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Role of Smart Contract in Arbitration: A Critical Analysis

M.A.D.S.J.S. Niriella, Professor, University of Colombo, Sri Lanka.

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Abstract

Smart contracts are programming programs that, without any involvement of a reliable authority, can be reliably carried out by an internet of mutually distrusting nodes. Smart contracts, which are integrated into blockchains, allow an agreement's terms to be automatically enforced without the need for a third party to be contacted. The advancement of technology has been continuing for a while. Technology's advancement has made it possible for it to enter the legal sector and, with it, the complementary conflict resolution sector. Given this, the writing aims to accomplish three goals. It starts by discussing the arbitral framework, which does not categorically prohibit the use of new technology during arbitral procedures. Second, it looks at how arbitration and new technologies—like blockchain technology, intelligent contracts, large-scale data, intelligent machines, and cryptocurrency—work together. It suggests that whereas advances in technology improve and expedite the resolution of disputes, the arbitration process offers protection to the tech sector and these developing technologies. The key characteristics of blockchain technology that make it one of the most revolutionary technologies today are its decentralization, self-control, peer-to-peer relationships, fixed records, and time stamps. This article, therefore, focuses on the use of block chain technology and its crucial role in the digitalization of land records within the context of India. However, the lack of widespread adoption of smart contracts is primarily due to users' lack of clarity about whether they could enforced as relationships under state contract laws nowadays in operation.

Keywords: - Technology, Blockchain Technology, Contract Laws, Smart Contracts, Potential Technologies, Cryptocurrencies, Artificial Intelligence, Arbitration, Digitization, Indian Scenario.

"Arbitration is private. It doesn't have the tools to dig into the corporate files. It's usually controlled by arbitrators who want repeat business from corporations not from the injured person".

—Ralph Nader

I. INTRODUCTION

Bitcoin technology is being embraced by the technological, commercial, financial, and legal sectors with increasing frequency, and they have created blockchain inventions for use in a variety various scenarios within their respective domains. Blockchain applications have become more refined as developers have created them, and users have expanded from a small group of early adopters to numerous large organizations and even international financial institutions. Prominent media outlets and legal journals have reported on the explosive ascent of blockchain technology, showcasing its quick development and limitless potential uses. While the overall discussion surrounding blockchain technology and its consequences has grown over the past few years, a notable block chain implementation grabbed attention recently. Smart contractual arrangements are not new; the first officially recorded references to the instruments emerged in the 1990s and characterized it as a mechanism

including, *"Many organizes of contractual terms such as liens, bonds, [and] delineation of rights to property".* that record and perform transactions between both parties on the distributed ledger. Smart agreements rely on robotics and the interconnected capabilities of blockchain technology to link parties, trade considerations, and record transactions.

The present digital contracts are largely used for straightforward interactions that require an "if-then" function. Banks and financial organizations have begun to invest in and exploit blockchain technologies, noting its greater efficiency in computerized transactions and decreased operational expenses. Recently, academicians, legal professionals, government departments, and legislators from states have begun debating how to interpret and govern smart contracts consistently.

New technologies are promoted to boost effectiveness, cut costs, and permit the growth of arbitration into novel segments of the market. Efficiency, besides expense management, have been defined across many countries as the key goals or prerequisites for the operation of arbitration. Nevertheless, the widespread introduction of these innovations will unavoidably result in fresh categories of complicated issues cantered in either the underlying unique aspects of the innovation or the lagged regulatory environment to that exist as subjected.

Having stated the notion that binding arbitration boasts of a distributed regime, adaptability, and an assisted implementation system, is rendered one of the best ways to deal with those issues. Therefore, in the distance lay a synergic connection whose mutually advantageous advantages are ripe for appropriation. While the coming technology will enhance the process of arbitrage, arbitrators will present certainty, in a relatively uncertain environment, that there exists an acceptable venue for the settlement of any consequent problems.

1.1 Arbitral Framework

Is it possible at all for all participants and parties to the arbitration process to employ modern technology under the underlying arbitral framework? All arbitration professionals surely have this urgent question on their minds at all times. The topic of arbitrators' roles being substituted is even more pressing: will they soon lose their jobs?

- Using Innovative Technologies in Arbitration within the Existing Arbitral System In essence, the introduction of advanced technology in arbitration procedures is not completely precluded by the existing regulatory framework. Because the choice of arbitrating and the process for carrying out the arbitration are governed by a contract, the two sides and the arbiter have a great deal of operating discretion.

The UNCITRAL Model Regulations on Arbitration in International Commercial Matters, or "Model Law," stipulates in Article 19(1) that,*"The parties are free to decide how the arbitral tribunal will conduct proceedings, according to the restrictions of this Law".* Moreover, the Model Law's Article 19(2) stipulates that,*"In the absence of a comparable arrangement, the arbitral panel may conduct the arbitration in any way it deems suitable, according to the conditions of this Law",* and also has, *"The authority to judge any evidence's weight, relevance, materiality, and admissibility".*

The standard way of establishing a partnership involves drafting a contract, which is essentially a set of promises made during a "conversation of the minds". Contracts can relate to personal relationships like marriages, even though they primarily serve a purpose for commercial partnerships—the topic of this article. For a long time, contract enforcement has been viewed as an essential responsibility of capitalist administrations, which is why contracts play an important role in politics in addition to "social contract" theories. The fundamental component of an economy based on free markets is the contract, whether it is upheld by government entities or otherwise.

The different types of interactions we can have are being drastically altered by the digital age. The digital revolution has opened the door to create new institutions and new means of formalizing the ties that comprise these organizations.

These agreements are an important part of daily life and are beneficial to us in many ways, particularly when interacting with businesses or other people. When it comes to protection, privacy, or independence, these conventional contracts have many problems. In the event of a breach of contract, participants must go through a rigorous process. To impose penalties on the other party and to meet their goals, they must engage with law enforcement agencies which requires an enormous amount of resources.

To tackle this problem, we required a digital solution that would transform how we communicate with individuals and organizations, swapping conventional paper contracts for electronic ones. Nicholas Szabo was the primary individual to use the term "smart contracts" in 1996 to address this issue.

Because such modern contracts are significantly more operational than their paper-based, inanimate predecessors, I refer to them as "smart" contracts. Intelligent technology is not addressed. Because they allow two entities to agree, smart contracts are the fundamental element of any blockchain application. Its function is quite similar to that of "protocols," which set down rules for communication across networks.

On the blockchain system, a transaction is initiated autonomously by the original agreement, managed by intelligent contracts, and it is not dependent on another party. Blockchain innovation makes intelligent agreements possible. Contract regulations specified in computer programs in an intelligent contract will be autonomously achieved when certain requirements are satisfied. Distributed blockchains are mainly used to store, reproduce, and modify smart contracts made up of events.

1.2 The Relationships of New Technologies and Arbitration

The complementary connection between arbitration and new technology will be covered in this section. Although a lot of evidence has been presented or hypothesized about the impending modification that technological advancements will bring to arbitration processes, it's also critical to consider the benefits that arbitrating disputes will provide for the expansion and possible widespread adoption of innovative technologies.

1.2.1 Digital Currency

The supposedly evident connection between cryptocurrency and arbitration is rarely discussed. However, given the growing recognition of digital money and the resulting intrinsic need for a well-tailored dispute-resolution process, it is worth discussing. International arbitration is comparable to the international nature of virtual currency, whether it exists on or off the blockchain.

1.2.2 Cryptocurrency and Intelligent Contracts

Decentralization, the absence of middlemen, and automation are some of the fundamental ideas of the technology known as blockchain and smart contract development, as previously mentioned. These ideas promise the security, longevity, immutability, and accessibility of a peer-to-peer network. Similarly, three of the most noteworthy characteristics of international arbitration are decentralization (64%), adaptability (38%), and ease of enforcement of verdicts (65%), according to a survey done in 2015 by Queen Mary University of London. Therefore, the advantages of arbitrators in disputes resulting from smart contracts—which are decentralized in and of themselves—cannot be overlooked. The inherent adaptability and easier enforcement that are features of international arbitration result from this decentralization.

1.2.3 Intelligent contracts

While the implementation of intelligent contracts on the block chain is designed to enhance the efficiency of the dispute resolution process, disputes may still occur. This could potentially give rise to a new set of challenges that will require the establishment of safeguards.

1.2.4 Master contracts

The possibility for disparities in handling disputes contracts or clauses across the contractual chain is an additional problem that needs to be addressed and protected against. Establishing early on the type of dispute resolution process to be used and how it will cascade through the contractual chain outlined above is crucial. Thus, it has been recommended that an umbrella contract be signed to guarantee consistency along the chain regarding the applicable laws, the procedure for resolving disputes, and the capacity to join or combine problems where appropriate.

Additionally, machine arbitration lacks the fundamental assets of metacognition and empathy. Additionally, they are incapable of justifying their choices, which puts them in conflict with some nations' legal frameworks. Finally, with the recent extraterritorial application of the EU-GDPR (European Union the General Data Protection Regulation), machine-generated choices that might not thereafter be explained are prohibited.

II. LITERATURE REVIEW

(Khivsara, H., 2021) Modern technology has interconnected itself into the world. It is connected with ingenuity and invention. The ongoing advancement in technology is the basic engine of the economic growth of every country. Millions of US dollars are annually invested by the governments to boost their technical game. It is present in numerous industries ranging from the construction industry, finance, and even the medical sector. Block chain is one of numerous technical marvels. It takes the form of data that differentiates itself from the others. This is because it stores information in several blocks and all of those blocks are linked to one other, thereby forming a chain.

(Beebeejaun, Z., 2022) International conflicts are common in the energy industry owing to the inherent complexity of contracts. The involvement of numerous Stakeholders with conflicting agendas (multinational corporations, state-owned enterprises, host states, and their citizens); (ii) the disparity of multinational jurisdictions (local laws, laws of the investor's country, international standards and laws); and (iii) modifications to legislation and rules throughout the years (long-term the natural world of energy agreements) are the factors that generate the complexity.

(Green, S., 2018) The conventional laws of contracts face multiple obstacles with the introduction of smart contracts. One of the biggest and most urgent concerns is how contracts constructed using computer code will require modifications to the forensic interpretation procedure. The logical design of smart contracts differs from that of human languages, which is not the only difference between the two languages that courts deal with. This implies that it is unlikely to be advantageous to hire an expert to translate everything literally so that a judge can comprehend it. Creating a test for "reasonable programmers" would appear to be a good place to start. Since smart contracts are self-fulfilling restoration could grow into a more popular remedy in the event of executory contracts.

(Dwivedi, V., 2021) Smart contracts and blockchain technologies improve the efficiency and automation of commercial operations. Decentralized Autonomous Organizations (DAOs) are gaining momentum, revealing that the application of blockchain technology has the capacity to alter both society and business. A Decentralized Autonomous Organization (DAO) is one in which smart-contract scripts representing business rules are carried out when predetermined rules are satisfied.

(Sharma, A. 2018) The term "blockchain" has garnered a lot to pay attention in the near past. The two most popular blockchain systems are Ethereum and Bitcoin, however, numerous additional platforms have just recently surfaced. However,

not all blockchain-based applications take advantage of smart contracts. Self-fulfilling computer protocols, or "smart contracts," are designed to confirm and enforce contract compliance. Even while the field is developing, there is still a great deal of uncertainty involving the idea. Because of this, choosing the platform is an important choice for the users. This essay will examine the pros and cons of five distinct blockchain-based smart contracts systems: the following: Ethereum, Bitcoin, Stratis, Lisk, and Neo.

(McKinney, S. A., Landy, R., 2017) By removing the inefficiency and unpredictable nature brought about by the present transaction environment, which includes banks, legal professionals, courts, regulators, and other stakeholders with opposing viewpoints, smart contracts are a ground breaking technology that has an opportunity to completely transform business transactions. However, a solid legal, commercial, and technological smart contract in the environment has not yet emerged due to disagreements about how electronic agreements are executed, confusion about their enforcement, and a lack of pertinent legislation and case law.

2.1. Objectives of the study

- Examine how smart contracts, which offer an auditable and unchangeable record of agreements and transactions and lower the possibility of fraud or manipulation, can increase openness and confidence in arbitration.
- Examine the potential legal ramifications of employing smart contracts in arbitration, encompassing matters concerning jurisdiction, the enforcement of smart contract provisions, and adherence to current legal structures.

2.2. The Scope of the study

A study on smart contracts' application in arbitration would probably include several important topics:

- **Overview of Smart Contracts:** An explanation of smart contracts' definition, operation, and importance in contemporary transactions.
- **Arbitration Process:** An overview of arbitration, including its advantages, disadvantages, and similarities and differences from traditional litigation.
- **Intersection of Smart Contracts and Arbitration:** An analysis of how arbitration procedures can incorporate smart contracts. This would entail talking about the advantages—like automation, efficiency, and transparency—as well as the drawbacks—like enforceability and the requirement for human interaction.
- **Enforceability and Legal Framework:** a rigorous examination of smart contract enforceability in arbitration that takes into account national and international legal systems. This would entail talking about matters like jurisdiction, governing law, and how conventional legal principles support the outcomes of smart contracts.
- **Ethical and Social Implications:** a review of the moral and societal ramifications of using automated methods to settle disputes, including concerns about justice access, bias, and fairness.

III. METHODOLOGY

A rigorous technique is essential to objectively analyze the function of smart contracts in arbitration. This is a suggested methodology for the investigation:

- **Expert Interviews:** Interview authorities in the areas of arbitration, blockchain technology, and law. These individuals can offer discerning opinions on the possible advantages and drawbacks of employing smart contracts in arbitration, as well as information on the many legal and technological issues at play.
- **Legal Analysis:** Conduct a thorough legal review of smart contract usage in arbitration. This should involve a review of pertinent laws, rules, and court rulings in addition to an evaluation of how smart contracts fit into the current arbitration frameworks of law.
- **Technical Evaluation:** Examine the smart contracts' implementation, security, scalability, and design from a technical standpoint. Examine these technical aspects about their appropriateness for use in arbitration, and note any possible dangers or weaknesses.
- **Comparison with Traditional Arbitration:** Examine the differences between using smart contracts and conventional arbitration procedures. Evaluate the benefits and drawbacks of each strategy, considering the elements like effectiveness, cost-effectiveness, transparency, and the enforcement of awards.

Anyone can perform a thorough and rigorous examination of the function of smart contracts in arbitration by using this methodology, which will add insightful information to both academic research and real-world implementations in the field.

IV. RESULTS

4.1. Expert Interviews

The insights obtained from expert interviews revealed diverse perspectives on the integration of smart contracts in arbitration:

4.1.1. Advantages:

- The potential for greater efficiency through automation, especially in lowering procedural delays, was highlighted by experts.
- One notable advantage of block chain technology over conventional arbitration procedures was its inherent openness.
- Because there was less dependence on middlemen, cost-effectiveness was regularly mentioned.

4.1.2. Challenges:

- Smart contracts' rigidity, which may make it difficult to handle intricate, nuanced conflicts, has drawn criticism.
- The enforceability of awards in cross-border situations and jurisdictional concerns were often brought up.
- One of the obstacles to adoption was found to be practitioners' general lack of technical and legal knowledge.

4.2. Legal Analysis

The legal review underscored several critical findings:

4.2.1. Compliance with Existing Laws:

- Although smart contracts have the potential to be compatible with arbitration frameworks, there are notable jurisdictional differences. The enforceability of agreements based on block chain technology is unclear in several jurisdictions.
- There is a void in legal precedents due to the small number of court decisions on issues involving smart contracts.

4.2.2. Regulatory Gaps:

- There is ambiguity due to the lack of defined regulations for block chain technology, especially in cross-border arbitration.
- Legal professionals pointed out that in order to guarantee smooth applicability, incorporating smart contracts necessitates adding to or changing current arbitration legislation.

4.3. Technical Evaluation

The technical analysis yielded mixed results regarding the feasibility of smart contracts for arbitration:

4.3.1. Strengths:

- High degrees of security and automation were acknowledged as major benefits.
- The immutability of block chain guarantees that contracts and supporting documentation cannot be altered.

4.3.2. Weaknesses:

- Current block chain networks are unable to effectively manage large transaction volumes, making scalability a major obstacle.
- Critical risks were determined to be security flaws, such as coding problems or vulnerability to attacks.

4.4. Comparison with Traditional Arbitration

The comparative analysis highlighted clear distinctions between smart contract-based arbitration and traditional methods:

- **Efficiency** By automating repetitive procedures, smart contracts shortened procedural timescales, while traditional arbitration maintained its flexibility in resolving complex issues.
- **Cost:** By reducing the need for middlemen, smart contracts have proven to be more cost-effective; yet, the early setup expenditures (such as creating strong smart contracts) may be substantial.
- **Transparency:** Comparing block chain to traditional arbitration's confidentiality standards, the former generated privacy issues despite its unequalled transparency.

- **Enforceability:** Particularly in international conflicts, the enforcement of traditional arbitration techniques was better.

4.5. Overall Findings

According to the results, smart contracts have a lot to offer, but their existing drawbacks prevent them from being widely used in arbitration. For simple, low-complexity issues where automation and transparency are the main factors, they work well. Because of its established legal underpinning and flexibility, conventional arbitration is still the procedure of choice for more complex matters. The broad use of smart contracts in arbitration requires filling up the gaps found in the technical and legal assessments.

V. CONCLUSION

Finally, it may be said that a novel technology has entered the legal sector. Arbitral procedures could be affected and disrupted by new technologies in several ways. The impact is particularly fascinating when considered in the framework of global arbitration, which offers a viable alternative to the current conflict settlement system. They might be extremely helpful in adjudicative services and representing themselves in court, and they could give academics and outside funders more thorough information. Emotions and knowledge, motivation, processing, memory, and judgment are inextricably linked. As a result, machines are devoid of both fundamental metacognition and empathy. To address an appropriate revision of specific institutional guidelines and national legislation that effectively forbid the appropriation of the arbitrator's position, I believe think tanks and discussions should be created as soon as possible. Blockchain innovation is now essential for registering property in the modern world. The strongest and most impermeable system mode is this one. Upon completion of the geographical transfer task, the data is updated and recorded on the blockchain that underlies the platform right away. A smart agreement is a set of digitally stated promises along with the protocols that the parties must follow to fulfill those commitments. The fundamental concept behind smart agreements is the ability to incorporate an extensive variety of contractual clauses—liens, bonding, property rights demarcation, etc.—into both the software and the hardware that we work with, making it possible to make contract breaches costly—if desired, occasionally prohibitively so. Business executives who aren't keeping up with blockchain advances ought to look into the technology and see how it can work with smart contract technology to generate new business opportunities or inefficiencies.

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