MUTABILITY OF SMART CONTRACTS: AUTOMATION, HUMAN INTERVENTION AND RESOLUTION

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Introduction

In a world that is rapidly accepting its new identity in the digital age while receding away from the industrial one, it is important for institutions of law and governance to adapt themselves to face new challenges and thereby be prepared to avoid and resolve new forms of human conflict.

Traditionally, contracts have been drafted on paper, where the parties to the contract come to an agreement about the object and terms and conditions of a contract and by doing so depict their legal intention to enter into a mutually binding contract. The primary purpose of having legally binding contracts is obvious; to ensure that parties entering contracts have a legal remedy in case a dispute arises. Despite its benefits, traditional contracts can be troublesome. To begin with, most contracts that involve even the slightest amount of complexity requires lawyers as middlemen to draft fair contracts. In the corporate world, lawyers are utilized to draft contracts in such a way that there is an unobvious imbalance created towards the corporate. This lack of legal expertise of the general public means that entering into a contract is an expensive process in many instances. In addition, there is also an issue of trust that can arise between parties, where neither trusts the other to fulfil their part of the obligation and therefore end up not fulfilling their obligation. For instance, if certain goods have to be delivered for Rs. 2000, one party might demand the goods to be delivered first while the other party might demand Rs. 2000 to be paid first. Whose consideration takes precedence?

Smart contracts address both the issues described above. Judicial enforcement is not the primary intent of smart contracts. Instead, they use code and technology to draft agreements such that certain parts of the agreement are automated. It doesn't need lawyers to draft complex legal documents, it rather makes use of "If/then/else" code commands to automatically perform

certain functions[1].

For example, the consideration precedence problem described earlier can be resolved in the following way through code:

If "goods are delivered by A"

Then "deduct Rs. 2000 from B's accounts and transfer it into A's."

This simple instruction through code removes any ambiguity regarding obligation and assures both parties that upon performance payment will be made.

So far, it appears as though smart contracts have improved upon traditional contracts, made the whole process efficient and is therefore perfect. Though it is true that smart contracts have huge upsides and is therefore here to stay, by no means are they perfect. They bring along with them a new set of challenges.

In the above example, it might very well be possible that technology might not be perfectly designed to identify the nature of the goods delivered or the code would have forgotten to consider damaged goods and thus end up marking them as delivered and so on. In such situations, the process of automation would complete payments or other terms of the contract and yet leave one of the parties (or both the parties) unsatisfied. This definitely would lead to a lot of conflicts as there would always arise unforeseen situations.

In simple terms this is the central conflict:

As code written on blockchains cannot take into consideration all possible situations of conflicts that can occur before executing its commands for automation, there is a concern as to how and who must resolve such conflicts. How to address the immutability of smart contract codes?

In traditional contracts, whenever there is a change in circumstance both parties can come back to the negotiating table and re-negotiate the terms of the contract while pausing the actions demanded of the old contract. As this is not possible in smart contracts, there is a need to develop a new system at the intersection of technology and law to lay down guidelines and

[1] Amy J. Schmitz and Colin Rule, Online Dispute Resolution for Smart Contracts, 2019 *Journal of Dispute Resolution* 103 (2019).

resolve conflicts.

WHAT CAN BE DONE?

The first observation I'd like to make is that the resolution systems that need to be built for issues arising in smart contracts (and other similar tech solutions) must involve minimum state interference. In other words, they must have pre-dominantly extra-judiciary solutions. I believe this because the purpose of any technology reliant on a decentralized platform (such as blockchains) is to eliminate the role and power of a central authority and build trust and capacity in a localized manner[2]. This would mean that the evolution of such technology would make it extremely complex for lawmakers to regulate by laying down guidelines or amending existing acts precisely because the systems have been designed to avoid such interference from the state. Digital currencies are for the same reason difficult to regulate.

In light of this, I'd like to point out my responses to the conflict described in the previous part, which shall mostly take the form of suggestions for its resolutions.

i. Periodic verification clause

As immutability of code is one of the primary problems that need to be addressed, it would be beneficial if smart contract code would allow for periodic verification. The purpose of the inclusion of such verification would be to allow for both parties to communicate that there have been no unwarranted circumstances that have arisen from their end, thereby giving a green signal for the code to continue to execute. In the instance that one of the parties raises a red flag, it would allow for communication to occur between both the parties who could then approach the coder to execute a new code taking into consideration the changed circumstance. I believe that such a clause won't be misused for two reasons, first, it is in the interest of both the parties for the code to be executed smoothly and the contract terms to be met as soon as possible. Secondly, there can be a monetary amount attached to the unreasonable use of such a clause, where its "reasonability" can be adjudicated by arbitration. As the financial costs involved in breaching the clause is high, there is a massive deterrence from misusing such a provision.

[2] What is a BlockChain and its purpose?, Peter Ho
https://medium.com/coinmonks/what-is-a-blockchain-and-its-purpose-42f462e017ed

The code for such a provision would resemble this:

if " x days have occurred since the initiation "

then " Ask for verification"

if " Verification approved "

then " Continue code"

else " freeze code"

repeat code after "every y days"

Such a clause would be specifically useful when the term period would be large. However, it is important to note that the clause described above would be useful only if either of the parties can observe an unwarranted circumstance.

ii. Autonomous body for smart contract guidelines

Since most conflicts concerning smart contracts are likely to occur post the execution of the code, the role of dispute resolution will always play a huge part regardless of technological solutions. I believe that arbitrators must make use of a separate unique set of guidelines regardless of the geographical origin of the conflict because with the advent of smart technology arises the greater possibility of international smart contracts to be formulated not only between big corporations but also between individual citizens from different countries. This would mean that there is a need for guidelines to exist which isn't entirely borrowed from any single jurisdiction and is yet fair to all parties. One way of achieving such a system (preferably online) would be to set up decentralized autonomous organizations (DAO's)[3]. Such platforms have already been set up on the Ethereum platform for addressing some issues in investments and digital currencies. The same approach can be followed for smart contracts. Where a network of individuals across the globe could contribute in laying down a set of guidelines based on their expertise and experience with smart contracts, verification and revision of these guidelines can occur in a similar fashion.

iii. **Establish liability of coders**

[3] Decentralized Autonomous Organization (DAO), Investopedia https://www.investopedia.com/tech/what-dao/

I believe that the kind of expertise and leverage coders have is humongous. Even though everyone might not be able to draft complex contracts, a reasonably well-read person can comprehend written words and fairly question lawyers to clearly describe what the terms of the contract signify. However, when contracts are established through code, both the parties must take it on the word of the coder that the code written accurately describes the demands of both parties. Therefore, there are sufficient conditions created for the duty of care to exist, thus giving rise to the tort of negligence to be applicable. There is a need to develop a body of thought to clearly understand what a reasonable duty of care would be for a professional coder, just like how such standards are established for other professions. In the same vein, it would also be important to lay down standards of foreseeability of coders, describe contributory negligence, whether or not there can be strict liability clauses among other areas of law that establish liability of professionals. To achieve this end, there needs to be greater interactions between legal experts and tech experts. Despite this subject which intersects coding and law is relatively new, important observations have already been made[4]. Clearly defining the liability of coders will tremendously improve the quality of smart contracts.

The role of the state in all these instances, I believe, is to facilitate further development of decentralized networks and encourage modes of dispute resolution that is more suitable to resolve conflicts concerning smart contracts. It is also my opinion that there needs to be minimum statutory work to regulate smart contracts. Many states in the US such as Arizona and Tennessee have begun to make attempts to govern smart contracts by amending existing laws[5]. I find this development to be problematic for two reasons. First, the meaning of such contracts and the technology it is based on is likely to rapidly change, which would mean that there will have to be amendments continuously made to keep up with changing technology. Secondly, independent states (and nations) developing their own definitions of and regulations for smart contracts will make the whole system extremely chaotic and will also hinder innovation because once the state attempts to codify developments in technology it also allows for grounds to de-legitimize other technology and thus obstructs innovation.

Instead, I believe it would be preferable for post-facto regulations to be developed on autonomous dispute resolution systems similar to how common law systems function, while simultaneously building a global autonomous organization to understand and track

[4] The Reasonable Coder, Petros Terzis (PhD student), University of Miami School of Law (publication)
[5] States that are passing laws to govern "smart contracts" have no idea what they are doing, Mike Orcutt, MIT Technology Review

developments in the same field and to also act as guides to dispute resolution bodies.

CONCLUSION

Smart contracts are here to stay. Though the problems posed by smart contracts are likely to evolve, I'm optimistic about the growth of this field as I believe that the solutions to deal with these problems which lie at the intersection of law and technology shall evolve as well. The problem of the immutability of code arising due to the nature of blockchains and automation can be addressed by including a periodic verification clause, building autonomous global bodies on decentralized platforms and defining liability of coders, as has been described in the previous part.

I would like to conclude by stating that it is important for there to be minimum state interference to regulate such technology as the purpose of such technology is to avoid the influence of central authorities and will therefore always mould itself to bypass any coercive law by the state. Lawmakers need to acknowledge this as opposed to making tons of laws and governmental bodies to regulate smart contracts.