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# REGULATORY APPROACHES TO BLOCKCHAIN-BASED SMART CONTRACTS IN COMMERCIAL TRANSACTIONS: AN INDIAN PERSPECTIVE

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## ABSTRACT

The idea of a smart contract, which was planted in the 1990s, had grown drastically by 2008 with the advent of blockchain technology. The technology not only revolutionised fintech to a large extent, but more importantly, how humans interact in a contract setup. But for every new idea that shook the world, there existed many lacunas and questions on its regulation. Blockchain and smart contracts, in this case, are no exception.

With the world trend going towards blockchain-based smart contract regulations and framework, India, being one of the 4th largest contributors to the GDP in the world economy, still does not have a unified regulations that could cover them in case of a potential issue. In this short article, we will be looking into the concept of smart contracts and their legal implications. The paper aims to understand and evaluate the concept from an Indian perspective, the existing legislation and the frameworks that have an impact on such blockchain-based technologies. For this purpose, the article also looks into the prominent jurisdictions that have made and are trying to make a definite regulatory environment for smart contracts. The paper continues to discuss the challenges encountered in implementing smart contracts, dispute resolution, and evidentiary standards in India. While primarily looking at the concept of smart contracts, the paper also looks into other cross-border commercial transactions using blockchain and their advancement across the globe. Previous works on the topic point out that technology is evolving, and the need for a change would be beneficial for all jurisdictions. The article thus tries to articulate technology and commercial law. With the doctrinal research methodology, the final objective is to provide some recommendations on the existing laws and frameworks.

**Keywords:** Smart Contracts, Blockchain, Cross-border Commercial Contracts, Distributed Ledger Technology, Regulatory Framework, India.

## 1. INTRODUCTION

Blockchain technology is extensively used as a digital recording system that is interconnected by way of cryptography<sup>1</sup>. This practice of converting readable messages into unique and unidentifiable texts makes it a secure mode of transaction. Consequently, these transactions are widely practiced across many spheres of modern commercial transactions. This includes supply chain transactions, gaming, Real estate markets, and financial transactions between banks, NBFCs, etc. With the rise of blockchain-based technology, another important development that is taking place in the digital marketplace is the use of Smart contracts. A smart contract is a computerised transaction protocol that executes the terms of a contract.<sup>2</sup> With these virtual techniques, the conventional contract terms can now be made digitally and more conveniently. This widespread usage could be advantageous to society, but at the same time, proper regulations and frameworks that govern the transactions are necessary for the induction of trust in more users. Also, as with other major technological transitions that affect human life, there is high uncertainty about what successful implementation of the underlying principle looks like<sup>3</sup>. Therefore, it is important to look into the regulatory landscapes across the world. Many countries, like the UK, the US, and Singapore, are actively trying to work with legislation that governs blockchain-based transactions and smart contracts, and are successful to an extent. India, being the 4th largest contributor to World GDP,<sup>4</sup> is increasingly utilising these blockchain techniques and smart contracts to fulfil many of its cross-border transactions. The lack of a clear, comprehensive, and future-ready legal framework has been a significant obstacle to adoption in India. Although other countries such as the UK and Singapore are beginning to create guidance notes and regulatory sandboxes to use smart contracts in their applications, India continues to go by the provisions in statutes such as the Indian Contract Act 1872, the Information Technology Act, 2000, and the Indian Evidence Act, 1872, which do not envisage the technology of decentralization technologies.<sup>5</sup> Reports from NASSCOM<sup>6</sup> and the

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<sup>1</sup> F A Cahyadi, A I Owen, F Ricardo and A A S Gunawan, 'Blockchain Technology behind Cryptocurrency and Bitcoin for Commercial Transactions' (2021) *Proceedings of the 1st International Conference on Computer Science and Artificial Intelligence (ICCSAI)* 115, 117 <https://doi.org/10.1109/ICCSAI53272.2021.9609790> accessed 28 September 2025.

<sup>2</sup> Nick Szabo, 'Smart Contracts' (1994) *Satoshi Nakamoto Institute* <https://nakamotoinstitute.org/library/smart-contracts/> accessed 28 September 2025

<sup>3</sup> Christian Catalini, 'Blockchain Technology and Cryptocurrencies: Implications for the Digital Economy, Cybersecurity, and Government' (2018) 19 *Georgetown Journal of International Affairs* 36, 38

<sup>4</sup> World Economics Research, 'India's Share of Global GDP: 10.0%' (2025) *World Economics* <https://www.worldeconomics.com/Share-of-Global-GDP/India.aspx> accessed 21 September 2025.

<sup>5</sup> *Indian Contract Act 1872; Information Technology Act 2000; Indian Evidence Act 1872*

<sup>6</sup> NASSCOM, *India's Web3 Startup Landscape: 2023 Report* (2023) <https://nasscom.in/knowledge-center/publications/indias-web3-startup-landscape> accessed 28 September 2025

Ministry of Electronics and Information Technology (MeitY)<sup>7</sup> highlight that the ecosystem of blockchain development in India is growing, but is hampered by legal uncertainty and institutional ambiguity.

In the event that such a regulatory gap persists, it might have various effects: less investor confidence, less innovation, and more fraud and abuse, conflicts over jurisdiction, and failure to offer a legal remedy in case of breach of a contract. Moreover, by not being a global leader in the blockchain arena, India will be deprived of the economic and strategic advantages, particularly at the time when the government actively drives digital public infrastructure such as Digi Locker, Aadhaar, and UPI.<sup>8</sup>

This research paper tackles the following core question: Should India adopt its legislative and regulatory framework on blockchain-based smart contracts on a one-stop-shop basis or through a principle-based staged overhaul of the existing legal architecture? It argues that this is where India can not afford a strict, single-piece legal codification of the so-called Smart Contracts Legislation, but rather choose a more progressive, gradualist approach to reform that would be sensitive to the ongoing changes in the project of automated contracting of UNCITRAL. By doing this, this research endeavour shall contribute to the existing discourse on blockchains and smart contracts through the synthesis of the very latest Indian developments on this subject, namely the Supreme Court's ruling on blockchain-based cadastral registration, the judicial recognition of cryptocurrencies as property within the Madras High Court, as well as the very last clarifications on virtual digital assets issued by RBI, SEBI, and MeitY, into a doctrinal framework, and through the incorporation of best-of-comparative-law teachings from the EU, UK, US, Singapore, as well as UAE legal traditions, which as of the date of this research endeavour remain far less synthesized within the existing Indian literature. The methodology used in the article is purely doctrinal by utilising the literature, reports, and publications from the government and other private agencies already available on the topic.

## **2. UNDERSTANDING THE CONCEPTS OF SMART CONTRACTS AND THEIR IMPACTS**

### **2.1 Blockchain-based Smart Contracts and their foundational principles**

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<sup>7</sup> Ministry of Electronics and Information Technology (MeitY), *National Strategy on Blockchain* (Government of India 2021) [https://www.meity.gov.in/writereaddata/files/National\\_Strategy\\_Blockchain.pdf](https://www.meity.gov.in/writereaddata/files/National_Strategy_Blockchain.pdf) accessed 28 September 2025

<sup>8</sup> Government of India, *India Stack* <https://www.indiastack.org> accessed 28 September 2025.

Smart Contracts, in Leiman's terms, are self-executing, virtual contracts based on Blockchain technology that trigger specific, programmed outcomes when a predefined event occurs.

A blockchain stores encrypted data, linking contiguous "blocks" of information. This information is in the form of algorithmic characters. Every block of such information is connected together through a ledger technology. Thus, Blockchains represent a form of intermediaries – code as a trusted intermediary<sup>9</sup>

Blockchain is based on the idea of Distributed Ledger Technology or DLT. A distributed ledger is a digital store of information or data<sup>10</sup>. It is shared or distributed amongst a network of computers (known as “nodes”). Ledgers in DLT can be considered as the source of all the transactions that take place within a blockchain.<sup>11</sup> These DLTs are distributed across all participants in the computer network, and the changes made to blocks are visible to all network participants. When a new transaction is recorded, it will be in a manner that is cryptographically secured, permanent, and visible to all participants in near real time. The continuous DLT algorithm ensures that information remains consistently immutable throughout the distributed network, preventing individual users from adding to the ledger without permission from the main network<sup>12</sup>. This also makes tampering with the algorithm almost impossible.

## 2.2 Smart contracts and their impacts on modern commercial transactions

The primary objectives of smart contract design are to meet common contract parameters (such as payment terms, liens, confidentiality, and enforcement), reduce the number of exceptions (both intentional and unintentional), and minimise the need for trusted intermediaries. Along with these other utilities, like lowering fraud loss, arbitration, and enforcement costs are added benefits.<sup>13</sup> The UK Law Commission on its study on the smart contracts noted that it could

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<sup>9</sup> NITI Aayog, Blockchain: The India Strategy, Part I – Draft Discussion Paper (January 2020) [https://www.niti.gov.in/sites/default/files/2020-01/Blockchain\\_The\\_India\\_Strategy\\_Part\\_I.pdf](https://www.niti.gov.in/sites/default/files/2020-01/Blockchain_The_India_Strategy_Part_I.pdf) accessed 29 September 2025

<sup>10</sup> Law Commission, *Smart Contracts* (UK) <https://lawcom.gov.uk/project/smart-contracts/> accessed 29 September 2025

<sup>11</sup> US Government Accountability Office, *Science and Technology Spotlight: Blockchain and Distributed Ledger Technologies* (GAO-19-704SP, 2019) <https://www.gao.gov/assets/gao-19-704sp.pdf> accessed 29 September 2025.

<sup>12</sup> 'Blockchain as a Type of Distributed Ledger Technology' (2021) *ResearchGate* [https://www.researchgate.net/publication/348271633\\_Blockchain\\_as\\_a\\_Type\\_of\\_Distributed\\_Ledger\\_Technology](https://www.researchgate.net/publication/348271633_Blockchain_as_a_Type_of_Distributed_Ledger_Technology) accessed 21 September 2025.

<sup>13</sup> John Eatwell, Murray Milgate and Peter Newman (eds), *Allocation, Information and Markets* (Palgrave Macmillan 1989).

increase efficiency, transparency, and reduce enforcement costs, based on the evidence group they selected.

At the same time, concerns may arise regarding the increased cost of implementation of smart contracts compared to conventional contracts. But it could be reduced by the development of model clauses<sup>14</sup>.

In the modern world, the utility of smart contracts can be visible in Government voting systems, Healthcare, Supply Chain, Financial Services, etc<sup>15</sup>. When specifically mentioning, there are cases reported where the technology was used in aviation refuelling, parametric insurance, service level agreement monitoring, and real estate<sup>16</sup>. As of today, modern blockchain platforms, such as Ethereum and Ripple, among others, offer smart contract services. The transactions in such platforms vary from cryptocurrencies to the tokenisation of assets.

### **3. ANALYSING THE LEGAL AND PRACTICAL CHALLENGES ASSOCIATED WITH THE ENFORCEMENT OF SMART CONTRACTS IN INDIA.**

#### **3.1. Applying the Indian Contract Act to Smart Contracts: A Functional Assessment.**

The Indian Contract Act, 1872, defines a contract in Section 2(h) as an agreement enforceable by law. Each party to the contract is 'legally bound' by the promise it has made<sup>17</sup>. The code of the smart contract makes it technically enforceable, but whether it is legally enforceable needs to be determined<sup>18</sup>. Thus, the importance of law cannot be ignored. Further to this, the question then arises whether contract law relating to traditional contracts would apply to smart contracts, or would a separate legislation dedicated to blockchain and smart contracts be required.

In India, there has been no separate legislation for e-contracts as such<sup>19</sup>. The Information

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<sup>14</sup> Thibault Schrepel, 'Smart Contracts and the Digital Single Market through a "Law and Technology" Approach' (European Commission, Directorate-General for Communications Networks, Content and Technology) <https://doi.org/10.2759/562748> accessed 12 October 2026.

<sup>15</sup> Teja A S Hari and B Lavaraju, 'A Study on Smart Contracts and Blockchain: Legal Issues' (2024) 7 *International Journal of Law, Management and Humanities* 1419, 1423.

<sup>16</sup> Law Commission (UK), *Smart Contracts*, Project page, available at <https://lawcom.gov.uk/project/smart-contracts/> (visited Sept. 2, 2025)

<sup>17</sup> Pollock and Mulla, 'Preliminary' in R Yashodh Vardhan (ed), *The Indian Contract Act, 1872* (15th edn, LexisNexis 2018) 1, 12.

<sup>18</sup> Florian Möslin, 'Conflicts of Laws and Codes Defining the Boundaries of Digital Jurisdictions' in Philipp Hacker, Ioannis Lianos, Georgios Dimitropoulos and Stefan Eich (eds), *Regulating Blockchain: Techno-Social and Legal Challenges* (OUP 2019) 275, 279.

<sup>19</sup> Abhishek Krishnan and Rakshitha, 'E-Contract' in Sairam Bhat (ed), *Law of Business Contracts* (Sage 2009) 214.

Technology Act, 2000, is the legislation responsible for providing legal recognition to transactions carried out through electronic means. Significantly, the passage of this act has not affected the laws of contract; instead, it has provisions facilitating e-contracts<sup>20</sup>. The Act provides validity for electronic transactions.

### 3.1.1 Agreement and the Code- Law Interface

Under Section 2(h) of the Indian Contract Act, 1872, a contract is an agreement that is enforceable by law. When one of the parties to the contract 'offers' or proposes something and the other party 'accepts' the offer, an agreement is formed. Section 10 of the Indian Contract Act, 1872, elucidates upon agreements that can form contracts.

When we think about smart contracts, the agreements involved in them are not formal in some sense. However, in traditional contracts, the impact of the agreement's formality has been considered. For instance, in *Shankarlal Narayandas Mundade v. The New Mofussil Co. Ltd.* (AIR 1946 PC 97), it was held that, unless an inference can be drawn from the facts that the parties intended to be bound only when a formal agreement had been executed, the validity of the agreement would not be affected by its lack of formality. Similarly, in the English case *Brogden v. Metropolitan Railway Company* (1877), the House of Lords held that performing the clauses of a draft contract without formal objections was enough to signify acceptance by conduct, forming a binding contract even without a formally executed document. The importance given by the courts to the situation in a particular case is relevant to the present discussion. Consider, for instance, a smart contract based on a permissionless DLT system like that of Ethereum. On Ethereum, anyone without access to any formal financial service, e.g., a bank, can lend or borrow<sup>21</sup>. In this case, it is a matter of fact that shall decide the validity of the smart contract in the legal sense.

### 3.1.2 Algorithmic Consensus as Offer and Acceptance

An offer becomes an agreement when accepted. For blockchain-based smart contracts to constitute agreements, it is relevant to determine what constitutes an 'offer' and 'acceptance'. The Indian Contract Act, 1872, uses the term 'proposal' for offer and defines it in Section 2(a)

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<sup>20</sup> Ibid

<sup>21</sup> Vitalik Buterin, *Ethereum: A Next-Generation Smart Contract and Decentralised Application Platform* (White Paper, 2013) <https://ethereum.org/en/whitepaper/> accessed 30 October 2025.

as follows: 'when one person signifies to another his willingness to do or abstain from doing anything, with a view to obtaining the assent of that other to such act or abstinence, he is said to make a proposal'. Section 2 (b) of the act further points out that when the person to whom a proposal is made signifies his assent, the proposal is said to be accepted; and, a proposal, when accepted, is a promise. In Section 2(c) of the Act, the person making the proposal is called 'a promisor', and the person accepting the proposal is 'a promisee'. The essential requirements to be fulfilled for an offer to be valid under Indian law, as discussed by the Indian Supreme Court in *Trimex International Fze Limited, Dubai v. Vedanta Aluminium Ltd*<sup>22</sup> which is also applicable to smart contracts. This includes the consensus Ad Idem or meeting of minds, Essential Terms to be properly defined, Clear & Unequivocal Acceptance, Intent to create Legal Relations and Completed communication. The case is also marked as a landmark judgment where the Supreme Court held that electronic communications can form binding Contracts, upholding the principle of technological neutrality.

A classic and widely used example of a smart contract illustrating offer and acceptance is an automated vending machine or a simple escrow arrangement for an online sale. A buyer wants to purchase a digital asset (e.g., an e-book) from a seller. The "Offer" is constituted when the seller deploys the smart contract code to the blockchain with predefined terms and conditions. The coded conditions will include the price and the item will be linked by a secured hash function. The buyer's funds will be held securely by the contract until the buyer confirms receipt. The funds are only released to the seller once the buyer triggers the "confirm receipt" function. The "Acceptance" occurs when the buyer interacts with the smart contract and fulfils the conditions specified in the offer. The buyer sends the price to the smart contract address, and this act executes the part of the code that moves the funds into escrow. Thus, we can say that smart contracts constitute offer and acceptance terms under the Contract Act.

### **3.1.3. Capacity and Digital Identity Verification in Blockchain Ecosystems.**

The reality that smart contracts are becoming a part of commercial dealings opens up an inherent problem that is not unique to traditional contract law: the technological incompatibility of blockchain architectures to verify the legal capability of contracting officials. A minor, a person acting under the influence of substance abuse, or a natural person explicitly excluded by the contracting law to conclude contracts may at will form a blockchain wallet and

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<sup>22</sup> *Trimex International FZE Ltd v Vedanta Aluminium Ltd* (2010) 3 SCC 1 (SC)

participate in smart contract transactions without any technological protection against such activity<sup>23</sup>. The code contained in the smart contract, by definition, can never conduct any cognitive evaluation of the legal standing of the counterparty. The issue of digital identity verification in smart contract ecosystems is one of the most urgent unresolved questions, as the Law Commission of England and Wales has pointed out in their detailed 2021 analysis of the problem<sup>24</sup>. According to the Indian contract law, which was enacted in *Mohori Bibee v. Dharmodas Ghose* (1903), contracts concluded by minors are void ab initio. That is not at all capable of ratification even when they become of age<sup>25</sup>. Used mechanically with blockchain-related operations, this concept would make all smart contracts caused by an incapacitated individual completely null and void, and not subject to legal proceedings. But this high-flying application produces extremely stern practical inequities<sup>26</sup>. Young people use online learning materials, create email accounts, use online payment systems, and use online asset management applications, all of which involve contractual implications<sup>27</sup>. The declaration of all such contracts as void ab initio would mean to deprive an entire generation of access to the necessary digital infrastructure and services, which would be inconsistent with the emerging jurisprudential understanding of the fact that minors can have enough capacity to engage in age-related digital transactions. The case of *Internet and Mobile Association of India Vs Reserve Bank of India* (2020), The Indian Supreme Court, indicated a move toward acknowledging a subtle digital transactions made by underage with special emphasis on the situation when such a transaction can be used by a legitimate developmental or educational rationale<sup>28</sup>. The potential mechanism of assigning digital identity and origination attribution in blockchain systems is established in Section 11 of the Information Technology Act, 2000<sup>29</sup>. It is provided in such a manner that the electronic record can be attributed to an originator (under Section 2(1)(za), the originator is the person sending, generating, storing or transmitting an electronic message by an information system programmed to be automatically operated by the originator) when an electronic record is sent using an information system that is programmed

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<sup>23</sup>Law Commission, *Smart Contracts: Call for Evidence and Advice to Government* (2021) <https://www.lawcom.gov.uk/project/smart-contracts/> accessed 21 October 2025.

<sup>24</sup> *Ibid*

<sup>25</sup> Pollock and Mulla, *The Indian Contract Act, 1872* (15th edn, LexisNexis 2018) 127.

<sup>26</sup> S Swaminathan and R Surana, 'Minors' Contracts: A Major Problem with the Indian Contract Act, 1872' (2018) 20 *Statute Law Review* 115, 120.

<sup>27</sup> S D Levi and A B Lipton, 'An Introduction to Smart Contracts and Their Potential and Inherent Limitations' (2018) *Harvard Law School Forum on Corporate Governance* <https://corpgov.law.harvard.edu/> accessed 5 December 2025.

<sup>28</sup> *Internet and Mobile Association of India v Reserve Bank of India* (2020) SCC OnLine SC 275, [72]

<sup>29</sup> Information Technology Act 2000, s 11

to be automatically operated by the originator.

### 3.1.4. PERFORMANCE, AUTOMATION, AND REMEDIAL MECHANISMS.

Moving Beyond Immutability, automation is the necessary feature that makes smart contracts stand out compared to regular electronic contracts<sup>30</sup>. It is this same attribute, however, that produces deep complications in remedial structures inherent in the traditional contract law. The Act of Indian Contracts of 1872 provides a full remedial framework: specific performance, injunction, damages (including liquidated damages), rescission and restitution<sup>31</sup>. Nevertheless, the principle of immutability of blockchain, that is, once a transaction has been registered into a distributed registry, it becomes impossible to modify or reverse it, does not seem to be consistent at all with the solutions that involve reversal or amendment of a contract.

A critical failure mode is created in which smart contracts follow literal code compliance and at the same time engage legal violation. Even in the case that goods later arrive damaged, a smart contract of the supply chain which starts payment release based on the electronic delivery of the shipment will send the payment<sup>32</sup>. The condition (shipment confirmation) was met, payment was thus transferred. However, legally these amounts to the performance of the obligation of the buyer and failure of the seller- the seller did not discharge the goods in the condition it was supposed to. The legal fault was concealed by the automation<sup>33</sup>. This observation can be seen as an extension of a more fundamental architectural issue, namely that smart contracts can only access the information on the blockchain or oracle mechanisms available to them<sup>34</sup>.

### The Frustration Doctrine in the Automated environments.

The Indian Contract Act under Section 56 states that contracts are not valid in cases where the performance is impossible, as a result of the occurrence of incidents beyond the control of the

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<sup>30</sup> Amy J Schmitz and Colin Rule, 'Online Dispute Resolution for Smart Contracts' (2019) *Journal of Dispute Resolution* 103, 110.

<sup>31</sup> Pollock and Mulla, *The Indian Contract Act, 1872* (15th edn, LexisNexis 2018) 163.

<sup>32</sup> Fabio Bassan and Michele Rabitti, 'Legal Certainty and Technological Flexibility in Web3 Smart Contracts' (2024) 55 *Computer Law and Security Review* 106035.

<sup>33</sup> E Tjong Tjin Tai, 'Force Majeure and Excuses in Smart Contracts' (2018) 26(6) *European Review of Private Law* 787, 795.

<sup>34</sup> Lin William Cong and Zhiguo He, 'Blockchain Disruption and Smart Contracts' (2019) 32(5) *Review of Financial Studies* 1754, 1768

parties<sup>35</sup>. What does this doctrine mean in the case of smart contracts? Suppose that a smart contract in commodity futures trading cannot be executed because of the banning of the underlying commodity by the government, a cyberattack, the bankruptcy of the services providers of Oracle which does away with price feed mechanisms etc. The automated execution of the contract cannot be stopped in such cases by the use of the conventional remedial measures (judicial discharge). The blockchain network will persist in an attempt to execute the code of contract<sup>36</sup>. Parties, however, can code smart contracts with explicit force majeure clauses, so-called coded conditions that will cause the suspension or termination of the contract when extraordinary events are identified. The frustration doctrine is usually applied by courts to the unexpected cases<sup>37</sup>. Contract designers that use smart contracts have to explicitly list the foreseeable force majeure; situations that are not anticipated in the parameters of the code cannot activate automated discharge frustration.

### 3.2 Regulatory Guidelines (RBI, SEBI, MeitY) – Updated Framework

Besides the Contract Act and the IT Act of 2000, three institutional actors, namely the reserve bank of India (RBI) balancing between monetary stability and the creation of CBDC, the securities and Exchange Board of India (SEBI), which has operational mandates in capital markets, and the ministry of electronics and information technology (MeitY), which positions blockchain in the overall national strategy of developing a digital infrastructure, shape and regulate the development of blockchain and smart contracts. They have provided transparency of cryptocurrency as legal property, formalised industry-specific regulatory levels, formalised smart contracts in management of land, and harmonisation with the emerging fiscal treatment of virtual digital assets (VDAs).

#### A. The RBI's Structured Framework: From Caution to Calibrated Engagement

In 2022, the RBI released its CBDC concept note<sup>38</sup> with design requirements of the e-Rupee that recognized efficiency benefits of settlement and technical limitations on scaling public DLTs to large volumes of retail payments. The RBI Crypto Framework 2025 has however been

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<sup>35</sup> Indian Contract Act 1872, s 56

<sup>36</sup> Alexander Savelyev, 'Contract Law 2.0: "Smart" Contracts as the Beginning of the End of Classic Contract Law' (2017) 26(2) *Information and Communications Technology Law* 116, 122.

<sup>37</sup> *State of Karnataka v Shree Rameshwara Rice Mills* AIR 1987 SC 1359, 1363.

<sup>38</sup> Nalin Priyaranjan, Mohua Roy and Sarat Dha, 'Distributed Ledger Technology, Blockchain and Central Banks' *RBI Bulletin* (February 2020) [https://rbi.org.in/Scripts/BS\\_ViewBulletin.aspx?Id=18702](https://rbi.org.in/Scripts/BS_ViewBulletin.aspx?Id=18702) accessed 28 January 2026.

a clean cut departure to its 2018 circular which had effectively banned banks to conduct business with them in cryptocurrency<sup>39</sup>.

## **B. SEBI's Shift to Operational Deployment**

SEBI has left the exploratory stage of consultation to operational implementation of permissioned DLT of capital-markets infrastructure. On March 29, 2022, a released SEBI Circular<sup>40</sup>, required depositories to implement permissioned DLT systems of security creation, asset cover and covenant monitoring in listed debt markets. The circular concentrates on access control, audit records, cryptographic verification, and mapping of explicit operational responsibility, and it is evident that even though smart contracts can execute transactional logic, the human custodians could be accountable to ensure that they validate legal compliance. The framework of SEBI validates that permissioned DLT is most suited in cases where the decentralized regulation and protection of investors are consistent, and consumer-facing smart contracts will require more detailed legal scaffolding.

## **C. National Strategy of MeitY and the Blockchain-for-Land Initiative.**

The recommendations of the national strategy on blockchain (January 2021) published by MeitY suggested that national blockchain frameworks needed to focus on common infrastructure and regulatory sandboxes, and building R&D capability as opposed to hard rules, making it consistent with public-sector with privacy, regulation, and legal enforceability<sup>41</sup>. This plan gained operation momentum when the Supreme Court of India in November 2025, in a landmark declaration, indicated the inefficiency of Indian colonial era property registration system and made a direct directive to the Law Commission to look into the aspect of blockchain technology to register land systems in India<sup>42</sup>. The Court observed that even under the legacy

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<sup>39</sup> Reserve Bank of India, *Prohibition on Dealing in Virtual Currencies* (Notification, 6 April 2018)

<sup>40</sup> Securities and Exchange Board of India, *Operational Guidelines for Security and Covenant Monitoring using Distributed Ledger Technology (DLT)* (Circular No SEBI/HO/MIRSD/MIRSD\_CRADT/CIR/P/2022/38, 29 March 2022) [https://www.sebi.gov.in/legal/circulars/mar-2022/operational-guidelines-for-security-and-covenant-monitoring-using-distributed-ledger-technology-dlt-\\_56818.html](https://www.sebi.gov.in/legal/circulars/mar-2022/operational-guidelines-for-security-and-covenant-monitoring-using-distributed-ledger-technology-dlt-_56818.html) accessed 21 December 2025;

<sup>41</sup> Ministry of Electronics and Information Technology, *National Strategy on Blockchain* (Government of India, January 2021) [https://www.meity.gov.in/writereaddata/files/National\\_Strategy\\_on\\_Blockchain.pdf](https://www.meity.gov.in/writereaddata/files/National_Strategy_on_Blockchain.pdf) accessed 21 December 2025.

<sup>42</sup> 'Property Purchase Traumatic: Supreme Court Suggests Use of Blockchain Technology to Make Land Registrations Easy and Reliable' *LiveLaw* (6 November 2025) <https://www.livelaw.in/top-stories/property-purchase-traumatic-supreme-court-suggests-use-of-blockchain-technology-to-make-land-registrations-easy-reliable> accessed 21 December 2025.

systems, where alterations to documents, title disputes, and inefficiencies are common in property purchases, the process remains traumatising<sup>43</sup>.

#### **D. The Madras High Court's Recognition of Cryptocurrency as Property**

In October 2025, the Madras High Court, in *Rhuthikumari v. Zanmai Labs Pvt Ltd*<sup>44</sup> stated that cryptocurrencies should be classified as a property according to the Indian legal framework and that users of a cryptocurrency acquire identifiable proprietary rights to it. The rationale of the Court that digital assets are protectable legal interests that can be governed by custodians simply justifies the logic of smart-contract-driven settlements: once property becomes property, automated settlements of ownership transfers under blockchain-encoded sets of rules are legally valid under the Indian Contract Act<sup>45</sup>. The decision also made clear that Indian courts have the power through Section 9 of the Arbitration and Conciliation Act to issue interim relief upholding the rights of crypto-assets.

#### **E. Fiscal and Fiduciary Integration**

The fact that the Finance Ministry treats VDAs under Section 2(47A) of the Income Tax Act of 1961, which levies a flat tax of 30 per cent on gains, means that digital assets have a well-defined fiscal position as defined by the governmental tax framework<sup>46</sup>. This kind of transparency facilitates organisations to incorporate smart contracts into VDA management in integrated tax and treasury systems.

### **4. COMPARATIVE ANALYSIS: INTERNATIONAL PRACTICES**

Regulation of blockchain and smart contracts has been treated differently in various jurisdictions, however, a variety of consistent models have been developed that can provide valuable insights to India. These frameworks include full legislative frameworks, supervision by hybrid federal-state, innovation sandboxes, and systematic legal legitimacy of smart contracts.

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<sup>43</sup> Ibid.

<sup>44</sup> *Rhuthikumari v Zanmai Labs Pvt Ltd* (Madras High Court, OA No 194 of 2025, 25 October 2025); 'Cryptocurrency as Property: Business and Legal Implications of the Madras High Court Ruling' (AM Legals, 27 November 2025) <https://amlegals.com/cryptocurrency-as-property-business-legal-implications-of-the-madras-high-court-ruling/> accessed 21 December 2025.

<sup>45</sup> *ibid*; Indian Contract Act 1872, s 10.

<sup>46</sup> Income Tax Act, 1961, § 2(47A); Ministry of Finance, Tax Treatment of Virtual Digital Assets (2023).

#### 4.1. European Union

The European Union has established itself as a regulator as well as promoter of smart contracts by way of making some pertinent legislation and regulations on this topic.

The EU Data Act, enacted in early 2024, is one of the primary source of legislation that validate over smart contracts. The Act defines Smart Contracts in Article 2 (39) “means a computer program used for the automated execution of an agreement or part thereof, using a sequence of electronic data records and ensuring their integrity and the accuracy of their chronological ordering”<sup>47</sup>. The act regulates smart contracts for the first time in EU. The Act provides for a technology-neutral stand in case of smart contract by allowing any technology that complies with the requirements of the Data Act, and that could be used for the automatic execution of a data sharing agreement to be construed within the concept of a smart contract. The act also clearly mentions that the use of smart contracts shall not disregard the provisions of civil and criminal laws in the member states<sup>48</sup>. For example, Chapter 4 of the act establishes rules for unfair contractual terms, prohibiting unfair terms in data contracts and establishes rules for general conditions of use for data-related contracts. The act encourages the use of smart contracts as a mode of technical protection measure and also clearly mentions the essential requirements regarding smart contracts for executing data sharing agreements<sup>49</sup>. The entire Article 34 covers the use of smart contracts in data sharing agreements. Article 36 of the Data Act provides for the essentials of smart contracts which include, principles like Robustness and access control, safe termination and interruption, Data archiving and continuity, and Consistency<sup>50</sup>.

Other than the Data Act, a single, horizontal regime has been put in place in the European Union by the Markets in Crypto-Assets Regulation (MiCA), which became effective in June 2023. MiCA sets a framework for the licensing of crypto-asset service providers (CASPs) throughout the EU. Legal certainty in MiCA allows services based on smart contracts (e.g. decentralised finance platforms or token issues) to be performed in harmonised rules across 27

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<sup>47</sup> Regulation (EU) 2023/2854 of the European Parliament and of the Council of 13 December 2023 on harmonised rules on fair access to and use of data (Data Act) art 2(39)

<sup>48</sup> Regulation (EU) 2023/2854 of the European Parliament and of the Council of 13 December 2023 on harmonised rules on fair access to and use of data (Data Act) recital 104.

<sup>49</sup> Regulation (EU) 2023/2854 of the European Parliament and of the Council of 13 December 2023 on harmonised rules on fair access to and use of data (Data Act) 34.

<sup>50</sup> Regulation (EU) 2023/2854 of the European Parliament and of the Council of 13 December 2023 on harmonised rules on fair access to and use of data (Data Act) 36

Member States, rather than in heterogeneous national directions. Moreover, European Securities and Markets Authority (ESMA) is empowered to supervise important CASPs, avoiding the differentiation and cross-border oversight<sup>51</sup>. MiCA is not technology-specific and is not an attempt to author the code of smart contracts as such, but rather their economic and consumer-related actions, a design choice that encourages innovation and minimises systemic risk.

## 4.2 United States

The United States adopts a fractured approach.

The state of Arizona, in its amendment to the Electronic Transactions Act, added a new article 5, which recognises aspects of blockchain technology and smart contracts. The Act specifically recognises that “a contract relating to a transaction may not be denied legal effect, validity or enforceability solely because that contract contains a smart contract term.” S44-7061(c)<sup>52</sup>.

Wyoming, the first US state to pass legislation allowing Decentralised Autonomous Bodies to register as a limited liability company, permits the management of such organisations through smart contracts. DAOs are blockchain-based based leaderless entities, where decisions and finances are determined through community consensus<sup>53</sup>. They work without hierarchical structures and promote democratic decision-making.

Smart Contracts play an integral role in the working of DOAs under the DOA Act. The act defines smart Contracts in Chapter 31 Article 1(a)(ix) as, an automated transaction, as defined in W.S. 40-21-102(a)(ii), or any substantially similar analogue, which is comprised of code, script or programming language that executes the terms of an agreement and which may include taking custody of and transferring an asset, administrating membership interest votes with respect to a decentralized autonomous organization or issuing executable instructions for these actions, based on the occurrence or non-occurrence of specified conditions<sup>54</sup>. The legislation is clear in acknowledging that smart contracts are the devices capable of

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<sup>51</sup> Dirk A Zetsche, Ross P Buckley and Douglas W Arner, ‘Regulating LIBRA: The Transformative Potential of Global Stablecoins’ (2023) 15 *European Banking and Financial Law Review* 5, 12.

<sup>52</sup> Arizona House Bill 2417, amending Arizona Revised Statutes S 44-7003 and Title 44, Chapter 26 by adding Article 5, relating to electronic transactions (2021).

<sup>53</sup> ‘What Is a DAO and How Does It Work?’ *Digital Skills and Jobs Platform (EU)* <https://digital-skills-jobs.europa.eu/en/opportunities/learning-content/what-dao-how-does-it-work> accessed 2 January 2026.

<sup>54</sup> Wyoming Senate File No 0038, Enrolled Act No 73, 66th Legislature (2021)

automatically executing the provisions of contracts, vote in membership, administer electronic resources and engage in actions under pre-defined conditions. In the case of algorithmically controlled DAOs, smart contracts represent, in other words, the management that replaces human managers with self-governing code controlling all aspects of voting processes to distribution and dissolution requirements. Altogether, smart contracts bring the automation, transparency, and enforceability that enable the functioning of a DAO without the conventional and centralized management.

Apart from the two states, legislations and amendments from states like Arizona<sup>55</sup>, Arkansas<sup>56</sup>, Tennessee<sup>57</sup>, Kentucky has defined a smart contract for promoting and regulating the usage and disputes arising from smart contracts.

Instead, the regulation is driven by the overlap of jurisdiction: the Securities and Exchange Commission (SEC) considers certain token issuances as the sky of the Securities Act of 1933 and Securities Exchange Act of 1934<sup>58</sup>, as the investment contracts, but the Commodity Futures Trading Commission (CFTC) regulates the derivatives of the digital assets and spot-market programs<sup>59</sup>. Regimes at the state level, such as the New York BitLicense, require a licensing and cybersecurity policy for virtual assets businesses. This case-by-case approach is legally unclear, but federal authorities have internalised the interpretive guidance and enforcement precedents that indirectly affect smart-contract activity.

### 4.3 Singapore

Singapore is a blend of clear legislative underpinnings and a sandbox-like environment for innovation encouragement. The Monetary Authority of Singapore (MAS) oversees digital token business via the Payment Services Act 2019<sup>60</sup>, that mandates a license and AML/CFT requirement and technology-risk requirement.

Another regulatory sandbox available through MAS is through which blockchain-based financial services can temporarily be run under reduced requirements to pilot their viability<sup>61</sup>.

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<sup>55</sup> Arizona Revised Statutes S 44-7061 (2024).

<sup>56</sup> Arkansas Code S 25-32-122 (2024).

<sup>57</sup> Tennessee Code S 47-10-201 (2024)

<sup>58</sup> Securities Act of 1933, 15 USC S 77a–77aa.

<sup>59</sup> Commodity Exchange Act, 7 USC S 1–27f.

<sup>60</sup> Payment Services Act 2019 (Singapore).

<sup>61</sup> Monetary Authority of Singapore, *FinTech Regulatory Sandbox Guidelines* (November 2016) accessed 3 January 2026.

The maker of MAS has been providing exhaustive principles on the legality of smart contracts suggesting that contract law principles apply irrespective of form and, therefore, ensure technological impartiality. This relative stability of the law, freedom in sandboxes, and direction has been praised in comparative law as an ideal practice in emerging economies<sup>62</sup>. The MAS affirmed that "contract law principles apply regardless of whether agreements are expressed in natural language or code."<sup>63</sup> This technological neutrality provides legal certainty without prescribing specific technical implementations.

The Payment Services Act classifies payment services into groups depending on the level of transactions. Providers of digital payment tokens services should receive relevant licenses that indicate that they meet minimum capital requirements (SGD 250,000), asset segregation procedures, cybersecurity, and anti-money laundering procedures. The regulatory sandbox system in Singapore allows companies to pilot blockchain-based financial services on light conditions over short periods so that regulators can see how it works in practice and then make permanent regulations.

#### 4.4 United Arab Emirates

The UAE has been at the forefront for adopting and regulating technological developments. Crypto regulations and acceptance of smart contract-based transactions are many of such practices.

In the UAE, smart contracts do not have a specific, special statute to regulate them, but a system of the UAE Civil Transactions Law, electronic transactions laws, financial free zone laws, data-protection legislation, and virtual assets legislation controls their evolution. Federal law normally considers smart contracts as a form of electronic contract: in case the traditional elements of offer, acceptance, capacity, and legality as well as legitimacy are fulfilled, consent can be effectively expressed through electronic methods including cryptographic keys, and electronic records and signatures are accepted as evidence of formation and performance. The UAE rules of the cross-border blockchain dealings can be seen as central to the expression of choice of law by the parties, with fallback links (common domicile or place of conclusion) posing practical challenges of decentralized systems and hence promoting the use of so-called

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<sup>62</sup> Philipp Paech, 'The Governance of Blockchain Financial Networks' (2017) 80 *Modern Law Review* 1073, 1081.

<sup>63</sup> Monetary Authority of Singapore, *Smart Contracts and Blockchain Technology: Technology Neutrality Guidance* (2021).

hybrid solutions that may involve a combination of a code with a natural-language contract and arbitration clauses.

In the same vein, the United Arab Emirates has utilised specific virtual asset regimes. Dubai Virtual Assets Regulatory Authority (VARA) regulates and licenses virtual asset service providers under the Dubai Virtual Assets Law 2022<sup>64</sup>, whereas Abu Dhabi Global Market (ADGM) has a well-developed framework of regulations, which legally recognizes smart contracts, implements them under the common law principles, and presents the standard of governance and operational risk standards<sup>65</sup>. The UAE's strategy stands out in that it has formally incorporated the recognition of smart contracts into its regulation of financial free zones. The laws of digital assets in DIFC are offering a framework of the law over digital asset transactions and other electronic transactions. This is a proactive nature of the law that is providing a favourable environment to use smart contracts. Under the DIFC and ADGM, which are common-law fashion jurisdictions officially acknowledge the enforceability of smart contracts by analogue to English law supported by custom e-transactions, data protection, and fintech regulations.

#### 4.5 United Kingdom

Another helpful example is the United Kingdom. The Ministry of Justice of the UK and Wales realised growing usage of smart contract transactions and asked the Law Commission of the UK to undertake a study on the conformity of smart contracts within the current legislation. The Law Commission of England and Wales published a seminal 2021 report confirming that smart contracts can be valid, enforceable contracts under current English law principles<sup>66</sup>.

It is accepted that smart legal contracts can be counted as binding provided that they satisfy the requirements of the traditional contract law, including offer, acceptance, intention to establish legal relations, and certainty of the terms. According to the Law Commission and the UK Jurisdiction Taskforce, smart contracts can satisfy these requirements, whether coded or hybrid (part natural language, part code), and can comprise a binding legal obligation. Although generally adhering to it, the law may require specific modifications to address the areas of

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<sup>64</sup> Dubai Virtual Assets Law, Law No 4 of 2022 (UAE)

<sup>65</sup> Abu Dhabi Global Market, *Guidance: Regulation of Crypto Asset Activities in ADGM* (2020) accessed 3 January 2026.

<sup>66</sup> Law Commission of England and Wales, *Smart Legal Contracts: Advice to Government* (25 November 2021) <https://www.lawcom.gov.uk/project/smart-contracts/> accessed 4 January 2026.

international law unique to a particular country, including the identification of applicable law in the execution of cross-border codes. The Law Commission suggests that further consideration of the Rome I Regulation (retained EU law) should be made to cover the jurisdiction over digital assets. Later directions on crypto-assets (2023) based on this model recommend a statutory description of proprietary rights in crypto-tokens without creating a separate category of assets.

The UK regulators have chosen to use guided innovation and sandboxes (such as the Financial Conduct Authority sandbox) instead of general legislation because it will allow the legal system to evolve gradually through judicial interpretation and soft law instruments. According to the scholars, this allows flexibility without technological neutrality and market integrity. The legislative decision to make is resolvable. This is the case that suggests a hybrid and incremental framework<sup>67</sup>.

## **5. RESOLVING THE LEGISLATIVE CHOICE: THE CASE FOR A HYBRID, INCREMENTAL FRAMEWORK**

### **5.1 The Central Debate**

India has a policy dilemma to make: can it pass a single generalist piece of legislation, the Smart Contracts Act, or can it achieve gradual legal adaptation by targeting specific legal frameworks via amendments and regulation? The current paper will settle this dispute by arguing that a hybrid, principle-driven, and incremental approach must be adopted to conform to UNCITRAL standards, as opposed to a statute.

### **5.2 Why Not a Single Comprehensive Statute?**

There could be arguments that standardised laws would bring about a sense of clarity, remove fragmentation, and standardisation of technical demands. Nevertheless, there are serious disadvantages of this method: To begin with, technological obsolescence: Smart contracts and blockchain platforms are developing fast. A prescriptive statute as it is written today has a chance of being outdated in 2-3 years and needs to be amended daily. Principle-based structures are more persistent. Another aspect is the heterogeneity of sectors: Smart contracts in the

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<sup>67</sup> Sarah Green, 'Digital Assets and English Law: The Law Commission's Proposals' (2023) 19 *Journal of International Banking and Financial Law* 241, 245.

supply chain are not similar to smart contracts in capital markets or government services. General one-size-fits-all rules are either likely to excessively regulate sectors with low risk or insufficiently protect systemically important sectors. Sectoral regulators are in a better position to develop proportional rules. Global fragmentation is another concept that vouch for this hybrid approach. International coordination of even a comprehensive national statute (EU Data Act, MiCA) is necessary. An inflexible Indian law that would not be consistent with UNCITRAL and would not have mutual acceptance by the partners in trade would pose risks of imposing compliance costs with no gain. Gradual compliance with the new international norms is more effective. Sufficiency in common law could be another indicator: The UK Law Commission (2021) and Singapore, in its Monetary Authority, have shown that the current principles of contract law in place (used in a flexible manner) can be successfully applied to resolve smart contracts disputes without specific laws. Finally, the implementation risk: The rushed legislation may entangle incorrect assumptions (e.g., having code immutability and legal finality confused) or leave holes. Gradualism is seen as being in a comparative analysis of Britain and Singapore as having been more successful in preserving market integrity as well as technical progress than aggressive statutory innovation.

### **5.3 Why Incremental Adaptation Works Better**

To corroborate the argument of an incremental hybrid approach, certain advantages can be pointed out. Flexibility and learning can be considered the key advantages. Sandboxes and pilots allow regulators and courts to observe real transactions, identify problems, and craft evidence-based interventions rather than speculative rules. Another aspect is the Stakeholder alignment. Incremental processes with built-in consultation accommodate diverse interests (judges, regulators, industry, consumers, technologists) more effectively than top-down statute-drafting. International coherence: By anchoring Indian reforms to UNCITRAL principles (technological neutrality, party autonomy, dispute resolution), India gains access to global best practices and facilitates cross-border transactions without bilateral agreements. Another advantage is Proportionality: Targeted amendments to pain points (e.g., clarifying digital identity under IT Act Sec 11; adding blockchain-record admissibility to Evidence Act Sec 65; recognising coded force majeure in Indian Contract Act) avoid over-regulation while addressing genuine gaps. Finally, Political feasibility can also be considered a factor: A focused, phased roadmap delivers faster wins and builds political capital, avoiding the 5–10 years of legislative battles that are typical for comprehensive codes.

## RECOMMENDATIONS

In **Indian Contract Act 1872**, make a clarity on automated or algorithmic processes (including smart contracts) constitute valid offer and acceptance if: (a) essential terms are unambiguous and verifiable; (b) parties have manifested consent through cryptographic signature or authenticated electronic means; and (c) all requirements of contract formation (Sections 10–14) are satisfied. This directly addresses formation ambiguity (Section 5).

In the **IT Act 2000**, make clarity to blockchain attribution under section 11 of the IT Act of 2000: transactions initiated from a private key are presumed to originate from the key holder unless unauthorised access or key compromise is demonstrated through credible evidence. For consumer-facing contracts, mandatory KYC is required above specified thresholds. This addresses capacity and digital identity challenges (Section 5)

**In Indian Evidence Act 1872** – Blockchains shall be records as a primary evidence if authenticated through cryptographic verification by three independent nodes or accredited custodians. Smart-contract code is admissible to establish contractual terms, code malfunction, or deviation between intended and actual performance. Expert testimony on blockchain forensics is permitted. This addresses evidentiary standards (Section 5) and enables courts to adjudicate performance-in-code vs performance-in-law conflicts.

**Other Regulatory Coordination**, like - RBI Framework: Issue guidance on custodial services (segregation, audit standards), settlement finality (upon multi-signature confirmation and distributed recording), and oracle liability (insurance, circuit breakers, shared liability with deployers). SEBI Framework: Issue guidance on tokenised securities (retention of rights, unique identifiers), smart-contract deployment for automated dividends/margin calls (subject to SEBI-approved data sources), and custodian fiduciary duties. MeitY Framework: Operationalise the Supreme Court's November 2025 directive on blockchain land registration; pilot smart contracts for end-to-end property registration with identity verification, tax compliance, and automated ownership transfer.

And the final recommendation is to establish a "**Distributed Ledger Dispute Tribunals**" at the district level with jurisdiction over smart-contract disputes over a certain threshold.

## CONCLUSION

Smart contracts mark a revolutionary change in the conduct of commercial deals, which guarantees efficiency, transparency, and less dependence on intermediaries. Nevertheless, their stipulation in India is marked with major challenges owing to the inability to write a detailed legal framework. This paper opened with a central question: How should India design its legal and regulatory framework for blockchain-based smart contracts in commercial transactions—through a single comprehensive statute or through incremental, principle-based adaptation of existing legal frameworks? The response to this question is inarguable: India must adopt a hybrid and incremental, standards-based strategy instead of adopting a single-purpose, monolithic, Smart Contracts Act. This conclusion is based on four pillars. The existing dependency on the Indian Contract Act and IT Act provides a partial solution and inability to fix the specific features of automated and decentralised contracts. The practice of other countries can demonstrate that India needs to take a hybrid approach by promoting innovation based on regulatory sandboxes and industry-driven standards but progressively providing a legislative clarity. A slower transition of the more gradual processes, e.g., making automated contracts legitimate, assigning digital identity, and advancing consumer protection, should lead to a more inclusive statutory framework alongside international standards, e.g., the UNCITRAL Model Principles. It is a middle ground that will not only accelerate the adoption at home, but will also make India a world leader in the blockchain and smart contracts ecosystem.