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Smart Contracts: Potential and Legal Status

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ABSTRACT

Blockchain has been posed as a revolutionary technology. Its application is diametrically opposed to the centralized conventional mechanisms. However, it would appear that blockchain has only been able to have a significant impact on payment mechanisms and financial transactions. Blockchain technology went on to revolutionize the financial industry with the advent of Bitcoin in 2008[1]. However, many within the legal and business fraternity believe that smart contracts will outsize the disruption caused by crypto-currency and believe that smart contracts will reinvent the way businesses and people alike enter into transactions[2]. The purpose of this paper is two pronged: first, to analyse the use of smart contracts to understand if its positives outweigh its negatives or viceversa and analyse how this technology can benefit India; and second, to analyse the legal recognition and enforceability of smart contracts in India while drawing from the regulatory experiences of other jurisdictions, with a focus on the experience of the United Kingdom.

Keywords: *Blockchain; Cryptocurrency; Smart contracts, Distributed ledger technologies; Hybrid agreements.*

1.0 Introduction

Blockchain based technology is not new and its applications in Law are not new. However, there has been renewed interest in the technology recently with the exponential rise in the adoption of cryptocurrencies such as Bitcoin, Ethereum, Dogecoin and Shiba Inu. To enter into a smart contract, parties would begin by negotiating the terms of their agreement, then memorialize their terms into computer code which would be backed by digitally signed blockchain based transactions. In other words, it acts as a

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platform for distributed applications, which in this case is for creating smart contracts trustless, secured and decentralized manner[3].

In this case, blockchain would act as a peer to peer database that is decentralized, which keeps track of terms and understanding of the parties clearly defining the rights, obligations and liabilities of the parties at any given time. This problem can be tackled via a centralized server easily under conventional methods; however, if you want to execute these agreements in a decentralized manner because of the advantages associated with blockchain technology, scientifically it becomes a difficult problem to solve. Arguably, Satoshi Nakamoto, the anonymous founder of Bitcoin was the first one to tackle this challenge albeit in the financial space and not in the legal context[4].

Around 2013, people started realizing that blockchain has many more significant applications and is more than just a peer to peer based digital currency. Apart from Bitcoin, the first major application of this realization was Namecoin which was a peer to peer based decentralized Domain Name System ("DNS")[5]. After the advent of Namecoin, people started thinking of the various other applications of blockchain technology such as smart contracts and financial agreements.

1.1 The use case for smart contracts

Advanced blockchain technologies such as Ethereum which is a general purpose blockchain allows parties to negotiate and enter into binding agreements by memorializing the terms of their agreement into computer code and using software or a blockchain database in this instance to monitor and even enforce the performance of parties to the agreement[6].

The added advantage of using blockchain based transactions is in the fact that the terms of the agreement are memorialized in formal code such as Ethereum's solidity[7] and therefore, parties can enforce obligations using autonomous code. Very similar to Bitcoin, this code is distributed across the blockchain network and therefore, eliminating the need to rely on an intermediary. Its autonomous nature has an additional benefit which is that because of its formal code, it's harder for parties to terminate when compared to traditional contracts. The autonomous nature of smart contracts necessitates that no party to the agreement is able to control it and therefore, it becomes much more difficult to stop the execution of the agreement unless the parties provided for such an option in the embedded code.

Blockchain is also much more flexible than your traditional contacts because of their ability to adjust performance obligations during the term of the agreement which would be facilitated by a third party code. These third party codes allow the blockchain or the smart contracts in this case to communicate and react to events in the real world.

An extremely fascinating application of this is the ability for a smart contract to reflect the relevant rate of London Interbank Offered Rate ("LIBOR")[8]. This has vast implications in the financial world, most loans given by financial institutions globally are based on the LIBOR rate plus 'x' basis points as determined by the lender and the borrower. The 'x' basis points increase on the LIBOR will always remain constant but LIBOR in itself is dynamic and the ability for a smart contract to reflect real time LIBOR at given periods of time is awe inducing. With traditional contracts, the lack of real time adjustments leads to ambiguities in interpretation which pose significant challenges to all the parties involved in executing their agreements.

Smart contracts are neither conceptually nor practically new. Smart contracts are used for settling transfer of digital currencies like Ethereum, they have even been used to manage some commercial transactions. Smart contracts also allow people to conduct Customer to Customer ("C2C") transactions on the digital marketplace. Goods/ services are exchanged for a consideration. Smart contracts help address the underlying complications in transactions like these such as payment, description of goods/ services etc. The buyer would transfer money into a digital escrow managed by the smart contract. Once the buyer receives possession of the goods or receives supply of the service, the escrow managed by the smart contract will wire the money to the seller and conclude performance of the contract. These escrows are often referred to as multi-signature accounts. This is just one example of how smart contracts enforce obligations at the behest of parties.

1.2 Hybrid Agreements

Smart contracts govern the terms of the entire contract. However, not everyone may be comfortable with memorializing all the terms of the agreement or in some situations, smart contracts may not always be the optimum approach to a transaction. In such situations, parties have the option of memorializing only a portion of the terms of the agreement into code. Hybrid agreements work very well with agreements that have open-ended terms which may be difficult for a computer to analyse such as "parties shall act in good faith". There are merits in keeping the language of some terms in the contract open-ended to cover unforeseeable events or prevent unintended consequences[9].

In addition, a majority of agreements include Representations and Warranties from the parties which can prove difficult to fulfil on the basis of the data stored on the blockchain database. These terms in the agreement are not absolute and therefore are difficult to convert into code as of today at least. These limitations may persuade parties to opt for hybrid agreements instead.

1.3 Legal enforceability

Even though third party code embedded in blockchain enforces obligations of the parties such as transfer of consideration, they are still amenable to disputes between parties which will ultimately be settled by the Courts if negotiations fall through. The process of memorializing the contract in itself can become the crux of disputes between the parties, pursuant to which Courts may have to step in and opine whether or not the memorializing of the terms of the contract were accurately done[10].

Smart contracts could potentially pose another issue to the parties involved. Since the terms of the agreement or wholly or partially memorialized into code, it can become difficult for a Court to infer the parties intention to be contractually bound to some of the terms in the agreement. It is worth noting that this problem can for the most part be solved by the use of hybrid agreements. In addition, the parties can incorporate terms such as "terms of the agreement memorialized into code shall qualify as valid writing".

2.0 Advantage of Smart Contracts

2.1 Reduction in monitoring costs

Blockchain based smart contracts allow for parties to embed third party code which allows for monitoring the agreement which is a more cost efficient method when compared to natural persons monitoring these agreements. Once the contract comes into force, the smart contract will itself monitor the agreement with the help of third party embedded code[11].

In addition, these smart contracts can be coded in such a manner that no one party has absolute control over the agreement which significantly reduces the scope of tampering or the possibility of one or more parties to the agreement acting opportunistically because of their inability to stop the contract from being executed unilaterally. As a result, smart contracts should have a higher completion rate when compared to traditional contracts. Smart contracts also help parties in effectively tackling issues such as language barriers and limitations posed by the distance between parties. It can also take away distrust between parties to an extent, thanks to blockchain technology, parties do not need to trust each other as much as they need to trust the process through which they are dealing.

2.2 The Advantage of using blockchain recognized code

As mentioned already, there are shortcomings in using code such as its inability to memorialize open-ended terms in agreements. However, there are advantages to using

code to memorialize terms as well. Wherever a human is involved, one can expect issues such as poorly drafted agreements or part of the agreement is poorly drafted and inconsistency in terms. Smart contracts do away with this problem because of their ability to uniformly apply a standard throughout the agreement.

In addition, since agreements are memorialized in code, they are capable of being read by any machine. What this implies is that smart contracts can allow machines to interact with each other, this has great significance in the context of Artificial Intelligence ("AI") and Internet of Things ("IoT"). These machine communications can autonomously allow financial transactions, manage asset accounts etc. For instance, imagine a vending machine being able to determine when a particular item is about to go out of stock and being able to autonomously place an order with the supplier via a smart contract without the need for human intervention in the entire process. This would increase business efficiency significantly and bring down costs.

3.0 Disadvantages of Smart Contracts

Throughout the paper we have largely discussed the positive elements of smart contracts, now we will dive into some of its negative elements.

3.1 Criminal activities

Any technology in the wrong hands can have devastating outcomes, blockchain technology is no exception. Criminals could potentially use smart contracts combined with the anonymity of cryptocurrencies to conduct illegal activities such as money laundering, sale of drugs, sale of ammunition etc. Smart contracts can also be used as a monitoring mechanism to ensure the illegal activity has been carried out and completed. For instance, smart contracts could monitor morgue records to ensure an illegal contract for murder has been carried out. When the negatives of blockchain technology are combined with Artificial Intelligence, its negative impact on society is frightening[12].

3.2 Pseudonymization of parties

As has already been discussed, one of the advantages of smart contracts is that they allow different kinds of parties to interact with each other across geographies because of the added security smart contracts offer, one such transaction could be an agreement between pseudonymous parties. However, if the pseudonymous parties make an error in memorializing the terms of the agreement, there is not much in the way of remedies available to parties because of the difficulty in putting a stop to the execution of the parties. In transactions between known parties, they can enter into a second

agreement that can nullify the error in the first transaction; however, this remedy is not available to pseudonymous parties. In addition, to take the dispute to the Court, the parties are going to need to know each other's identities[13].

3.3 Lack of privacy

The way blockchain technology works is by distributing the information stored on its database across all nodes in its network of systems. Each system stores a copy of the information and therefore, if anyone tries and makes alterations to a file at one place, the network will verify these alterations across its network and if it does not match, it will reject the changes made which is what makes blockchain so secure. In order for a person to hack into a file, s/he would need to hack into every node on the network simultaneously which is almost impossible.

The other side of the coin is that it takes away privacy from the parties to the agreement. Traditional contracts can be kept private with the parties however since the terms of the agreements are memorialized and distributed across every node on the network, it makes the terms visible to every node on the network[14].

4.0 Positive Potential Verus Negative Elements of Smart Contracts

It can prove difficult to determine whether the positive potential of smart contracts outweighs its negative elements. However, one ought to remember that that the technology is relatively new and is undergoing big changes by way of improvements. The implication of these improvements is that a lot of these negative elements can be addressed and corrected for. For instance, people are working on introducing Third Party Auditors ("TPAs") to increase trust between parties entering into agreements[15]. Another example could be where smart contracts are able to autonomously verify identities of partis via Government ID verifications such as Company Identification Numbers ("CIN") and Director Identification Numbers ("DIN").

As it stands today, there can be no doubt that smart contracts do not have a universal application in the legal fraternity because of their shortcomings and limitations. However, there are multiple instances where smart contracts or hybrid contracts may be just what parties need.

5.0 Legal Status

While the idea of a smart contract based on blockchain technology originated in 1994, the concept of a digital contract dates all the way back to 1948 when the US army

began its airlift operations in response to the Soviet Union cut off all road access to western parts of Germany[16]. We have come a long way since. With the exponential adoption of crypto-currency and the advent of advanced multi-purpose blockchain networks like Ethereum, it is now possible to realize Nick Szabo's conceptualization of a smart contract.

Increasingly, organizations have begun using smart contracts to increase efficiency. For instance, Axa the insurance giant experimented with smart contracts with their product 'Fizzy' to handle delayed flight insurance[17]. Global banking giants such as Bank of America and Standard Chartered are testing smart contracts to increase efficiency in trade finance and supply chain financing[18]. In India, Bajaj Electricals is using Blockchain technology to increase the efficiency in bill discounting[19]. Therefore, with the renewed interest in smart contracts and its increasing adoption, it has become important to assess the enforceability of these contracts.

5.1 Adhering to basic contractual principles

Section 10 of the Indian Contract Act, 1872 ("Contract Act") talks about which agreements can be called contracts. It reads as follows:

"All agreements are contracts if they are made by the free consent of parties competent to contract, for a lawful consideration and with a lawful object, and are not hereby expressly declared to be void."[20]

Therefore, reading Section 10 of the Contract Act along with other key provisions it becomes clear that for any contract in India to be valid must have the following elements:

- Offer;
- Acceptance and communication of that acceptance of that offer;
- A valid consideration;
- iv. It must be pursuant to a legal purpose;
- Parties must have consented freely and should intend to be bound by the agreement;
- Parties must have the legal capacity to enter into an agreement.

All of the above 6 elements do exist in smart contracts as well. Parties that wish to enter into an agreement will first need to negotiate conditions for their proposed transaction. Once these negotiations are settled and all the parties agree upon a common set of terms, they can proceed to memorialize these negotiated terms into code using language such as Ethereum's Solidity. This code is then dispersed across all the nodes on the network of the blockchain. The private key generated can be treated as a digital signature. A classic analogy that Nick Szabo liked to give in the context of smart

contracts was that of a vending machine. A vending machine is a device implemented in physical hardware that implements the conditions of an agreement. The conditions in a vending machine are relatively straightforward i.e. you put Rupees 20 in and select the relevant number and the vending machine dispenses a bottle of water. If you didn't put in any money or enough money against the relevant selection, the machine does not dispense your water bottle. This mechanism of built-in rules keeps the products secure[21].

In addition, Sections 5 and 10 of the Information Technology Act, 2000 ("IT Act") permit contracts within India to be digitally signed and expressly state that digital contracts shall be enforceable. Also, Section 65-B of the Indian Evidence Act, 1872 allows digitally signed contracts to be admitted as evidence in the Courts provided certain requirements are met.

Smart contracts seem to fit all the above-mentioned requirements. Yet, the problem seems to arise at the fact that merely fulfilling the above conditions does not necessarily make smart contracts legally enforceable in India. The other side of the coin is the fact that it does not mean that smart contracts are unenforceable in India. A legislative lacuna coupled with the judiciary's silence on the matter has left ambiguity in the subject and have pushed smart contracts into the grey area of the Law.

5.2 Drawing from the experiences of other jurisdictions

In the United States, there is no Federal Contract Law per se; however, all contracts must conform to individual State Law requirements and importantly to Common Law principles of offer, acceptance, consideration, legality, mental capacity etc. Courts will pay close attention to the intent of the parties to be bound by the agreement that they entered into. For example, more than a century ago the US Supreme Court upheld an agreement that was electronically communicated in Bibb v Allen[22]. In this case, the parties entered into an agreement for the sale of ten thousand bales of cotton in exchange for monetary consideration and the communication between the parties took place telegraphically. Even though at the time this was an unusual way to enter into an agreement, the Court looked at the intention of the parties to be bound by their agreement and held the contract to be valid. Therefore, they do not present any barrier to the formation of smart contracts.

Since, Bibb v Allen[23], the US Congress has over a period of time made it more difficult for parties to an agreement to challenge the validity of it on the grounds of it being communicated electronically. Under Uniform Electronic Transactions Act, 1999 ("UETA"), electronic data/records include computer programmed records and digital signatures which means that they would have the same status as traditional paper based contracts. In fact, the UETA expressly recognizes an electronic agent as code that within

its set of instructions is capable of communicating with natural persons or other electronic agents which would ipso facto include other sets of computer code to enter into agreements. Further, the Electronic Signatures Recording Act, 2000 not only recognizes digital signatures but also expressly includes interstate agreements between electronic agents provided that such electronic agent has nexus with the party/person entering into the agreement and expressly states that these agreements would not be unenforceable. In fact, Nevada and Arizona have amended their domestic UETA legislation to specifically include smart contracts.

Perhaps, the most advanced jurisdiction in the respect of regulating smart contracts is the United Kingdom ("UK"). In November 2019 the UK Jurisdiction Taskforce ("UKJT") published a much awaited legal statement on the legal status of crypto-assets and smart contracts under English Law[24]. The UKJT was set up by the LawTech Delivery Panel ("LTDP") which in itself was set up by the UK government. The task force was headed by Sir Geoffery Vos, Chancellor of the High Court and included many other esteemed members from parliament, judiciary and industry experts. The purpose of setting up the task force was to foster innovation in the country by adopting new technology and to guide lawmakers on how these emerging technologies should be regulated by the Parliament.

At the onset, it must be clarified that this legal statement is not binding under Law; however, the reason it is so important is because of the massive persuasive value it carries. In fact, in AA v Persons Unknown[25], the High Court's commercial division while deciding whether or not to grant an injunction in the case where Bitcoin was paid as ransom relied on the UKJT legal statement. For the Court to grant an injunction it would need to be satisfied that Bitcoin amounted to property and the Court referred to the UKJT statement and concluded that Bitcoin was in fact property.

The statement begins by identifying the novel aspect of smart contracts which is their 'automaticity'. The statement goes on to further state that there is no reason as to why smart contracts should be treated any differently than traditional contracts under English Law. It identified that domestic Law did not require contracts to be in any specific form per se and that the same was true under Irish Law. It also clarified that for smart contracts to be legally binding they would need to conform to the common law basics of contractual law i.e. offer, acceptance, lawful consideration and legal capacity.

The Statement also went on to provide clarity on some important concepts as given in Table 1.

Table 1: Clarity on Ceratin Aspects of Smart Contracts as Provided by UKJT Legal Statement

S. No.	Issue	Clarification Provided
1.	Interpretation of smart contracts by courts.	Courts will continue to interpret the terms of the agreement in the same way they would for traditional contracts. Although, expert evidence may become necessary to help courts interpret the terms of an agreement completely memorialized into code.
2.	Are anonymous and pseudo-anonymous smart contracts legal?	The statement answered this issue affirmatively and stated that there was no legal requirement for parties to an agreement to know each other's identity.
3.	Is the statutory requirement of smart contracts being in writing fulfilled by smart contracts?	A Private Key can amount to a valid signature. The statement also referred to Section 13(2) of the Electronic Commerce Act, 2000 in Ireland which recognizes digital signatures.

Source: Allen & Overy. English Law's Approach to Cryptoassets and Smart Contracts. Retrieved from https://www.allenovery.com/en-gb/global/news-and-insights/publications/uk-jurisdiction-taskforce-the-lawtech-delivery-panel-legal-statement-on-cryptoassets

5.3 What approach should India adopt?

Now that the paper has looked at the approaches taken by other jurisdictions, the key question that remains is what approach should India take? Will India need to tailor its approach when compared to the approach of other jurisdictions to better reflect the conditions of its society?

Jurisdictions like the UK and the USA have demonstrated that smart contracts do not require new and specific legislations to regulate them well. Smart contracts are more than capable of being fit into existing legislation and still being well regulated. With respect to the second question, it is not necessary for India to tailor its approach in any manner to better fit its society. The existing framework in its overarching sense already takes care of that. What is important, however, is for the Parliament to come out and take a definitive stance on the matter and gap the lacuna.

6.0 Conclusion

Technology forms the backbone of any large economy. The Indian government has set up an ambitious target of achieving a 5 trillion USD economy by 2024. Pursuant to this goal the government has brought in multiple reforms and initiatives such as

'Digital India', 'Make in India' and 'Start-up India'. Technologies such as blockchain are arguably the face of the future and regulatory hurdles have been stifling innovation in India when it comes to emerging technologies of the nature. Multiple businesses and start-ups have already expressed their interest in adopting smart contracts to increase their efficiency and productivity but are hesitant because of the legislative lacuna. Smart contracts continue to operate in a grey area under Indian Law. Widespread adoption of smart contracts would benefit start-ups immensely, reduce overhead costs and bring in more efficiency for businesses. Therefore, it is imperative for the Indian government to take steps to bring smart contracts into the existing legislative framework and end the ambiguity.

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