THE INTEGRATING BLOCKCHAIN TECHNOLOGY IN INDIAN ARBITRATION: EVALUATING THE IMPACT AND LEGAL FRAMEWORK OF STRONG SMART CONTRACTS

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ABSTRACT

Though some sceptics argue that Web3 has lost its spark and is on the decline, with its promises of decentralisation and heightened security, blockchain technology presents a potential game-changer for arbitration, particularly in addressing the strain on traditional dispute resolution methods in India. As courts and arbitration systems grapple with overwhelming caseloads, online dispute resolution (ODR) mechanisms offer a compelling alternative, specifically those incorporating smart contracts with arbitration clauses. Smart Contracts can be broadly classified into two main categories: (I) Weak Smart Contracts and (II) Strong Smart Contracts. Weak Smart Contracts are those that are either revocable or relatively irrevocable. In contrast, Strong Smart Contracts are characterised by their absolute irrevocability. Typically, Smart Contracts on blockchain platforms such as Ethereum align with the concept of Strong Smart Contracts. This article will exclusively explore the characteristics and implications of Strong Smart Contracts, which aim to revolutionise efficiency and achieve decentralised justice by leveraging blockchain, crowdsourcing, and game theory. Further, it examines how traditional and blockchain arbitral orders can coexist from an Indian standpoint. Subsequently, it delves into potential resolutions, with a particular focus on the nuanced approach of the hybrid Kleros model. Finally, it concludes with insights drawn from the preceding analysis.

Keywords: Blockchain technology; blockchain arbitration; online dispute resolution; decentralised justice; smart contracts; Kleros, CodeLegit

I. INTRODUCTION

The increasing use of smart contracts and e-contracts in global business transactions has led to a re-evaluation of their impact on alternative dispute resolution (ADR). In India, traditional dispute resolution methods are frequently criticised for their perceived sluggishness, high costs, and unreliability, prompting parties to turn to arbitration in the hope of a faster resolution. However, the reality often falls short of expectations, prompting a call for integrating technologies like blockchain-based arbitration to overhaul the Indian arbitration landscape.

Blockchain-based arbitration is conducted within blockchain ecosystems such as Ethereum, and it is quite similar to traditional arbitration. Because blockchains do not require middlemen like official registries, banks or courts they have the ability to completely revolutionize societal systems. Blockchains are distributed public ledgers that run concurrently over a massive network of millions of computers. They were first introduced by Satoshi Nakamoto in the Bitcoin White Paper.[1] These ledgers keep track of transactions along with linkages to earlier blocks and timestamps. The blockchain ledger is said to be impenetrable since it would be extremely difficult for a hacker to change any data; they would need to be able to process enough data to take down the entire network of millions of computers. Blockchains use consensus-based algorithms and cryptography to be decentralized, unchangeable, and anonymous for users.

One well-known use of blockchain technology is Nick Szabo's invention of smart contracts. These are programs that are kept on a blockchain and run when certain requirements are satisfied. "If/when...then" statements are used in smart contract code to create consensus triggers and transaction rules. By doing this on the blockchain, all parties involved can be guaranteed of the conclusion right away, doing away with the need for middlemen and cutting down on waiting times.[2][3]

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[1] Nakamoto, S. (2008). Bitcoin: A Peer-to-Peer Electronic Cash System.

[2] Yeoh D, 'Is Online Dispute Resolution the Future of Alternative Dispute Resolution?' (*Kluwer Arbitration Blog*, 29 March 2018) <https://arbitrationblog.kluwerarbitration.com/2018/03/29/online-dispute-resolution-future-alternative-dispute-resolution/> accessed 2 May 2024

[3] Navale S and Chengappa B, 'An Arbitrator's Toolkit: Blockchain, Cryptocurrency, and Smart Contract Dispute Resolution' (2023) 77 Dispute Resolution Journal 1 <https://kluwerlawonline.com/journalarticle/Dispute+Resolution+Journal/77.1/DRJ2023015> accessed 5 May 2024

However, the complexity of incorporating an arbitration agreement into a smart contract surpasses that of simple cases like for example a buy-and-sell agreement. Arbitration disputes might result from complex contracts with multiple clauses. Numerous blockchain arbitration models, such as those being developed by CodeLegit, Kleros and more, are presently in development. However, the enforcement of the decisions made through this process is a crucial factor to consider when evaluating the viability of using blockchain technology for arbitrations in India. The Arbitration and Conciliation Act was updated in 2015 to better align with modern technology, but it is still uncertain if the Indian legal system can recognize the distinctive features of blockchain arbitration.[4]

To gain a deeper understanding of the enforceability of awards in blockchain arbitration, it is imperative to discern between "on-chain" and "off-chain" arbitration.

A. ON-CHAIN ARBITRATION:

When a smart contract executes the same function as a traditional arbitration award automatically, it is referred to as "on-chain" arbitration. For these kinds of projects, it is essential to guarantee that the award can be implemented without the need for third parties, such as courts for award enforcement, or for additional action from the parties. Providing the smart contract with assets (such as cryptocurrency) that are transferred from one party to the other when a predetermined condition is met (such as issuing a "award") would be one way to achieve this.

In theory, on-chain arbitration allows for a complete deviation from the conventional enforcement process of arbitration awards. If the award is executed automatically, there is no necessity to verify its compliance with the enforcement requirements of state courts. However, on-chain arbitration institutes a notably rigid system, providing scant chances for parties to pursue remedies after an award. Additional hurdles encompass the determination of the arbitral seat, no scope for correction in the contract, and the methodology for appointing arbitrators. These challenges pose significant considerations for the future of dispute resolution in the realm of blockchain. Given these complexities, it appears judicious, at this juncture, to favor hybrid

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[4] Chevalier, M. 'From Smart Contract Litigation to Blockchain Arbitration, a New Decentralized Approach Leading Towards the Blockchain Arbitral Order', (2021) *Journal of International Dispute Settlement*, 12(4), pp. 558–584.

solutions that amalgamate both "off-chain" and "on-chain" arbitration.[5]

B. OFF-CHAIN ARBITRATION:

Off-chain arbitration closely resembles traditional arbitration procedures as it lacks inherent mechanisms for the automatic enforcement of awards. This form of arbitration can be supported by specialized rules tailored for blockchain and smart contract applications. For instance, various initiatives suggest the automation of arbitrator selections or the incorporation of game theory principles into the decision-making process. Despite these advancements, numerous legal complexities emerge in enforcements of "off-chain" arbitration.[6]

II. LEGAL STATUS OF THE ENFORCEMENT OF OFF-CHAIN BLOCKCHAIN ARBITRATION IN INDIA:

A. Regarding the need for written Arbitration Agreements:

In situations where blockchain-based arbitration rulings lack automated enforcement mechanisms, their enforceability may not meet the criteria outlined in Article 2, Paragraph 2 of the New York Convention. This provision stipulates that arbitration agreements must be in writing or established through telegraph or telefax exchange to be enforceable. However, a potential solution to this issue lies in interpreting Article 2, Paragraph 2 in alignment with Paragraph 16 of the UNCITRAL Model Law on Electronic Commerce 1996, which addresses the concept of functional equivalence. Moreover, UNCITRAL's interpretation of the "in writing" requirement in Part II of the New York Convention is not exhaustive, allowing for flexibility in considering alternative forms of documentation.[7]

A valid arbitration agreement should be in "writing", as per the Arbitration and Conciliation Act's Section 7. In contrast to Article II of the New York Convention, Section 7(4)(b)[8] explicitly states that electronic agreements are valid. The Arbitration and Conciliation (Amendment) Act,

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[5] Korey ZC, 'Blockchain, Smart Contracts and Alternative Dispute Resolution' (*Gide Loyrette Nouel*, 5 July 2023) <https://www.gide.com/en/news/blockchain-smart-contracts-and-alternative-dispute-resolution> accessed 10 May 2024

[6] Szczudlik K, '"On-Chain" and "off-Chain" Arbitration: Using Smart Contracts to Amicably Resolve Disputes' <https://newtech.law/en/on-chain-and-off-chain-arbitration-using-smart-contracts-to-amicably-resolve-disputes/> accessed 17 May 2024.

[7] Yeoh D, 'Is Online Dispute Resolution the Future of Alternative Dispute Resolution?' (*Kluwer Arbitration Blog*, 29 March 2018) <https://arbitrationblog.kluwerarbitration.com/2018/03/29/online-dispute-resolution-future-alternative-dispute-resolution/> accessed 2 May 2024

[8] The Arbitration and Conciliation Act 1996, s 7(4)(b)

2015 included the phrase "electronic means" in Section 3[9]. The term "electronic means" is defined in Section 10A of the Information Technology Act, 2000[10] as a method used for creating an "electronic record." Furthermore, an electronic record is defined in Section 2(1)(t) [11] of the Act as "data, record or data generated, image or sound stored, received or sent in an electronic form or micro film or computer generated micro fiche." Smart contracts fall within the ambit of "electronic means" as they consist of various digital documents exchanged and stored by involved parties. Consequently, blockchain arbitration agreements would be legally binding under the revised Section 7 of the Arbitration and Conciliation Act.[12]

B. Requirement of Signature on arbitration agreement:

Another issue surrounding smart contracts pertains to the validity of digital signatures. The legitimacy of a digital signature hinges on its endorsement by a Certifying Authority designated by the government, as outlined in Section 35 of the Information Act of 2000[13]. This situation may pose challenges as blockchain technology, operating outside conventional legal frameworks, generates the "hash" or digital fingerprint utilized within a smart contract.

The Indian Evidence Act of 1872 holds significant sway over the admissibility of documents in legal proceedings. Within this framework, Section 65B[14] delineates that any information contained within an electronic record, stored via optical or magnetic means and originating from a computer, is deemed as a document and thereby admissible in court. Complementing this, Section 85A[15] of the Act establishes a presumption wherein any record appearing to be an agreement containing electronic signatures is presumed to have been concluded by the parties affixing such signatures.

Furthermore, the Information Technology Act of 2000, encapsulated in Section 5[16], underscores the legal validity of electronic signatures, provided they comply with the specifications outlined by the Central Government. Section 10[17] of the same Act empowers the Central Government

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[9] The Arbitration and Conciliation (Amendment) Act 2015, s 3
[10] The Information Technology Act 2000, s 10A
[11] The Information Technology Act 2000, s 2(1)(t)
[12] The Arbitration and Conciliation Act 1996, s 7
[13] The Information Technology Act 2000, s 35
[14] The Indian Evidence Act 1872, s 65B
[15] The Indian Evidence Act 1872, s 85B
[16] The Information Technology Act 2000, s 5
[17] The Information Technology Act 2000, s 10

with the prerogative to formulate regulations pertaining to electronic signatures.

Given the prevailing legal structure, the lack of regulatory oversight and official sanction from the Central Government concerning the hash generated within a smart contract may engender possible complications. Introducing a smart contract as evidential material in a judicial setting could encounter hurdles pertaining to its authenticity, thereby introducing an additional stratum of intricacy to the scenario.[18]

C. Challenges arise when delineating the jurisdictional boundaries of the country conferring the award.

India has made the reciprocity reservation, as stated in Article I of the New York Convention. This indicates that only certain international awards issued in Convention Contracting States (announced by the Central Government) are enforceable in India. However, it cannot be stated that a particular country produced the blockchain arbitral decision as it provided on the digital environment. This begs the question of whether the reciprocity clause allows such an award to be made in India. An award of this type cannot be executed in India as the Central Government has not gazetted the actual internet space, based on a literal interpretation of the Arbitration and Conciliation Act. In order to address this issue, the service provider or Decentralized Justice apps may request an award from independent arbitrators or from a recognized arbitral body. In this situation, it can be determined if the arbitral institution would pass the reciprocity and enforceability tests in India by looking to the nation in which it was created.

D. Requirement of Signature on written Arbitration Award:

The Arbitration and Conciliation Act's Sections 36 and 48, respectively, set forth the requirements for whether a local or international arbitral ruling can be enforced. An "original copy" of the award must be included with any application for enforceability of either of these awards. In blockchain arbitration, this becomes challenging since the award is posted on the network for public access and there isn't a single "original copy" of it.

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[18]Chaturvedi A and Trivedi T, 'The Blockchain Arbitral Order: An Indian Perspective' https://www.mondaq.com/india/arbitration--dispute-resolution/1330488/the-blockchain-arbitral-order-an-indian-perspective > accessed 23 May 2024.

On the other hand, one may contend that the Act allows for the submission of "duly certified" duplicates of the original award. Any copy of the award retrieved from the blockchain is theoretically guaranteed to be intrinsically verified due to the immutable nature of the blockchain. And to fulfil this requirement, the court could be allowed access to the blockchain network.

However, domestic awards also need to be marked for enforcement under Section 36[19], unlike overseas awards. Arbitral awards rendered in "writing" are subject to stamping requirements under Schedule I, Article 12 and Section 3 of the Stamp Act[20]. "Electronic means" are not now included in the Stamp Act's definition of a "written" arbitral ruling. Until this is changed by legislation, the Stamp Act may be read to permit "electronic" arbitral awards. This would be consistent with the progressive approach taken by the Information Technology Act and the Arbitration and Conciliation Act to promote technological innovations in business dealings.[21]

III. HYBRID APPROACH: COMBINING HUMAN EXPERTISE WITH BLOCKCHAIN EFFICIENCY

The emergence of Kleros and its implementation of a hybrid blockchain arbitration system represents a significant innovation in resolving disputes arising from smart contract executions on platforms like Ethereum. Kleros' arbitration mechanism can be activated when disputes occur within smart contracts, temporarily halting fund transfers until resolution. This decentralized system adopts blockchain technology to settle disputes through the selection of jurors, cost considerations, and other prerequisites stipulated in smart contract dispute resolution clauses. This framework qualifies as a form of Online Dispute Resolution (ODR), recognized by the United Nations Commission on International Trade Law (UNCITRAL) Working Group III. India, as a UNCITRAL member, has incorporated these principles into its Arbitration Act, prompting consideration for explicit recognition of ODR platforms within Indian legal frameworks.

Key features of the Kleros platform include crowdsourcing, game theory, and jury voting to incentivize jurors, who are compensated with PNK tokens (a cryptocurrency). While

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[19] The Arbitration and Conciliation Act 1996, s 36
[20] The Indian Stamp Act 1899, s 3
[21]Bansal R, 'Enforceability of Awards from Blockchain Arbitrations in India' <https://arbitrationblog.kluwerarbitration.com/2019/08/21/enforceability-of-awards-from-blockchain-arbitrations-in-indi> accessed 5 June 2024

establishing a space for ODR, Kleros encountered a pivotal legal development when a Mexican court[22] acknowledged a Kleros arbitral award alongside a traditional arbitrator's decision.

The Mexican case underscores the convergence of national legal systems with blockchain arbitration, ensuring adherence to prevailing lex arbitri. Additionally, the Carrera Report[23] advocates for Kleros' recognition in civil justice systems, particularly for small-scale claims, insurance matters, and other disputes, emphasizing enforceability. The report proposes that parties opting for blockchain arbitration could legitimize their choice under transactional agreements or the Ex Aequo et Bono decision-making principle. Notably, this principle has been integrated into Section 28(2) of the Arbitration Act[24], paving the way for the adoption of the Kleros model and aligning with global jurisprudence.

Moreover, the potential development of a hybrid model suggests that arbitrators may issue a Procedural Order detailing dispute summaries and evidence to Kleros, which bases its decisions solely on legal facts. Arbitrators are then required to incorporate Kleros' decision into their arbitral awards, ensuring coherence in both procedural and substantive aspects of the ruling.

In essence, Kleros represents a pioneering approach to resolving disputes in the digital age, bridging the gap between blockchain technology and established legal frameworks while enhancing transparency and enforceability in arbitration processes.

IV. CONCLUSION

An expeditious, transparent, unbiased, and decentralized version of ODR is offered by the blockchain arbitral order. The way in which the arbitration landscape accommodates this could be transformative. Nonetheless, there are discrepancies in the law about the legitimacy of direct awards given by blockchain-based arbitration systems. The adoption of a hybrid blockchain arbitration approach can address these discrepancies. For the same, the Kleros case turns out to be an amazing precedent. By drawing comparisons, this approach can be incorporated into the

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[22] Chevalier M, "Arbitration Tech Toolbox: Is a Mexican Court Decision the First Stone to Bridging the Blockchain Arbitral Order with National Legal Orders?" (*Kluwer Arbitration Blog*, March 4, 2022) <https://arbitrationblog.kluwerarbitration.com/2022/03/04/arbitration-tech-toolbox-is-a-mexican-court-decision-the-first-stone-to-bridging-the-blockchain-arbitral-order-with-national-legal-orders/> accessed June 2, 2024

[23] Mauricio Virues Carrera, 'Accommodating Kleros As A Decentralised Dispute Resolution Tool For Civil Justice Systems: Theoretical Model And Case Of Application' (2021).

[24] The Arbitration and Conciliation Act 1996, s 28(2)

Indian legal system using the already-existing concepts of party autonomy and Ex Aequo et bono.