities under the Controller of Certifying Authorities. They carry a presumption of validity and are admissible in evidence (pursuant to amendments to the Indian Evidence Act, 1872).
- Validity and exceptions: most transactions may be executed with electronic signatures, but not negotiable instruments, powers of attorney, wills, and certain other instruments (First Schedule to the IT Act). Courts treat due affixation as valid.[18]

This framework supports digital transactions and e-commerce as part of the 'Digital India' programme.

D. Blockchain and smart contracts in the Indian legal system

India has no legislation that specifically addresses blockchain technology or smart contracts, being pieces of code that run on a blockchain and perform automatically once specified conditions are satisfied. The Indian Contract Act, 1872 and the IT Act, 2000 are the principal statutes that confer legal status on them.

- Legal recognition: although smart contracts are neither expressly defined nor regulated, they may be valid where they satisfy the requirements of Section 10, namely offer and acceptance (through code or digital acts), free consent, lawful consideration and object, capacity, and the intention to create legal relations. Courts treat them as ordinary contracts rather than disregarding them.
- Enforceability: the underlying agreement must satisfy the requirements of contract law to be enforceable. Automation follows the rules governing performance, but difficulties may arise from immutability, coding errors, or disputes requiring judicial resolution (for example, rectification or damages). The immutability of the blockchain assists proof but does not displace the law.
- Evidentiary value: blockchain records are electronic records under the IT Act and are admissible in evidence where duly authenticated (for example, by electronic or digital signatures), a position supported by amendments to the Indian Evidence Act.

[18] CAPRICORN, *Digital Signature & Electronic Signature Under IT Act 2000*, https://www.certificate.digital/articles/25112016/digital-signature-electronic-signature-under-it-act-2000/.

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- Problems and gaps: there is no specific regulation of cryptocurrency-linked consideration (given the Reserve Bank of India's restrictions on cryptocurrency), jurisdiction, stamping, taxation, or the correction of coding errors. In some cases, smart contracts may not accommodate 'free consent' or government-certified signatures. Regulatory notices on cryptocurrency add uncertainty, though non-cryptocurrency uses of blockchain (such as supply chain and intellectual property applications) present fewer difficulties.
- Current status: smart contracts are valid and increasingly used in areas such as finance, real estate, and intellectual property licensing, provided they comply with the applicable rules. Indian courts apply general principles, and the law may evolve to provide greater clarity. Commentators suggest that hybrid approaches, combining code with traditional clauses, better secure enforceability.[19,20]

VI. The enforcement of smart contracts under Indian law

Smart contracts, being self-executing digital agreements stored on a blockchain, are becoming more prevalent in India, though their adoption is hampered by the absence of specific legislation. They align with the core principles of the Indian Contract Act, 1872 (ICA), but they are enforceable only where they satisfy the usual requirements of a contract, such as offer, acceptance, consideration, and a lawful object. The Information Technology Act, 2000 (IT Act) validates electronic contracts, but their automated and immutable character may create uncertainty. Judicial precedent indirectly supports digital agreements, yet legislative gaps remain to be addressed before broader adoption can occur.

A. Legal recognition of code-based agreements

The IT Act recognises the code-based agreements underlying smart contracts as legally valid. It treats electronic records on the same footing as traditional documents and accepts digital signatures as proof of identity. The ICA does not expressly recognise code as a medium of contract, so reliance must be placed on broad construction. Section 10 of the ICA, for instance, supports the validity of smart contracts made with free consent and lawful consideration. Their decentralised execution nonetheless lacks formal recognition, which may cause them to be treated as hybrid agreements combining code with natural language. Where the terms are clear

[19] Sannidhi Agrawal, *Smart Contracts: Functioning and Legal Enforceability in India*, International Journal of Law and Social Sciences 1 (2023), https://www.journalsalliancepub.com/index.php/ijls/article/view/24.
[20] Megha Ravindranath, *Legality of Blockchain and Smart Contracts in India*, 6 International Journal for Multidisciplinary Research (2024).

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and the parties intend to create legal relations, courts may uphold them as lawful, drawing on the precedents governing electronic contracts.[21]

B. Characterising smart contracts as "contracts"

Smart contracts may be characterised as valid 'contracts' under the ICA through liberal construction, since they contain the same essential elements, offer, acceptance, and mutual assent, as ordinary contracts. This is possible because the ICA is flexible and rooted in the common law, particularly where hybrid models incorporate human-readable terms. Because code is immutable and pseudonymous, however, it sits uneasily with established doctrine and requires courts to identify the 'meeting of minds.' Comparative developments, such as the UK Jurisdiction Taskforce's recognition of smart contracts under English law, reinforce analogous views in India. The objective test of intention supports their enforceability, provided no vitiating factors are present.

C. Offer and acceptance in automated transactions

In automated transactions, an offer is made by deploying coded terms on the blockchain, which constitutes a clear proposal. Acceptance is effected through cryptographic acts, such as signing with a private key or initiating a transaction, consistent with Section 2(b) of the ICA. This resembles the vending machine analogy, in which performance constitutes acceptance, and Section 10A of the IT Act confirms the validity of automated electronic communications. Pseudonymity on the blockchain nonetheless makes consent difficult to verify, so hybrid wrappers are required for clarity.

D. Certainty, intention to create legal relations, and commercial efficiency

Smart contracts provide assurance through immutable 'if-then' code, satisfying the ICA's requirement of certain terms. In commercial settings, an intention to create legal relations is presumed from the parties' conduct in deploying and using the code, consistent with the objective test applied in cases such as *Edwards v. Skyways Ltd.* By reducing costs and errors, smart contracts enhance commercial efficiency, which benefits sectors such as finance; where the contract contains gaps, however, courts may have to fill them in accordance with economic contract theory.[22]

E. Difficulties in enforcing code-based transactions

[21] Mukkesh Venkatesan, *Enforceability of Smart Contracts: A Comparative Study of India, the United Kingdom, and the European Union* (2025), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=5703602.
[22] Deepti Pandey & Harishankar Raghunath, *Stationing Smart Contract as a "Contract": A Case for Interpretative Reform of the Indian Contract Act, 1872*, NUJS LAW REVIEW (2020).

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Enforcement difficulties arise from the borderless nature of the blockchain, the absence of clear remedies for coding errors, and the uncertain status of cryptocurrency as a means of payment. Regulatory gaps in the allocation of liability and in consumer protection heighten the risks, and judges may struggle to interpret code without technical expertise. Adaptations such as oracles for external data are necessary, but immutability makes modification difficult and may produce inequitable outcomes.[23]

VII. COMMERCIAL AND LEGAL CERTAINTY

Smart contracts offer certainty through automation and transparency, reducing disputes and costs. Legal certainty, by contrast, requires adherence to the principles of the ICA even where the law contains gaps. Divergence arises where commercial advantages such as efficiency outpace legal development, though interpretation can help to reconcile the two.

A. The distinction between commercial and legal certainty

Commercial certainty concerns the predictability of business outcomes, which self-executing smart contracts facilitate by reducing intermediaries and errors. Legal certainty concerns the enforceability of an agreement at law. Certain difficulties nonetheless attend the application of the ICA to code, creating uncertainty, even though the IT Act supports electronic transactions. The distinction shows how commercial benefits (as in supply chains) may accrue without full legal support, which could render the agreements invalid.[24]

B. The predictability and standardisation of smart contracts

The blockchain's immutable ledger and consensus-based validation make execution transparent and verifiable, enhancing predictability. Programmable languages such as Solidity on platforms such as Ethereum promote consistency through the use of uniform terminology across transactions, much as electronic data interchange (EDI) agreements do under the IT Act. This builds trust between parties who do not know one another, consistent with the ICA's emphasis on objective intention.

C. Risk allocation and automated performance

Risk is allocated through programmed contingencies, and automation governs performance triggers, reducing fraud by validating transactions across multiple nodes. Under the ICA, this reflects mutual agreement, though unforeseen events may engage doctrines such as frustration.

[23] Venkatesan (n 21).

[24] Makam Ganesh Kumar, *The Impact of Smart Contracts and AI on Traditional Contract Law in India*, 6 INTERNATIONAL JOURNAL OF LAW MANAGEMENT & HUMANITIES (2023).

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Automated performance improves efficiency but depends on oracles for real-world data. Courts fill the gaps left by incomplete contracts to prevent the parties from exploiting the system.[25]

D. Case studies on commercial disputes involving smart contracts

Indian case law remains limited because the technology is nascent, but illustrative examples of potential disputes exist. In *Trimex International FZE Ltd. v. Vedanta Aluminium Ltd.* (2010), the Supreme Court held that electronic contracts are valid, which bears on questions of smart contract formation. In *NCR Corporation India Pvt. Ltd. v. Samsung Electronics Co. Ltd.* (2018), electronic arbitration clauses were upheld, a principle relevant to the resolution of smart contract breaches. *Siddharth Rastogi v. Gaurav Kapoor* (2020) drew attention to electronic evidence in litigation, which may assist in relation to blockchain records. Internationally, *Quoine Pte Ltd. v. B2C2 Ltd.* (Singapore) addressed problems arising from automated trading and permitted rescission for mistake, which may guide Indian courts in interpreting code.[26]

VIII. Remedies for breach and default

Where smart contracts are valid, the remedies under the ICA apply to them, including damages and specific performance. Automation, however, makes conventional breach less likely. Blockchain evidence assists proof, but its immutability complicates rectification, which is why arbitration or alternative dispute resolution is often preferable for technical disputes.

A. Remedies under the Indian Contract Act, 1872

The Indian Contract Act, 1872 provides for remedies including damages (Section 73), specific performance (Section 10 of the Specific Relief Act, 1963), and injunctions. Where code does not execute as intended, the smart contract is breached, and the blockchain serves as proof under Section 65B of the Indian Evidence Act, 1872. Anticipatory breach permits an immediate action, though self-execution may forestall certain difficulties.

B. Specific performance and damages in automated transactions

Specific performance is available where damages are inadequate and entails the performance of coded obligations. In automated transactions, immutability favours damages for quantifiable loss, since code is difficult to alter once deployed. Consistent with authorities such as *Fateh Chand v. Balkishan Das* (1963) on liquidated damages, courts may prefer damages so as to avoid enforcing defective automation.

C. The measure of damages in a code-triggered breach

[25] Pandey & Raghunath (n 22).

[26] Ajay Kumar Yadav, *Enforceability of Smart Contracts under Indian Law*, 18 The Lawway with Lawyers Journal (2024), https://thelawwaywithlawyers.com/enforceability-of-smart-contracts-under-indian-law/.

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Damages are intended to compensate for the actual loss caused by a code-triggered breach and are measured as the difference between the intended and the actual outcome. Nominal or, in exceptional cases, punitive damages may be awarded, and pre-estimated liquidated damages may be enforced where justified. Blockchain audits assist quantification, but the volatility of cryptocurrency complicates assessment.[27]

D. Restitution and unjust enrichment

Section 65 of the ICA provides for the restitution of benefits received under a void agreement, addressing unjust enrichment arising from the failure of a smart contract. Where coding errors produce an unjust gain, courts may order restitution or reversal. Because the blockchain is immutable, however, this may be difficult to achieve, and off-chain settlement may be required.[28]

E. Dispute resolution: arbitration, ADR, and the courts

Arbitration is favoured for its flexibility and its capacity to accommodate technical expertise, and it is enforced under the Arbitration and Conciliation Act, 1996, its electronic provisions being valid. Alternative dispute resolution, including mediation, suits non-adversarial disputes. The courts address more complex matters and admit blockchain evidence. Hybrid models combine on-chain resolution with off-chain supervision to improve efficiency.[29]

IX. Conclusion

Smart contracts represent a transformative development in the performance of contracts, relying on self-executing blockchain code to enhance the efficiency, transparency, and certainty of transactions. Their enforceability within the Indian legal system depends not on technological novelty but on satisfaction of the essential requirements of the Indian Contract Act, 1872, namely offer, acceptance, lawful consideration, competent parties, and free consent. Their legitimacy is reinforced by the Information Technology Act, 2000, which confers legal status on electronic records and digital authentication, and thereby on automated agreements concluded in the digital sphere. Difficulties nonetheless persist in relation to the verification of capacity in pseudonymous systems, coding defects, immutability, inter-jurisdictional uncertainty, and the reconciliation of automated execution with fair judicial remedies. Although

[27] Bhavitha Raj & Saumya Rajvanshi, *Crafting Commitments: A Journey Through the Indian Contract Act, 1872*, Jurists' Junction (2024), https://juristsjunction.wordpress.com/2024/08/20/crafting-commitments-a-journey-through-the-indian-contract-act-1872/.

[28] Ravindra Kumar Singh, *Are Smart Contracts Really Smart? Decrypting the Issues of Their Legality, Enforcement and Interpretation*, 10 National Law School Business Law Review (2024).

[29] Tisa Agarwal & Anusha Singh, *Convergence of Law and AI: Analysing the Legal Framework of Blockchain and Smart Legal Agreements*, 5 Indian Journal of Integrated Research in Law (2025).

blockchain technology enhances evidentiary reliability, it does not remove the need for judicial oversight, particularly in cases of fraud, mistake, or unjust enrichment. Notwithstanding the irreversibility of on-chain execution, Indian courts retain the power to award damages, restitution, and, where appropriate, specific performance. Rather than requiring wholesale legislative reform, therefore, smart contracts call for interpretive evolution and hybrid drafting models that combine programmable code with traditional legal terminology. Such an approach would preserve doctrinal integrity while enabling India's digital economy to reap the benefits of technological innovation without compromising legal certainty and justice.

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