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Bridging the Gap between Denotational Semantics of
Traditional Contract and Smart Contract

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Research Highlights

In this era of increasing cyber dependency in business dealings there is huge potential in the adoption of Distributed Ledger Technologies (DLT) particularly in the context of smart contract in the commercial world. The phenomenon of smart contract operates independently without the cumbersome need to engage any intermediary and is capable of executing specific task.(Thake, 2018) People relates it more to a piece of code (known as a software agent) that is designed to execute certain tasks if pre-defined conditions are met. Such tasks are often embedded within, and performed on a distributed ledger.”(Stark, 2016) However, if one accepts the contention that smart contract is not merely as a set of computer code but a smart legal contract which contains obligations and legal terms that are enforceable, hence, in programming or writing smart contract, one must ensure that the software developers who design smart contract take note of the legal rules and principles behind the specific type of contract in question. It has been argued that there is too much dependency on the programming aspect in the creation of smart contracts by programmers and computer scientists. (Khalil et al., 2017) In essence, if smart contract is to be regarded as smart legal contract or a binding enforceable contract, it must be expressed in a specific programming language that constitutes the substance of the legal norms. The correctness of the code is essential for ensuring the legal certainty that the program will execute the intention of the parties accordingly to the terms of the contract (Peters & Panayi, 2016). This paper proposes that there is a need to include lawyers and regulators to enhance the drafting of the corresponding denotational semantics in programming smart contract. Lawyers and regulators should be engaged in the early stages when designing smart contract such as identifying the type of agreements, possible legal implications, alternative and remedial actions of an agreement.

Research Objectives

The objectives of this paper are to first, demonstrate the semantic discrepancies between traditional contract and smart contracts and the implication of the latter. Secondly, to support the proposition that programmers and computer scientists lack the required legal knowledge and logic in appreciating the various legal terms and effects of a concluded contract, there is a need to include lawyers and regulators to enhance the drafting of the corresponding denotational semantics in programming smart contract. This paper contends that the





operational semantics which deals with the execution of the contract on technical platform should be consistent with and correspond with the denotational semantics.

Conclusions

Smart contracts has introduced into the commercial world a situation where computer code is capable of becoming law. This transformation has significant meaning particularly in the context of contract law. Algorithms on which the smart contract is based on need to be precise in order to avoid abuses and loopholes. As programmers and computer scientists lack the required legal knowledge, there is a need to include lawyers and regulators to enhance the designing of the corresponding denotational semantics in programming smart contract. On the other hand, lawyers and regulators should have the initiative to learn about the operational semantics of smart contract in order to appreciate its functionality. When smart contract have no consistency and correspondence with the law and legal principles, smart contract can only be regarded as set of computer code execute functions that has been pre-determined by the programmers or computer scientists. It can never be regarded as a binding contract in the legal sense. Although there is a lot of uncertainty and complexity surrounding smart contract and its development, it is important to take note of the limitations and nature of smart contract. (Subassandran, 2018) Smart contract and Distributed Ledger Technologies (DLT) are in their early stage of development and there is a great potential for this technology to have a positive impact in the modern cyber based society.

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