SMART CONTRACTS WITH RESPECT TO INDIAN LAWS

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ABSTRACT

The rapid emergence and evolution of cryptocurrencies and **blockchain technology** have greatly impacted the financial industry. Due to the emergence of **smart contracts**, a new generation of decentralized applications that do not require a third-party to operate has emerged. These are computer-based protocols that can automatically negotiate and resolve disputes among multiple parties.

Despite the positive effects of smart contracts, there are still many concerns that prevent their adoption. This paper aims to provide a comprehensive survey of the various technical and usage issues that affect the development of such applications. It also explores the multiple research studies that are related to the technology.

The findings of the survey were analyzed and identified open issues and challenges that need to be resolved in future studies. The study also identified future trends.

Keywords: blockchain technology, smart contracts, final agreements.

I. INTRODUCTION

Although smart contracts are becoming more popular, they are still not exactly clear what they are and how they can solve various problems. Nick Szabo coined the term smart contract in 1997. It is a type of contract that is usually self-executing.[1]

A smart contract is a type of agreement that is created using the code. It allows a company to perform various activities, such as exchange of money, shares, and property. It is executed on a blockchain, and it holds the company's money until the conditions are satisfied.

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[1] Nick Szabo, Building Blocks for Digital Markets, 1996, PHONETIC SCIENCES, AMSTERDAM, available at http://www.fon.hum.uva.nl/rob/Courses/InformationInSpeech/CDROM/Literature/LOTwinterschool2006/szabo .best .vwh.net/smart_contracts_2.html

A smart contract is a type of computer program that follows simple statements. It can perform various actions on a blockchain, such as releasing funds to certain parties, issuing a ticket, or registering a vehicle. When the conditions have been met, the program will update the blockchain. This ensures that the transaction is never changed. Only the individuals who have been granted the permission can see the outcome.

There are many conditions that can be set in a smart contract to ensure that the task is completed successfully. Before the contract can be executed, participants must first determine the terms of the contract and agree on the rules that will govern the transactions.

Developers can program smart contracts using blockchain technology. However, many companies that use blockchain for their business provide web interfaces and other tools that help them create smart contracts more easily.[2]

II. SMART CONTRACTS AND OFF-CHAINRESOURCES

Many of the use-cases that are proposed in smart contracts involve the exchange of parameters and information from resources that aren't on the blockchain. For instance, if a crop insurance policy is programmed to transfer the value of the crop insurance to an insured party after the temperature drops below 32 degrees, then the smart contract should be able to receive information from off-chain resources such as the weather.

When it comes to receiving temperature data, a smart contract will need to be able to pull it from an agreed source. Unfortunately, this isn't possible with smart contracts since they can't access off-chain resources. They also need to be pushed to the smart contract in order to receive the data. Another issue with this type of operation is that the data may be constantly changing, which could cause different nodes to receive conflicting information.

For instance, if the temperature in the area is 32 degrees Celsius, then the smart contract will receive information about the temperature from the weather resource as it is 31.9 degrees. However, since the transaction is dependent on the consensus across the nodes, the condition may be considered not satisfied.

[2] https://www.ibm.com/in-en/topics/smart-contracts#:~:text=Next%20Steps-,Smart%20contracts%20defined,intermediary's%20involvement%20or%20time%20loss.

Through an oracle, a contracting party can solve this issue by collecting off-chain data and then pushing it to the blockchain at a predetermined time. For instance, if a daily temperature was recorded, an oracle would be able to determine that a freezing event had occurred and then push the data to a smart contract.

Unfortunately, this method adds another party to the process, which could dilute the benefits of smart contracts. It can also introduce a potential issue with the data due to the lack of a contract between the parties involved. For instance, if an oracle gets a system flaw, it might not be able to provide the necessary information.Before smart contracts can be widely adopted, they need to be considered for various contingencies.

III. WHAT IS THE "FINAL" AGREEMENT BETWEEN THE PARTIES?

When analyzing text-based contracts, courts look closely at the final written document that the parties have agreed to. This document is the "meeting of the minds" between the parties.

The outcome of a code-only smart contract is the only objective proof that the parties agreed to. In most cases, the emails between the parties discussing the contract's functions and execution will yield the definitive code lines.

A court generally looks at the text and the code as a single agreement when analyzing ancillary smart contracts. However, if the two components don't align, it can be difficult to determine the correct payment method. For instance, in a crop insurance contract, the text agreement says that if the temperature falls to 32 degrees, the insurance payout will be made. On the other hand, the smart contract code indicates that the payment method should be triggered if the temperature reaches or exceeds 32 degrees.

If the text agreement doesn't explicitly state that the code or text controls should be in place in the event of a discrepancy, courts will have to determine if the agreement's written language should prevail or if the code should have been treated as an amendment.

The court should not rely on the differences between the text and the computer code when analyzing a main agreement. Although the two components should be considered together, they should not be determinative.

One of the most common solutions that parties can use when it comes to analyzing a text-based contract is to have the parameters of the smart contract's execution appear in the text instead of in the computer code. This will help prevent potential inconsistencies in the contract's execution. For instance, if the temperature is at 32 degrees, the payment method will be triggered if it reaches or exceeds that temperature.[3]

IV. BEST PRACTICES OF SMART CONTRACTS

Although the implementation of smart contracts is still in its early stages, the following checklist aims to help developers create effective and efficient contracts. And eventhough there are strong arguments for using code-only smart contracts, they should only be used for simpler transactions until there is more clarity regarding their validity and enforcement.

As the implementation of smart contracts continues, parties will still want to have text-based versions of their agreements. These documents will allow them to read the agreed-upon terms and make sure that they have a legal basis for their actions.

Hybrid contracts, which combine the use of code and text, should have clear descriptions of the smart contract's associated code. Also, the parties should be aware of the variables being sent to the contract, as well as the events that will trigger its execution.

When it comes to using an oracle for off-chain transactions, the parties should also be aware of the potential issues that could happen if the provider fails to deliver the required data.

In the event that a coding error occurs, the parties should consider allocating risk. The contract's text agreement should also specify the venue and governing law.

The text agreement should also include a representation that each party has reviewed the smart contract's code. This can help the other side fend off claims that the contract was never reviewed. Another option is to carry out a third-party review of the code to avoid potential errors.[4]

[3] https://corpgov.law.harvard.edu/2018/05/26/an-introduction-to-smart-contracts-and-their-potential-and-inherent-limitations/
[4] https://corpgov.law.harvard.edu/2018/05/26/an-introduction-to-smart-contracts-and-their-potential-and-inherent-limitations/

V. IMPACT OF COVID ON SPECIAL CONTRACTS

The COVID-19 pandemic has had a significant impact on various sectors of society, such as the fitness industry and enterprise. It has forced businesses to close down and severely reduce their operations. The pandemic has also caused customers to alter their behavior and industrial transactions.

Blockchain smart contracts could be used to prevent economic uncertainty caused by the pandemic. They can be used to establish and execute contracts due to the difficulty in bodily contacts during the course of a disease.[5]

Despite the advantages of blockchain technology, it is still important to note that the transaction cost economics of a contract are not always the same as those of a traditional contract. For instance, if the contract is not executed properly, the costs associated with the settlement may increase. This is because the lack of felony enforcement can prevent the contract from being enforced properly.[6]

One of the most prominent innovations in the enterprise world is blockchain technology. It is a type of record-keeping system that makes it incredibly hard to alter, hack, or cheat the system. This virtual form of transaction is allotted across various computer gadgets on the block chain.

Despite the positive aspects of blockchain technology, it is also important to note that its use in the pandemic should be considered carefully.[7]

Although India doesn't have a criminal framework for regulating the smart contracts or blockchain technology, there are several laws that can help make these contracts enforceable in the country. These include the IT Act, the Evidence Act, and the Contract Act.

[5] Massimiliano Vatiero, Smart Contracts and Transaction Costs, Discussion Paper n. 238, 2018, available at https://www.ec.unipi.it/documents/Ricerca/papers/2018-238.pdf
[6] The economy of transaction is attained in external adaptation via court intervention because it is prepared to address the contingencies that lead to breach of contract by mandating parties to perform their obligations and providing remedies in case of deviation. Even anticipatory breaches can be remedied under an external enforcement mechanism. As against this, self execution focuses on pre-emptive security against breaches and thus lacks adaptive mechanisms to deal with contingences which form essential part of efficiency of contract.
[7] *Business Law Review* Volume 42, Issue 4 (2021) pp. 195 – 200

VI. THE INDIAN CONTRACT ACT, 1872

In order to make a contract legally binding in India, there are various essential factors that must be considered. These include the Legitimate Offer, the Free Consent, the Lawful Consideration, and the Lawful Objective.

The concept of agreement law and the various elements of its application were pliant as society shifted toward technological changes. This is why the courts were receptive to the idea of regulating digital contracts. They were able to draw on a substantial similarity between the conventional and digital contracts in order to implement the regulation.[8]

Since smart contracts are computer-driven, there are bound to be human mistakes in them. This issue is also not new, as laptop programming has been prone to these kinds of bugs. With that in mind, who is going to be responsible for these mistakes and how will they compensate the parties? The biggest issue that the coders face is how to address these issues.[9]

There is no provision in the 1872 Indian contract act for the validity or enforcement of a clever contract. This means that even if the government passes an ordinance or the judiciary gives a ruling in favour of a clever agreement, the details of the contract will still be unclear.[10]

VII. THE IT ACT 2000

Although virtual contracts can be enforceable in court, they have to be accompanied by a digital or electronic signature, which can be obtained legally by the government.

The smart contract's creation process involves using the block chain generation method to generate its hash key and its identical hash secret. This is in contradiction of Section 35 of

[8] *Deepti Pandey & Harishankar Raghunath*, Stationing Smart Contract as a 'Contract': A Case for Interpretative Reform of the Indian Contract Act, 1872,Volume 13 Issue 4 (2020).
[9] Thomson v. Shoe Lane Parking, [1970] EWCA Civ. 2; Trimex International FZE Limited, Dubai v. Vedanta Aluminium Limited, India, (2010) 3 SCC 1.
[10] An electronic contract ('e-contract') is a contract designed, monitored and controlled using electronic means such as email, websites, EDI etc. See Roos Niza Mohd Shariff, The Role of UNCITRAL in Regulating E-contract in the Emerging E-Commerce, INTERNATIONAL CONFERENCE ON E-COMMERCE (ICOEC), September 19-20, 2006, available at http://repo.uum.edu.my/14325/1/010_ICoEC_2006.pdf (Last visited on December 3, 2020); See Werbach & Cornell, supra note 6; Victor Manuel Gracia, The Regulation Applicable to the Smart Contract and its Subtypes: Smart Code Contracts and Smart Legal Contract, MEDIUM, January 4, 2019, available at https://medium.com/@abogadovicgarcia/regulation-applicable-to-the-smart-contract-and-its-subtypes-smart-codecontracts-and-smart-legal-73e387be09ad

the Information Technology Act. The Act does not prohibit the use of this method of authentication, but it ensures that the virtual signature of the government is protected.

The Information Technology Act of 2000 and the Rules for protecting sensitive data and information offer various protections against unauthorized access and use. However, they are not applicable to the block chain due to its decentralized nature.[11]

Due to the nature of the block chain, it is hard for businesses to enforce their jurisdiction over it. This is why the creation of the emergency response team was made to help address cybercrime.

Many experts believe that smart contracts will eventually replace the traditional contracts. However, it is still not clear how this will happen. According to a global opportunity analysis and industry forecast, the smart contract market will reach a total of 345.4 million by 2026.

Despite the widespread adoption of smart contracts, the legality of their use still remains unclear in India. There is currently no regulation or corporation that can enforce the provisions of such contracts.

The lack of a central authority that can enforce the various security and privacy rules related to information technology is one of the biggest issues that prevent people from protecting their personal data.

The advantages of using clever contracts are numerous, such as reducing the risk of errors and improving the speed of transactions. However, they also come with some drawbacks. Some of these include the unauthorized access to data, criminal activities, and coding mistakes.

VIII. IN THE INSTANCE OF BAJAJ ELECTRICALS

As a leading electric system manufacturer, the company is part of the diversified group of companies known as the Bajaj Group. It is also one of the most prominent players in the Indian Economy. Its commercial activities have a huge impact on multiple sectors and companies both inside and outside the company.

[11] Information Technology Act, 2000, §2(t); See THE DAILY GUARDIAN (Sai Sushanth), Blockchain and Law, June 24, 2020, available at https://thedailyguardian.com/blockchain-and-law/

Due to the complexity of the charge system, it has been decided that it should be changed to make it easier for vendors to manage their transactions. This process involves showing the necessary documents related to their transport, as well as getting the necessary approval from the bank.

Due to the increasing number of complaints about its guide billing system, the company's management decided to update its technology. They then came up with a solution that would allow them to improve the efficiency of their operations by implementing a new block chain financing solution. This new solution would be provided through Yes Bank.

The use of block chain has eliminated the various steps involved in the process of invoice discounting. It has also reduced the time it takes to complete the transaction.

As a leading electric system manufacturer, the company is part of the diversified group of companies known as the Bajaj Group. It is easily one of the most prominent companies in the Indian Economy. Its commercial activities have a huge impact on multiple sectors and companies both inside and outside the company.

Due to the complexity of the charging system, it has been difficult for vendors to keep track of all the details of their transactions. This is why they have introduced a procedure that allows them to manage their transactions efficiently. The seller will be required to show the relevant documents such as a transport bill of lading, an invoice, and a proof of delivery to Yes Bank.

Due to the incident, the management of Bajaj electricals decided to update its guide billing gadget in a safe and fast manner. The company then decided to implement a new approach to finance its operations through block chain seller financing. This new method was introduced in January.

Block chain eliminates the various steps involved in the process of invoice discounting. It also allows the company to complete its transactions in a more efficient manner. The new system has greatly reduced the cycle time of the device sales at Bajaj Electricals.

IX. THE EVIDENCE ACT 1872

In Section 65B of the Act, electronic contracts can be admitted in court. But, they must have a valid Digital Signature from the authority to prove its authenticity.[12]

Due to the lack of certification of the digital signatures used in blockchain technology, it is very difficult for courts to accept the evidence of electronic contracts.

X. ADVANTAGES OF SMART CONTRACTS

1) SAVINGS- Instead of paying intermediaries to process transactions, users can utilize smart contracts. This eliminates the need for manual handling and money spent on both sides of the transaction. Through a study conducted by Khatoon[13], medical system stakeholders can benefit from blockchain technology to improve healthcare services and lower costs.

2) SECURITY- The transaction records of blockchain technology are almost impossible to crack. Its distributed ledger makes it harder for hackers to alter the entries in the chain. Pan and colleagues showed how secure blockchain and smart contracts are by developing a security model that uses EdgeChain.[14]

3) CONFIDENCE AND OPENNESS- No one should be worried about the data being changed for any nefarious purpose since there is no middleman involved in the exchange of records. In a study conducted by Nugent et al[15]., they demonstrated that smart contracts can provide a secure and immutable record of transactions. They also serve as trusted administrators and can help prevent data tampering.

[12] 8 Information Technology Act, 2000, §2(zc), §2(zd), §3; Private keys are used to create a digital signature and are confidential to an individual. Public keys are used to verify the digital signature and can be shared with people. They perform the function of encryption and decryption using hash function. Information encrypted with a certain private key can only be decrypted using the corresponding public key. See Guidelines for Usage of Digital Signatures in eGovernance (December, 2010), Cl. 4.4.

[13] Khatoon, A. A blockchain-based smart contract system for healthcare management. *Electronics* **2020**, *9*, 94. [**Google Scholar**] [**CrossRef**]

[14] Pan, J.; Wang, J.; Hester, A.; Alqerm, I.; Liu, Y.; Zhao, Y. EdgeChain: An edge-IoT framework and prototype based on blockchain and smart contracts. *IEEE Internet Things J.* **2018**, *6*, 4719–4732. [**Google Scholar**] [**CrossRef**][**Green Version**]

[15] Nugent, T.; Upton, D.; Cimpoesu, M. Improving data transparency in clinical trials using blockchain smart contracts. *F1000Research* **2016**, *5*, 2541. [**Google Scholar**] [**CrossRef**]

4) ACCURACY, EFFICIENCY AND RAPIDITY- The contract is executed immediately after a condition is satisfied. This eliminates the need for manual documentation and allows users to focus on their tasks. In addition, it saves time and prevents errors due to the digital nature of smart contracts. A system developed by Griggs et al.[16] allows sensors to interact with a smart device and record all events happening on an Ethereum blockchain. Keeping track of who initiated the actions and sending out alerts to medical experts and patients would allow real-time monitoring of their conditions.

XI. CONCLUSIONS

According to experts, the traditional contracts and contractual law are going to change due to the emergence of smart contracts. The global opportunity analysis and industry forecast indicates that the smart contract market will grow from 106.7 million in 2019 to 345.4 million by 2026.

Despite the various advantages of smart contracts, the legal status of them remains unclear in India. There is currently no agency or law that can guarantee the enforcement of such contracts.

One of the biggest issues that concerns the public about the security and privacy of data is the lack of a central authority that can enforce the various regulations related to information technology.[17]

Despite the advantages of smart contracts such as their ability to reduce the risk of errors and improve the efficiency of operations, they still have some drawbacks. Some of these include data leak, hacking, and legal issues.

The advantages of smart contracts are expected to continue to improve as time passes. Eventually, they will be able to solve all of the legal issues associated with them. However, at present, they are not ideal for every field.

[16] Griggs, K.N.; Ossipova, O.; Kohlios, C.P.; Baccarini, A.N.; Howson, E.A.; Hayajneh, T. Healthcare blockchain system using smart contracts for secure automated remote patient monitoring. *J. Med. Syst.* **2018**, *42*, 1–7. [**Google Scholar**] [**CrossRef**]

[17] Rachit Bahl & Rohan Bagai, Comparative Guide to Blockchain, MONDAQ, May 15, 2020, available at https://www.mondaq.com/india/technology/935294/blockchain-comparative-guide (Last visited on August 31, 2020).

Roy Amara, a computer scientist at Stanford University, coined the term "Amara's Law," which suggests that we tend to overestimate the technological progress that can be made in the short run and then undervalue it in the long run. Despite the initial challenges that smart contracts will face, they can still have a significant impact on how commercial relationships are structured.

When it comes to smart contracts, it's important to remember that the true revolution will not come from the existing structures and concepts. Instead, it will come from new innovations that we haven't yet seen.[18]

[18] https://corpgov.law.harvard.edu/2018/05/26/an-introduction-to-smart-contracts-and-their-potential-and-inherent-limitations/