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SMART CONTRACTS (CODE VS. CONTRACT): AN OVERVIEW OF BLOCKCHAIN TECHNOLOGY AND LEGAL IMPLICATIONS OF SMART CONTRACTS FROM A TURKISH LAW PERSPECTIVE.

Not a day goes by without news on Bitcoin and cryptocurrencies. However, few articles highlight the importance of the underlying technology – blockchain – and its potential. In fact, cryptocurrencies are mere implementations of blockchain technology, and various other examples of this new technology will be seen in the future. Blockchain is now viewed as an infrastructure for self-executing and performing autonomous smart contracts.

What is blockchain?

The blockchain is the technology underlying the Bitcoin. A blockchain is a "distributed database", which is updated and maintained by a decentralised network of participating computers, or "nodes". This unique nature allows blockchain to be used as an electronic ledger to record ownership over assets. Under a blockchain system, upon a triggering action, the network is designed to automatically produce outputs without third-party intervention, which makes the entire network system reliable and tamper-proof (i.e. unchangeable) and not dependent on the parties' trust in each other.

What are smart contracts and why use them?

So, what is a smart contract? Smart contracts are self-executing contracts put into operation using a computer code and performed by a network system without any human input following its initiation by the parties.

A smart contract is different from a traditional contract performed via computers. Setting up an automatic money transfer order via online banking is not a smart contract arrangement, as either the customer or the bank may intervene, terminate or change the order at any time. Conversely, a smart contract is executed and performed autonomously without the parties being able to interfere, or run the risk of it being tampered with. Accordingly, the autonomous nature of self-execution and performance rights and obligations are the fundamentals that make smart contracts "smart".

Smart contracts have certain practical advantages over traditional paper contracts:

- Certainty: Since the smart contracts are implemented by computer codes, there is no room for any ambiguous natural language maybe used in traditional contracts.

- Speed: Like any types of computer automation, smart contracts are executed and implemented almost instantly without human involvement.

- Cost: Although there will be upfront costs for development and implementation of the smart contract platform, the operating costs associated with the performance of smart contracts will be low, since there will be almost no human involvement at the performance phase.

Despite their advantages, there are no concrete smart contract solutions implemented in practice yet. However, there are projects run by startups and financial institutions, which are considered as experimental (e.g. Ethereum, Corda and Decentralised Autonomous Organisation).

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Why the blockchain technology can be used for smart contracts?

Blockchain is a crypto-secured, tamper-proof chain structure based on a distributed ledger and decentralised network, which makes an ideal infrastructure to accommodate the fundamentals of smart contracts:

- <u>Crypto-Secured:</u> Under the blockchain, only authorised participants are entitled to enter valid transactions by using unique cryptographic keys, which can be reassembled as the unique signature identifying the transaction party authorised to sign the contract.

- <u>Tamper-Proof Chain Structure:</u> Blockchain is formed by chaining data blocks together to form the ledger. As and when a data block is verified and recorded into the blockchain, such data block recording the transaction(s) cannot be altered, deleted or removed, which makes it tamper-proof and unchangeable.

- <u>Distributed Ledger and Decentralised Architecture:</u> In a blockchain, there is no single database controlled by a centralised governing body. Instead, there are various nodes administering a distributed ledger, which regulate and implement the rules for the recording of new data entries (e.g. new transactions) into the blockchain ledger. The blockchain ledger is distributed amongst participants who each keep their own separate identical ledger, which results in the processing and implementation of each transaction to be conducted without the interference of the parties to the transaction, and administered and cleared using the network that they do not directly control.

When the decentralised feature is linked together with the tamper-proof nature of blockchain technology, the system becomes a "locked cage", as a participant would not be able to alter or remove any of the data blocks unless all participants agree. Accordingly, blockchain eliminates the risk of parties' exposure to third party interference or corruption in the processing of the transactions forming the data block.

What are the possible examples of smart contracts?

There is no doubt about growing interest in using and testing blockchain technology in a variety of mediums and purposes, by questioning – and sometimes belittling – the "traditional contract". On the other hand, certain sectors including global financial sector take this technology extremely seriously, and have started developing and testing the technology on automated online payment systems.

It is clear that we will see different applications of blockchain technology for smart contracts. Simple derivative products such as options can be used as an example of a transaction that can be executed through a smart contract platform. For option transactions, the smart contract and blockchain platform would operate as the record-keeper for the title, custodian and intermediary, as well as the clearing and settlement system. Recently, a consortium including BP and Royal Dutch Shell announced that they will develop a blockchain-based digital platform for energy commodities trading by the end of 2018 in order to reduce the administrative operational risks and costs of physical energy trading.

What are the legal implications of smart contracts?

Smart contracts are based on software languages, or "codes". A code is the set of instructions forming the software which is executed by a computer in an abstract manner to produce real-world output. Coding and legal drafting are two different concepts. Codes are prepared by human language but in a computer-readable manner that takes effect by electronic execution, and is performed by computer drivers in a predetermined pattern and process, which cannot be operated in case of error or ambiguity. On the other hand, traditional contract obligations are based on human language, which takes effect upon the parties' agreement and is performed in line with its interpretation of the human language text, which can itself contain errors and ambiguous text. Accordingly, there is a gap between "code" and "contract", which is required to be erased so as to give life to smart contracts.

Under Turkish law, at a minimum, a legal contract must include an offer and an acceptance as well as the intentions of the parties that the contract should be legally binding. Amongst many others (e.g. artificial intelligence), one heavily discussed method (and probably the most realistic in terms of practice and implementation) is to create a "wrapper" to wrap the code in a contract in order to ensure that performance of the code is legally binding by means of a traditional legal contract. The wrapper should procure that a valid offer and acceptance are in place to satisfy the requirements under Turkish law. In other words, a wrapper is fundamentally required in the form of a "pre-agreement" to authorise the code to execute the smart contract. This could be created by ensuring that the launch of the smart contract is pre-authorised by the parties using human language to perform the code (for instance, by clicking "I agree" to the preset terms), which would give the smart contract the binding nature and effect of a traditional contract.

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Although a wrapper would generally work for traditional contracts, it would not work in cases where the law requires the observance of strict formality requirements for certain types of transactions (e.g. execution of a standard form transfer deed before the title deed registry to transfer title over real estate). For such specific types of transactions, we would need lawmakers to revise the current legislation, as well as adopt the technical and operational infrastructure to reconcile with the existing system and database. Some Turkish technology utopians and early adopters may see smart contracts as a medium to eliminate the existing, conventional infrastructure of the legal system. However, until lawmakers take the necessary actions, one should not disregard the power of traditional laws. The law will always prevail over technology as the ultimate authority of the "legality" and "enforceability" of a code-based, self-execution smart contract will be the courts.

What next?

In the long term, the development of smart contract might be interpreted as a beginning of a general shift from traditional paper to self-executing code agreement. Nonetheless, despite technology, smart contracts will not be suitable for all transactions. Traditional contracts will be required as humans will always need "interpretation" and "flexibility" in relation to the operation of legal concepts. On the other hand, there is no doubt that smart contracts will be a medium to execute transactions that are simple in nature, and which do not require interpretation or human intellect. As global digitalisation progresses, we will see the expansion of blockchain technology beyond its current implementation in directions that will change global business as well as the operation of law.

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