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The Regulatory Uncertainty of Smart Contract Flaws in Virtual and Argumentative Reality

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Abstract: Since the synthesis and evolution of the coding and blockchain technology with the self-executing commands, there is a sudden shift to the smart contract consumption patterns. In the global virtual commerce this phenomenon has been enormously increasingly day by day. This has been so based on the distinct, clear and strong advantageous characteristics mainly lies in security, transparency and its unique way of its decentralized automation nature. A large scope of transactions of this technology's usage has been implemented in virtual and argumentative reality where codes create a lot of services such as games and commercial services amongst end users basically with no lawyers involved. However, despite its wide adoption intensifies, it renders no immune from the potential risks and uncertainty issues like any other software-based platforms. In generic terms every industry needs a regulatory way, which oversee or set red lines of boundaries in the form of structures, organizations and policies. In this context the code written and protocols which are executed automatically in systems aught also to be vetted in legal judiciary systems.

Keywords: *Regulatory Uncertainty, Smart Contracts, Virtual and Argumentative Reality.*

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I. INTRODUCTION

Since around early 1990s when Szabo put to public the concept that users could value their data into another convertible value of use, and put to light the smart contract phenomena there's is an evolution to this unique technology (Kalyvaki, 2023). In real sense, a smart contract basically is a script of code executed in a decentralized way, to perform a specific task based on the command which run an execution when some predefined conditions are fully satisfied (Zen and Miraj, 2023). Meaning to say, the end users all agree on the result of execution, of cause knowing the state of the block chain. Basically, they are enforced by code instead of law because if the conditions are met the code of the smart contract executes the command automatically minimizing the possibility of human interactional errors in the sense that there is no third part involved and is assured by a unique cryptographic signature. Normally, it is referred to as 'the if this, then that' command on the Ethereum network. On these contracts it is difficult for one to hire a lawyer to represent as these are distributed all over the world meaning not to replace lawyers. In this language, the code is portrayed to be playing the Law role. Taking a hypothetical scenario which can be interpreted in a traditional sense setup. When two individuals are forging an escrow contract for example in front of a lawyer. The idea is that the lawyer signs with both individuals and collects the two products, then after all parties meet the initial conditions of the agreement then the lawyer hands over what the recipients have to receive after that they pay the lawyer, in that solving the trust issues. In the traditional world it is the lawyer who verifies if the conditions of the contract are met. In the smart contract, it is the blockchain that assures the verification with assistance of the digital signatures and relevant protocols. This is different from contract which is legally bind which has been codified.

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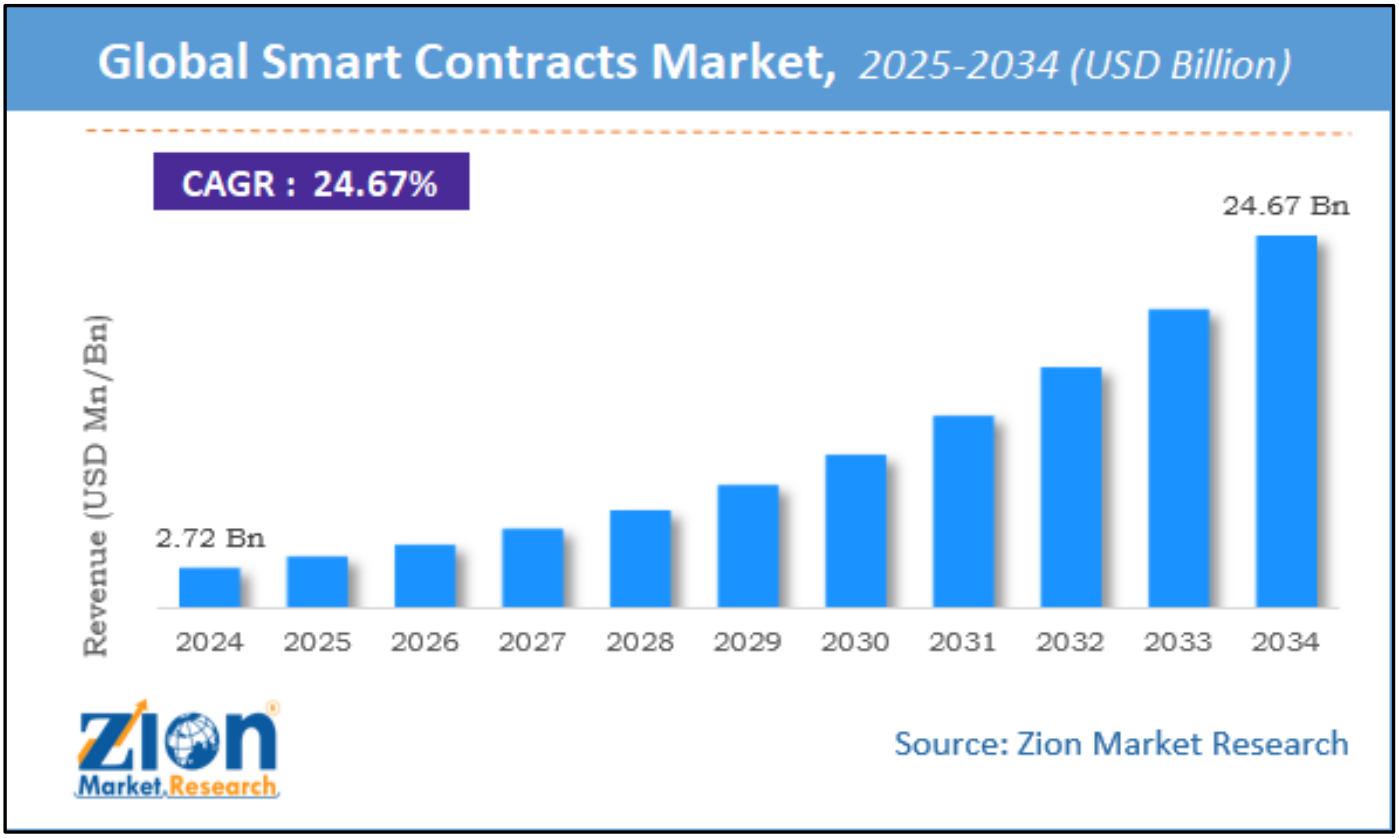

Fig 1 The Smart Contracts Flaws Prediction According
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To revert the smart contract upgradability, taking a hypothetical example in Ethereum there exists many patterns, and to achieve this it is of good will to say when the smart contract has been put to the blockchain and all the end users agree in this peer-to-peer current state. Altering this smart contract is to alter all the iterations in the background. Also noting that alterations are very complicated and in other words it is practically impossible to achieve this when a smart contract in use. Moreso, it attests that one will be violating the current state of the chain, so one has to either redeploy a contract or interact into the new smart contract. In this context, it is almost equivalent to migrating the database (Erlank, 2015).

II. PROPERTIES OF SMART CONTRACTS

The basic characteristics of a smart contract evolve around the components like automatic self-executing, immutability, decentralization, less ambiguity, conditional programmed logic, irreversible, having a backup data base (Chance, 2022).

➢ *Causes of the Uncertainties*

In the virtual commerce private and sensitive data. What is valuable on the platform. Disparity the focal point which is the enterprise can take its beneficial side not considering the factors like social interaction. The virtual identity preservation. Redefining prosthesis conflict. Giving the legal identity a good example is the user one identity through the relevant structures like the biometric identification.

To unpack the uncertainties, we have to unpack the vulnerabilities first. To dig in the vulnerabilities in smart contract we have to lock primarily on things like solidity codes of security. These include to examine every external call for reentrancy and doing the external audit in isolation without consulting any third part. Basically, in each and every smart contract there's a lot of potential possible bugs hiding in it. Deleting object structs containing the mappings or lists does not automatically mean delete one has successfully deleted the smart contract. Furthermore, immutable values are not contained on upgrade that reference those values, this is because they are not in the storage. Subtractions that underflow and revert depend strongly on the logic. Having parallel data structures can critically damaging in a smart contract. Patterns to upgrade the pro smart contact, is very complicated to put it short. In addition to that, proxy contracts keep the same statement but just upgrading a bit especially implementation so that the code will be executed on chain. After attempting to solve the above stated, that's where we can examine further the uncertainties these vulnerabilities cause (Cheong, 2022).

In virtual space such as games, there exists what is termed non fundable tokens which is a pile of code deployed on the chain and depending on the enterprise priorities and their main focus of the assets which it wants to store. Usually, all the non-fundable tokens have the same base of code which is like mapping. A significant percentage of smart contracts are in the flash loans on the Ethereum network. In addition, it involves a lot of tokens switching to keep a steady flow which by the way it doesn't pass through the exchange rates.

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➢ *Languages and Tools of Smart Contract*

The common tools of smart contract evolve on the basics of Blockchain, Ethereum, Solidity and viper. Solidity is like a programming language similar to java script (Legner, 2021). Viper is just pure python. In simple terms one is writing the script and smart projects in python. At the end all those languages get compiled into bytecodes and those are the bytecodes that are deployed on the blockchain once you want to interact with the contract. You're actually executing byte codes on chain. Results of these computations are agreed on the peer-to-peer network (Werback and Cornell, 2016). These can assist to see everything happening in Ethereum which the basic common type of blockchain platform and others prefer to use Oracles which feeds the Smart Contract with real data in real time, even though it has its own loopholes. Bytecode decompiling to get the smart contract are the code using the syntax.

➢ *The Pillars of Uncertainty and Trust*

The initial take away is that the technological infrastructure of smart contracts is not considered in many legal spheres across the globe (Lim et al, 2016) this means that there is a significance lack of trust and formality in it, but this is not a sufficient reason to be thrown away. Another point of uncertainty is that the coder can program the code in such a way that it can draw funds in such a way which extra contractual agreement (Ellul et al, 2020). There is a great chance of the black-block issues if it is enhanced by the artificial intelligence. In addition, there's lack of trust in the sense that a large volume of the end users might be code illiterate and fail to understand the dynamics and the logical framework of the programming code itself hence lack of clarity to them (Jagati, 2023). Theres a significant concern in the power dynamics, more so considering the separation distance apart of them since it is a decentralized at the global stage (Elvy, 2015). The dependence of oracles can bring forth new challenges in the sense that data can be delayed to be transmitted or to be verified due to unforeseen obstacles and also can be influenced by the coder himself (Cuccuru 2017, Grimmelmann, 2019). Theres a strong possible negative impact on the security part of the smart contract. Also, the digital currency acts in most places are not yet part of the judiciary that has a capacity to sterilize money forms transactions in case of a red flag raised by the users. In the layman's perception, when legal contracts are being formulated there exists a space for special considerations that are due to unreliable patterns of environments, politics and economics, whereas the smart contract are not like that in the sense that it is difficult to modify the code once uploaded. Most of the regulations and laws have been put or interpreted using the old versions of systems which were put in place century of years ago. But the laws of virtual platforms are still to be demystified hence making them difficult in ruling and policy (Ellul et al,). On top of that, the traditional laws of information and communication technologies have been of protecting the users who are consuming, but on the smart contracts the regulatory systems have to guarantee the pure ethical sphere of the platforms. In that context, the data protection and cyber security rules have to come to play. The tax and the central bank have to have a proper governing policy, so that it doesn't surrender the money regulatory power to the individuals who are in the decentralized infrastructure scattered all over across the globe. In order to guarantee the service delivery is always a great challenge. Putting the hypothetical example of end user recipient receiving the product that doesn't work or which needs repair after the smart contract has been completed. In that regard how does the smart contract ensures the quality of the promissory note. On top of that if the coder makes a mistake, it also means that any end user who prescribe to the smart contract will be prone to the mistake.

III. REGULATORY MANDATES SHORTFALLS

Regulatory roles are usually monitored by the state structures or in some cases by the international policies. This is the core aspects of this script, which is an attempt to demystify the slow action in policy drafting among governments and policy marking agencies (Krishnaa, 2023).

➢ *Risk Monitoring*

This is the complex part of smart contracts. In an ideal scenario a user is supposed to have risk compensation circuit breakers. (Chance, 2022) Which limits the entire loss through facilities such as insurance (Kalyvaki, 2023). To do that, it means there's need to have a robust real time monitoring systems to detect all the anomalies in real time, regular code audits and authentic formal verifications, decentralized oracles, regular upgrading controls, regular compliance with the regulatory arms, check clearances and fast incident response systems after a report to suspend a pending transaction. All these are very complex to be in proper functional hence proving to be uncertain (Danda et al, 2023)

➢ *Arbitrage*

Central governments have to treat and analyze the records and the flow of data through the central authorities, however for the case of virtual and argumentative reality the raw data is in the form of decentralized electronic ledger hence making it not flexible for easy tracking.

➢ *Innovations*

Each and every single day, there are countless innovations which are sky rocketing in the space. So, for a proper sensible regulatory policy it means the policy makers needs constantly upgrading and scaling the policies to cater for possible trending loopholes (Kalyvaki, 2023).

➢ *Stakeholder engagements*

When developing smart contracts, it's common that the code might failed to interpret the semantics of the judiciary legal document, which needs to be interpreted to a codified script. Stakeholders' involvement can easy this process by sharing their experienced insights, however there rest a challenge when some stakeholders are not illiterate when it comes to coding and artificial intelligence appreciation (Jackob, 2024).

➢ *Stability*

The jurisdictions always vary in the context that laws are diverse and vary with regions based on regional ethics, beliefs and environments, hence other laws are void in other

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regions unless if it is an international crime orchestrated by the end user. (Karimov, 2024) Taking an example that one has got a court order, on where and who enforces that order is tiresome since most of the interactions are virtual and are represented by avatars (Valente, 2024). This means that no one who entirely own the platform so to shut any user in case of any unfollowed protocol. The risk is too high of value manipulation. It means an individual can buy a lot of virtual currency and end up having an ability to control the market, causing an internal shock to the token market value (Vangapally, 2024).

- *Regular check ups*

Most of the token transactions or bitcoin which is one of the common types of currency are also virtual in nature, many of them might not be able to meet or to pin point each other because they are all scattered over the planet. Meaning to say, regular checking needs proper planning. It is reasonable to say that smart contracts need storage of large quantities of gigabytes of data and information. But to store and maintain large quantities of space is expensive if it is put to comparison with a transaction made on a piece of paper. In the global south, most of the banking systems are not designed to meet the recent trends like crypto currency bit coin etc. So, it implies that proper facilities for crypto tax, automated regulated liquidity provisions.

IV. CONCLUSION

In conclusion the regulation of smart contracts in virtual and argumentative reality to be legally valid and adopted by the central governments especially in the global south there's need of great collaborative work to be done by technical and professional specialists such as lawyers, computer science related, engineers' experts as well as the financial sector to rightly bring out a proper regulatory paper and structure, after the technology is fully matured.

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