

Unlocking The Legal Potential of Smart Contract Technology

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Abstract- India is undergoing a revolutionary moment regarding both its constitution and its legislative jurisprudence. It would only be naive to ignore the technology advancement and digital revolution that have permeated the legal sector at this time of increasing transcendence. The highly regarded field of contract law would greatly demonstrate its importance in this regard. Blockchain is one of the numerous technological marvels and promising technology of the recent years. This is a kind of database and is different from others by storing information in numerous blocks and all these blocks are connected to each other and thus forming a chain. Smart contracts are also known as digital contracts that are executed automatically when predetermined terms and conditions are satisfied. Smart contracts consist of transactions that essentially store, replicate, and distributed in decentralized blockchains. They basically provide a platform where people contract with parties who may or may not know each other and may also become liable to risks. This article analyses blockchain technology and various platforms of blockchain technology for Smart contracts. This article also discusses the challenges of Smart contracts and how it is regulated across the globe. This article further elaborates the legality of smart contracts and its enforceability in India. Since Smart contracts are legal in India, they are now governed by various Acts that regulate contracts even if there is no specific regulatory body in India to regulate them.

Keywords- Smart Contracts, Blockchain, Atomic swaps, Regulation.

I. INTRODUCTION

Technology is rising and upending many industries, including the legal profession. By adapting them to changing circumstances, it also transformed conventional contracts. Self-help is not a novel concept. Innovators have been developing computer technologies that offer self-help to the world of contracts during the past few years. These new agreements are referred to as "Smart contracts." They want to make it possible for parties to contracts to ensure that their agreements are upheld by prohibitively high fees associated with any breaches. A Smart contract is a computer programme

made up of a set of rules that runs on the blockchain. The growth of blockchain technology over the past ten years indicates that it has a wide range of applications. The combination of blockchain technology and Smart contracts allows for a great deal of flexibility in the design, development, and implementation of various real-world issues with reduced time and cost requirements compared to traditional third-party based systems. Unlike traditional transactions, the entire process is carried out amongst peers (also known as 'peer to peer manner') without the involvement of third parties like banks. Smart contracts give the two parties involved the ability to enforce a secure transaction. The idea behind a Smart contract is that even though one party receives something valuable in exchange for providing collateral, only the second party is guaranteed to receive priority access to that collateral. Implementing this kind of functionality in the real world would be challenging because a number of additional variables would be involved, such as the contract being entered into by a third party or a foreign party. There are several significant obstacles that developers must surmount while creating Smart contracts: (1) There is currently no reliable method for ensuring the security of Smart contract code; (2) Development tools currently available are still very basic; (3) Programming languages and virtual machines continue to have a number of limitations; (4) Performance issues are challenging to manage in resource-constrained running environments; and (5) Online resources (including advanced/updated documents and community support) are still scarce. Under Indian law, Smart contracts may be enforceable, used regarding the entity the party contracting with, the party will be responsible for dealing with the fallout on the party's own because there is no elaborate structure in place to govern Smart contract but if caution is used regarding the entity the party are contracting with, the party will be responsible for dealing with the fallout on the party's own because there is no elaborate structure in place to govern Smart contract.

In the mid-1990s, Nick Szabo first used the term "Smart contract." In order to reduce the cost of contracting between parties to a transaction and to prevent unintentional exceptions or malicious activities during contract fulfilment, he suggested converting a contract's provisions into code and

embedding them into software or hardware to make them self-execute. Currently, the phrase "Smart contract" is utilised differently by persons in various fields. Some have defined a "Smart contract" as a legal agreement that can be represented in part (or entirely) by software. While others characterised "Smart contracts" as computer programmes that, when certain criteria are met, carry out certain activities; often, but not always, these programmes run on distributed ledgers (e.g., blockchains). A definition of a "Smart contract" that encompasses the range of the aforementioned concepts was proposed by Clack et al. A Smart contract was described as "an automatable and enforceable agreement." Computer-automatable, yet some processes might need human input and management enforceable either by the tamper-proof execution of computer code or the legal enforcement of rights and duties. With blockchain, it is possible to convert contractual terms and conditions into self-executing computer software that automatically upholds and regulates the terms and conditions between the parties. They have the ability to mimic and adhere to logical contractual provisions. They have the ability to mimic and adhere to logical contractual provisions. The terms and conditions of the buyer-seller agreement are written or inserted directly into the lines of code in these self-executing contracts. The terms of the Agreement are codified in a distributed, decentralised blockchain network.

The provisions of the contract in question make up the contract's code. The working of Smart contracts analyses, confirm, and carry out each transaction that complies with the terms. To comprehend how effective and efficient a Smart contract may be, let's take a look at an example of a rent contract that has been changed into one. The owner of the property will receive the tenant's cryptocurrency rent payment, and once the payment has been received, the code will execute the transactions in accordance with the contract's specified terms. The homeowner will get a receipt after the deal is done, and the key to the house will be handed over. Hundreds of blockchain participants will be able to see the transaction and the contract because the system is based on the If-Then concept. The homeowner will surely receive payment if he turns over the key. The tenant will undoubtedly receive the key if he pays the rent. It is impossible to carry out one action without carrying out the other, creating a system that is both effective and efficient. Like conventional contracts, Smart contracts define the guidelines and sanctions that apply to an agreement, but they also automatically carry out those duties. These contracts are created using the "Ethereum" platforms, which are made up of two components: currency and contracts. Smart contracts are agreements where the medium of interaction is changed from paper to an electronic platform. This prompts the question of whether Smart contracts can still be governed by current legal systems or if a new legal system

is required. The limitation of smart contracts has some significant difficulties in testing Smart contracts based on voting challenges: 1) It is challenging to take into account all potential outcomes 2) Virtual machines and compilers may have undiscovered faults 3) No established testing frameworks like other languages 4) Testing must be conducted in an asynchronous fashion. 5) Testing guidance that is not helpful 6) There is no method to assess the efficacy of the Smart contract test suite 7) If testing is done on testnets or the mainnet, gas consumption.

Areas of Smart Contracts

A blockchain is, in its most basic form, a series of data called blocks that are connected and safeguarded by encryption. Each block is identified by a time stamp, some transactional information, and the previous block's hash value. Each block on a blockchain can be compared to a transaction record in a public ledger. The blockchain is not kept in a single place, but rather on a network of nodes, with a copy of the blockchain kept on each node. This makes it incredibly difficult for a node to change any data in the blockchain because all the records are public and readily verifiable to all network nodes. It is very challenging to change a block's transactions after it has been added to the blockchain without obtaining consensus from all nodes. These functions are all built within the peer-to-peer consensus protocol. Without the involvement of a third party, the blockchain technology enables secure transactions between two untrusted parties. Blockchain is therefore suited for record-keeping duties including the storage of ownership rights to musical works and other types of transactions. Blockchain-based cryptocurrencies have garnered a lot of attention recently. Smart contracts are a new application of blockchain technology.

Blockchains can be categorised as either public or non-public. While non-public blockchain platforms only let authorised users to join, public blockchain platforms allow any user to join the network. Ethereum and NEO are examples of public blockchains. Fabric and Quorum are two non-public blockchain examples. Different blockchain platforms offer varying levels of Smart contract capabilities. While some systems, like Ethereum, provide considerably more sophisticated programming languages for generating Smart contracts, others, like Bitcoin, may simply permit users to utilise a simple scripting language to develop Smart contracts with basic logic. The position of smart contracts prior to blockchain technology was the program automatically begins executing the contract, functioning as a third party akin to an escrow agency, as soon as it ascertains that both the parties have satisfied the necessary requirements. The absence of necessary technology hindered the broad use of smart

contracts. After it was created, blockchain simplified the application of smart contracts by acting as its technical foundation and offering accuracy and security. This method extends the smart contract implementation across a network of nodes. This more advanced execution is autonomous and independent, meaning it doesn't rely on anybody else to function. As a result, contracts created with blockchain technology are practically impervious to tampering and shield users from the potential for unilateral modification. Using various nodes or computers to validate and authenticate transactions, blockchain technology functions as a decentralized ledger to record transactions. The first platform to use blockchain was Bitcoin, which was developed primarily for the management and transfer of Bitcoin (the platform's cryptocurrency). Following Bitcoin, Ethereum's newly developed Smart contract technology gives rise to a new generation of blockchain systems and a variety of applications. Blockchain atomic swaps are a novel topic that several different parties are presently investigating. An agreement between two different parties that is complete or occurs in part without the assistance of a third party, such as a centralized exchange, is referred to as an atomic swap. This is recommended because it carries a risk to trust a third party, who may purposefully or unintentionally deprive either or both of the clients of their money. The Ethereum blockchain is especially well-suited for atomic swaps because it allows for smart contract execution, and the language used to build these contracts, Solidity, is Turing-complete.

Legality of Smart Contract

It is challenging to determine whether and how smart contracts belong within the legal structures of traditional contract law due to their uniqueness and inherent complexity. It is challenging to integrate smart contracts into a regulatory framework because courts and legislators have not yet fully considered their potential. To date, no court has issued guidelines regarding the legality of smart contracts, and no market with standardized procedures has been established for them. The lack of guidance and authority results in divergent opinions regarding the legality of smart contracts. Conventional contracts impose an obligation on one or more parties, so implying future performance. Since neither party is required by law to do anything once the contract is formed, smart contracts are unable to create any obligations in the future. A more legally solid recommendation would be to use the language of coding used to design smart contracts themselves to create regulations unique to them, given the different ways that smart contracts are treated and their legal standing. Smart contracts require greater technical regulation compared to those presently in place due to their complex structure. However, software developers and device

manufacturers should articulate the regulation in the coding languages they create, gradually converting legislation into code, rather than policymakers creating the regulation.

Regulation of Smart contracts across the Globe

EU

eIDAS

The electronic identification, Authentication, and Trust services regulation is a law governing digital identity in the European Union. These laws significantly affect the decentralised identity structure. Typically, they are property of the government organisation that issues identification cards. According to the eIDAS, blockchains are by definition electronic contracts. As a result, the information in blockchains, including that in Smart contracts, cannot be discounted just because it is electronic.

Rome I Regulation

In the European Union, the laws that should be applied to foreign contracts are summarised by the supreme regulation. According to Article 1 of the rule, all contractual duties in both civil and commercial proceedings are covered by this regulation. This would seem that Smart contracts are likewise covered by the rule. The restrictions only apply to contractual duties in the legal sense, which is an exception to this interpretation. Simply said, a Smart contract is a piece of software that manages, oversees, and/or records the execution of an existing contract. This indicates that the laws do not apply to Smart contracts themselves but rather to the contracts that the Smart contract performs.

By virtue of Article 3 of the regulation, parties are free to subject their contracts to any law they want, regardless of a link to a particular territory. In the case of Smart contracts, which function in a virtual and frequently decentralised environment, this principle of partial autonomy can aid in supplying legal certainty. Since the parties have the option of subjecting themselves to any applicable laws, this option must be specifically mentioned in the contract or in any other separate declaration.

This choice of law may be implicit or predetermined in some situations. It may have its own legal system for some contracts that it is used to execute. In these circumstances, it might be considered that the parties to the contract will only be subject to the laws of this particular jurisdiction. However, the implied choice of law option is given priority under Article 3 (1) of the rule. This means that it must be "clearly

established" by way of proof that the parties to the contract had the will to pick the appropriate laws, that they had chosen the legal system out of their own free will, through the terms of the contractor and the circumstances of the case.

If the parties have not selected any applicable laws, then the members or the panel of the regulator shall, in accordance with Art. 4. In these situations, the party's habitual residence's laws frequently apply. For instance, the laws of the seller's or service provider's country of residency must apply to Smart contracts for the execution of any sales or services. Although this approach can be used, it has its own challenges. Since these contracts are made online and may therefore be handled anonymously using a blockchain, one example would be determining the nation of residence.

Articles 5 to 8 contain the provisions pertaining to special choice of law rules. These regulations may apply to contracts for carriage, insurance, consumer goods, and employment. These serve mostly to shield the less strong parties. They are closely connected to the party's livable residence. Therefore, these laws may apply, for instance, if no legislation has been chosen by the parties.

INDIA

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Indian Contract Act 1872

It controls the regulatory framework of contracts and largely governs all contracts made in India. Provides a definition of a contract under Section 10. - All agreements that are made between the parties voluntarily, intentionally, and with the objective of achieving legal ends are referred to as contracts. Therefore, any agreement that satisfies the requirements of a contract can be legally enforced. This makes Smart Contracts more widely accepted in India.

Information Technology Act 2000

This Act's primary goal is to conduct legal internet transactions. It is designed to make electronic transactions easier and to lessen cybercrime. Section 5: Any document that includes a digital signature, which demonstrates the permission of the party, will be recognised by a court of law. The signature serves as proof between the parties because it demonstrates approval of the terms. Smart contracts use digital signatures throughout all procedures as a fully online concept. It acknowledges the legality and enforceability of electronic

contracts in Section 10. In instance, Section 10 A of the IT Act says that digital or electronic contracts are lawful and enforceable between the parties. The only prerequisite is that it fulfils every prerequisite listed in the contract act.

Indian Evidence Act, 1872

This law essentially establishes the guidelines for the admission or rejection of any evidence presented in court. The admission of evidence in court is covered by Section 65B. It declares that electronic records and digital signatures are admissible in court and are acceptable. As a result, the government can take action to resolve disputes and preserve the honour of traditional and digital or Smart contracts.

Enforceability of Smart Contracts in India

Because there is no explicit law governing Smart contracts, the drawback is the repercussions of a bad or unsuccessful implementation of any term that must be stated by the parties. Smart contracts offer a platform for people to conduct transactions anywhere in the globe.

According to the Indian Contract Act, the term consideration may be one of the objections to Smart contracts. Contracts may be unilateral in form, which implies that the other party is putting up the block and receiving no reciprocal benefit; he is powerless to negotiate the conditions and almost certainly breaks the key provisions of the agreement.

The Information Technology Act's Section 35 states that an electronic signature is only valid if it is provided by a government official, and the Smart Contract hash key is generated by blockchain technology, acting as an identity to authenticate. These provisions, which support the growth of Smart contracts in India despite the absence of a legal framework, are also subject to challenge. Therefore, there is no governing body that grants electronic signatures.

The Indian Evidence Act, Section 88 A, specifies the legality of electronic records being presented to the court for admission. However, it ignored the most important factor, which is that it makes no assumptions about the sender. This complicates the issue of Smart contracts because the signature is not obtained in the very first movement in accordance with the IT Act, and that directly results in the rejection of the electronic signature itself before the court.

Although Smart Contracts are lawful, there is no established structure that governs their use. No precise procedure or harm is outlined anywhere in the case of a breach. Currently, when Smart Contracts are established

within the borders of India and do not cause issues with multiple jurisdictions, legislation will be most helpful.

Conclusion: The Road Ahead

Legal contracts are utilised alongside Smart contracts to automatically carry out their conditions. This article has discussed the difficulties that developers face when creating these Smart contracts and its regulation across the globe. This paper underlines the need for enhance legislation for Smart contracts and for other developing technologies so that the parties involved shall be governed and multiple issues can be averted.