



THE APPLICATION OF BLOCKCHAIN AND SMART CONTRACT TECHNOLOGIES UNDER CHILEAN LAW: REGULATORY CHALLENGES

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The concepts of “blockchain” and “smart contracts” have been receiving increasing attention over the last few years, although both of them came into existence more than ten years ago. This interest was sparked globally after the explosive popularity of Bitcoin, the first and best known of the cryptocurrencies, which emerged with blockchain as its ecosystem. A few years later, the old concept of smart contracts returned to popularity, since blockchain provides the ideal medium for this type of contract to work effectively. Blockchain and Smart contracts have undergone several technological improvements since they were first developed. This is for a good reason: they have a huge potential for solving problems of daily life for everyone and over a wide range of areas.

Despite their increasing popularity, there are only a few countries in the world that have regulations covering these technologies and Chile is not one of them. This confirms once again the classic legal saying: “law will never keep pace with technology.” In this article, we will briefly explore these technologies and provide an overview of the impact they could have on Chilean laws and regulations.

I. THE BLOCKCHAIN

The blockchain was first developed in the year 2008, described in a white paper written by Satoshi Nakamoto called “*Bitcoin: A Peer-to-Peer Electronic Cash System.*”¹ This described the idea of a “purely peer-to-peer version of electronic cash (that) would allow online payments to be sent

directly from one party to another without going through a financial institution”,² as a response to the banking “subprime crisis” of 2007-2008. In simple terms, Bitcoin is money without the intermediation of banks.

The main problem that Satoshi’s proposal tried to solve was the “double-spending”

of a digital file in a decentralized environment. This refers to the fact that a digital file could be unduly duplicated or falsified, creating unwanted copies of such record, thereby increasing the number of them artificially. This is a critical problem for digital files that represent money or aims to have some monetary value.

¹ <https://bitcoin.org/bitcoin.pdf>

² *Ibid.* Pg. 1.

Satoshi's solution was the creation of a decentralised and immutable public ledger made of consecutive blocks of data of one megabyte each, containing every online transaction in the history of the Bitcoin ecosystem and secured through the use of cryptography.³ The purpose of this ledger was to keep an account of all transactions made by anyone, anywhere in the world, and to have this available for anyone's review. In order to add a transaction to a block of this public ledger, the transaction would need to be reviewed and confirmed by various decentralised third parties, called "full nodes" and "miners". These third parties would have to follow "consensus rules"⁴ based on the contents of this public ledger. As a product of the verification process, "miners" would finally add the valid transactions to the ledger and eventually get rewarded with a newly created Bitcoin (or fractions of it).

Today, Satoshi's ideas have been copied by several other cryptocurrencies that have their own blockchains⁵. Furthermore, several companies, foundations and groups of individuals are currently working on perfecting the system with new models of blockchains, faster architectures, or by means of interconnecting several existing blockchains to generate an "internet of blockchains".⁶

Moreover, various companies, institutions and even some countries have taken the core of the system and created or intended to create public or

private, centralized or decentralized, blockchains for purposes different to peer-to-peer electronic cash, in order to take advantage of their reliability, security and efficiency. For example, Chile is a pioneer in implementing blockchain technology in the energy sector.⁷

II. SMART CONTRACTS

The concept of smart contracts is older than blockchain. It was described for the first time in Nick Szabo's 1996 publication called "*Smart Contracts: Building Blocks for Digital Markets*", which defined them as "a set of promises, specified in digital form, including protocols within which the parties perform on these promises."

As explained by Szabo "the basic idea of smart contracts is that many kinds of contractual clauses (such as liens, bonding, delineation of property rights, etc.) can be embedded in the hardware and software we deal with, in such a way as to make breach of contract expensive (if desired, sometimes prohibitively so) for the breacher".⁸ The original idea of Szabo for a smart contract considered: (i) a computer code containing clauses of a contract; and (ii) a running software program that interprets the code, accepts input conditions and decides on outcomes.¹⁰ Smart contracts can make agreements automated and easy (e.g. direct and automatic payments at certain dates or upon the fulfilment of certain conditions without an intermediary).

However, the concept could not really be implemented until the rise of the blockchain, given its increased reliability, security and efficiency. Although Bitcoin is capable of producing smart contracts, it is limited in its application. For this reason, a young Russian programmer called Vitalik Buterin created his own blockchain and cryptocurrency with greater capabilities for the use of smart contracts. This new smart contract platform was named Ethereum¹¹, the new cryptocurrency was called Ether, and it changed the blockchain industry as we knew it.

Today, several permissioned (i.e. allowing certain actions to be performed only by certain identifiable participants) and public blockchains provide not only smart contract solutions but also centralized and decentralised applications, and cross-chain compatibility. Furthermore, cryptocurrencies have increased their functionalities (e.g. utility tokens, tokenised securities, etc.).

III. BLOCKCHAIN AND SMART CONTRACTS UNDER CHILEAN LAWS AND REGULATIONS

In spite of its explosive development, there are still a lot of doubts surrounding blockchain. The rise of a new kind of digital value ecosystem, including other types of blockchain-based digital assets, cryptocurrency scams, and also the elimination of typical intermediaries (e.g. banks) for the transfer of monetary value, among others factors, have set off alarms in a number of countries. In particular, financial and securities authorities are detecting legal and regulatory loopholes in their jurisdictions. Other countries, however, which see blockchain in a more favourable light, are studying its application and have already started to prepare applicable laws and regulations.

Divergent opinions have also arisen regarding smart contracts. There are people who believe smart contracts will definitely change the way in which we legally interact with each other. This "new law" (i.e. computational codes) should replace legal institutions as well as the need for long and time-consuming procedures. Others think that there is no

³This is defined as the practice and study of techniques of secure communications in the presence of third parties.

⁴ <https://bitcoin.org/en/glossary/consensus-rules>

⁵ E.g., Litecoin, Ethereum, Dash, and Neo.

⁶ For example, please visit: <https://wanchain.org/>

⁷ <http://energiaabierto.cl/>

⁸ http://www.fon.hum.uva.nl/rob/Courses/InformationInSpeech/CDROM/Literature/LOTwinterschool2006/szabo.best.vwh.net/smart_contracts_2.html

⁹ *Ibid.* pg. 1

¹⁰ Can smart contracts be legally binding? R3 and Norton Rose Fullbright paper, pg. 7. Available at <http://www.nortonrosefulbright.com/files/r3-and-norton-rose-fulbright-white-paper-full-report-144581.pdf>

¹¹ <https://github.com/ethereum/wiki/wiki/White-Paper>

way automated “technical artefacts” can duly cover and solve all the complexities and issues inherent to human and legal relationships. This last group also thinks that it is highly unlikely that smart contracts will be free from mistakes and computational glitches or bugs.

In our opinion, it is of paramount importance that Chile should start analysing the different applications of blockchain and smart contracts, as well as how these technologies will (or should) interact with our laws and regulations. There are a number of pending questions to be answered, such as: (i) how we will resolve the lack of a real person

with a proper identity in some smart contracts executed between machines; (ii) what the predominant language and applicable interpretation rules will be in smart contracts; (iii) who will be liable in cases of breach or bugs in the codes occurring in a decentralised ecosystem; (iv) how reliable smart contracts will be and how they should be enforced before courts of justice; (v) how smart contracts will be evidenced in a court of law (considering their codified nature); and (vi) how we will avoid fraud and comply with special regulations that require the execution of written documents in the Spanish language.

In other words, the task and the challenge is to determine to what extent blockchain and smart contracts can be governed and interpreted by using our general laws, principles and legal institutions, and what needs to be modified and/or updated in order to allow their development in our country. As happened with the Internet in its early days, we still cannot be sure of all future implications that these technologies could bring, but we ought to be prepared and to start thinking about how they could improve our day-to-day life, in a secure, efficient and regulated manner.