The potential impact of blockchain and smart contracts on the Chilean telecommunication

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Introduction

Although blockchain and smart contracts are young, still-evolving and need to be tested and improved, they are already promising a revolution in different areas of the economy, and this is not unfounded; both could bring huge improvements across many areas. Imagine being able to get a mortgage, buy an apartment and get the relevant records immediately registered under your name with no need to make legal reviews of these transactions in just one click.

The telecommunications sector is no exception. In this article, we explore these technologies and their application in the telecommunications market and give an overview of potential regulations that could be implemented in Chile to facilitate their use.

What are they?

Blockchain

Blockchain was born in 2008 on the publication of 'Bitcoin: A Peer-to-Peer Electronic Cash System',[1] a whitepaper signed by Satoshi Nakamoto which 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] The most accepted theory is that Nakamoto developed the idea in response to the 'subprime mortgage crisis'[3] of 2007–2008.

The main problem solved by Nakamoto's whitepaper was the 'double-spending' of a digital file in a decentralised environment, whereby a digital file is unduly duplicated or falsified, creating unwanted copies and artificially increasing the number of files.

Prior to the whitepaper, a touted solution to the double-spending problem of a digital asset was the introduction of a trusted central authority, similar to a bank, which would manage assets and review and confirm transactions. Nakamoto asked: do you need a central authority?

In simple terms, his answer was the creation of a decentralised and unmodifiable public ledger made of consecutive blocks of data that contain a record of every bitcoin transaction and are secured through cryptography. The ledger tracked the accountability of transactions that anyone anywhere can review.

To add a transaction to a block of this public ledger, the respective online transaction would need to be reviewed and confirmed by various decentralised third parties, called 'miners', that detected if the transaction is malicious and, at the same time, if other miners – that were also confirming transactions – were also malicious. A set of 'consensus rules' that miners must follow governed this process. As a product of the work in confirming these transactions, the miners were eventually rewarded with a newly created bitcoin (or fractions of it). Due to this system, and the first consensus algorithm called 'proof of work', the public ledger was extremely secure and, theoretically, almost 'unhackable'.[4] As a consequence, the blockchain and the first cryptocurrency – bitcoin – were born.

Today the blockchain is used by several cryptocurrencies. Some of them aim to perfect or produce new models of the blockchain and/or create a cross chain interconnection of existing blockchains in what is known as the 'internet of blockchains'.

Likewise, various companies, institutions and even states use, have created or intend to create blockchains for different purposes because of the technology's increased reliability, security and efficiency. The International Business Machines Corporation (IBM) has been a pioneer in offering blockchain services for food safety, private equity and trusted identity. Other companies such as Walmart, Visa, Mastercard, Samsung, British Airways, UPS and Fedex are implementing or have tested blockchain technology to fight fake identities, keep track of their supply networks, speed up payments, store records, manage data about flights or solve customer disputes, among other uses. Santander launched a foreign-exchange service that uses blockchain technology to make same-day international money transfers.

States are using the technology, too: Chile will be one of the pioneers in implementing blockchain technology in the energy sector to authenticate information such as marginal costs, average market prices, fuel prices and compliance with renewable energy law. The use of this technology has not been without controversy. Currently, Chilean banks have been closing the accounts of all cryptocurrency exchange companies in Chile, arguing, in general, that this technology is not regulated and could be used to implement money laundering. Countering these actions, cryptocurrency exchange companies have submitted legal remedies before Chilean ordinary and anti-trust courts, arguing that they have been voluntarily providing all available information about their client base to relevant governmental authorities and that they have strong 'know your client' policies. They accuse banks of intending to harm their right to develop a legitimate economic activity and of abusing of their dominant position in the market.

Chilean anti-trust courts have compelled the banks – by granting a precautionary measure – to reopen the relevant accounts. However, the controversy is far from being resolved.

Smart contracts

In simple terms, a smart contract is software that may execute, facilitate, enforce or verify a contract automatically without the involvement of third parties. The concept was relatively old[5] but wasn't possible until the rise of a new blockchain/smart contract platform: Ethereum. This new blockchain was created by a young Russian programmer, Vitalik Buterin, and he has changed the blockchain industry as we originally knew it.

The Ethereum smart contract technology could be used, for example, to pay a party or to transfer a digital asset automatically once a deadline is met, once a bet is won or, in general, when a verifiable situation is fulfilled, to the extent allowed by the technology. This technology could also be used to create 'decentralised applications that run exactly as programmed without any possibility of downtime, censorship, fraud or third-party interference'.[6] All this information, of course, is recorded in the Ethereum blockchain.

Ethereum smart contracts are different from the blockchain and, consequently, could be victim to hacks or bugs more easily. For this reason, its application should be carefully reviewed by experts before implementation.

The most relevant way this technology is used today is through a new form of crowdfunding called initial coin offerings (ICOs). The purpose of the ICOs is similar to an initial public offering (IPO) of company shares; the ICOs create a new digital asset offered to venture capitalists. The process is completely automated through a smart contract designed to send the new digital asset (named token) once Ether (the cryptocurrency of the Ethereum platform) is received.

Besides ICOs, companies are also starting to use the smart contract technology for their businesses. Slock.it and Share & Charge use it to automate the process of paying for electric vehicle charging stations and AXA uses it for airlines' insurance services.

Application and regulation

If these technologies prove to be as revolutionary as they seem, they will likely dominate several telecommunications and technology areas. These new areas would need to be specially regulated to assure the technologies' efficacy and security and/or to protect consumers. We believe the following are particularly likely to embrace these new technologies.

Telecommunications and consumers

Telecommunications operators could easily implement blockchain and smart contracts in interactions with their service users. Blockchain could facilitate the management of large databases and increase their security against hacks. Smart contracts could ease the process of contracting, modifying or terminating services (including the operation of number portability)[7] without the operation of a human being or a third party.

New blockchain companies could invigorate the telecommunication sector with fresh ideas. For example, the cryptocurrency Telcoin (a project still in its early stages) seeks to facilitate online remittances, transfers, payments and e-commerce within its partnering telecommunications operators.

If more telecommunications operators implement blockchain and smarts contracts or the sector sees an eruption of new companies like Telcoin, special regulations could be required in order to protect telecommunications users.

In the case of Chilean laws and regulations, the introduction of a new regulation in the Consumer Protection Act (Law No 19,496), focused on transparency of content in smart contracts made by telecommunications operators, a new regulation in the Data Protection Act (DPA) (Law No 19,628) regarding the right to accept and/or the right to access and know personal data contained in a blockchain, or of regulations regarding the responsibility of the telecommunications operator in the use or misuse of a cryptocurrency would seem reasonable.

There could also be specifications in the Informatics Crime Act (Law No 19,223) regarding frauds or misuses committed through the hack or unwanted modification of a blockchain or smart contract.

The Chilean telecommunications regulator, the Undersecretary of Telecommunications (Subtel), could also have special faculties in the General Telecommunications Law (Law No 18,168) to oversee misconduct with the use of these technologies that potentially damages the telecommunications services' subscribers.

International roaming services

For years mobile network operators (MNOs) have offered international roaming solutions to their clients in several places across the world. For MNOs to execute this seemingly simple service requires many resources and the participation of multiple parties.

Several analyses have proposed that a smart contract may offer a more efficient solution by getting rid of the data clearing house (DCH) – which processes the exchange of roaming billing information – between a home operator and a visited operator. A smart contract between two operators with a roaming agreement would designate nodes from both operators to act as miners in order to verify the authenticity of the transactions broadcasted on their networks over the blockchain.[8] There are already ongoing private projects aiming to create a blockchain solution for international roaming, such as Bubbletone.

Others

The use of blockchain and smart contracts could also solve several problems in the telecommunications industry, handle transactions with multiple parties, simplify supply-chain management, interconnect networks all over the world and help the massive implementation of 5G, IoT and M2M services, including the development of 'smart cities' and 'automated mobility'.

Telecommunications-related uses

PUBLIC DATABASE MANAGEMENT

Due to the increasing complexity and specificity of many business sectors, governments have been requiring and recording an enormous amount of information that is very difficult to classify. The majority is entrusted to the same requesting party (eg, governmental agencies) or third parties assigned by the authority with the assistance of private stakeholders. This sensitive information is safeguarded in databases managed, in most cases, with deficient safety policies that fail to protect them being compromised.

Blockchain and smart contracts may offer a reasonable solution in their assurance of transparency, efficiency, security, authenticity and safe processing of the information contained in public databases.

In the Chilean telecommunications sector, a good approach would be to analyse the migration of public databases or the licence-granting procedures to a blockchain-based structure. These databases could interact with the users of the same through smart contracts, for example, in the filing of concessions, permits and/or licence applications. It would also be reasonable to implement smart-contract mechanisms for operators' routine duties such as their obligation to deliver periodical technical and commercial information to Subtel.

IDENTITY-AS-A-SERVICE

The multiple goods and services offered in the modern economy are creating serious difficulties in the way people identify and authenticate themselves to providers. Current possibilities do not remove the need to have multiple accounts with multiple passwords, each of which store information in many places. This gives huge opportunities for hackers or even data processors to perform security breaches, as has happened many times in the past ten years (see the Equifax breach or the Cambridge Analytica case).

Blockchain may provide 'identity authentication across devices, apps and organisations, helping consumers reduce the hassle and privacy threat of identifying themselves to government agencies, banks and other businesses'.[9] Telecommunications operators, due to the nature of their services, are well positioned to offer identity-as-a-service (iDaaS) to customers. To the extent allowed by technology, iDaaS services seek to consolidate digital identities into one secure personal ledger, which would be entitled to grant encrypted access to information required by relevant goods and services provider, which is only accessible when a smart contract condition is triggered. All information would only remain in one place, where the individual's digital identity is located.

Of course, in Chile, the application of technology in this area would need to be in full compliance with the laws and regulations in force and especially with the DPA. However, as explained, we believe that some regulations would need amendments to match these new technologies.

Conclusion

We believe that blockchain and smart contracts may offer broad solutions to a whole sector of industries in an era where information is playing a leading role as an essential and valuable asset of the new digital economy. The way these enormous amounts of information interact via global interconnected networks provides an efficient understanding of cultures, patterns and behaviours and the opportunity to democratise the participation of people in any kind of endeavour from any place in the world.

However, the global interaction of information requires two pivotal pillars that are difficult to acquire: trust and efficiency. The implementation of blockchain and smart-contract technologies, if proven as revolutionary and safe as it appears, aims to challenge the absence of these factors in a world where digital information travels faster and much further than a human body, but in an insecure and non-efficient environment.

The laws and regulations must be updated to accommodate these new technologies because precautions must be taken and companies and consumers must be protected from misuse.

These technologies do not have natural frontiers or jurisdictions as limitations. It is indispensable therefore for the international community to take the lead on providing a global regulatory framework in order to assure the rights of the people all over the world and, more importantly, to encourage the creation and use of technologies that will make our lives different and better. Local complementary laws and regulations should also be implemented in order to achieve the same objective at state level.

Finally, both blockchain and smart-contract technologies are designed to operate over the internet. If ISPs are allowed to slow down, block, restrict or limit blockchain, smart contracts or similar software information, the application of these new technologies could be harmed and their integration delayed and even jeopardised. Antitrust and net neutrality regulations should be also reviewed and reinforced in order to guarantee free competition and technological innovation to the benefit of all consumers worldwide.

Notes

[1] Satoshi Nakamoto, *Bitcoin: A Peer-to-Peer Electronic Cash System*, see **https://bitcoin.org/bitcoin.pdf (https://bitcoin.org/bitcoin.pdf)** (accessed 28 May 2018).

[2] *Ibid,* 1.

[3] Bitcoin aimed to create an online payment system without going through a financial institution and Nakamoto added the following phrase to the 'genesis block' of bitcoin: 'The Times 03/Jan/2009 Chancellor on brink of second bailout for banks'. See **www.investopedia.com/news/what-genesis-block-bitcoin-terms/ (http://www.investopedia.com/news/what-genesis-block-bitcoin-terms/)** (accessed 28 May 2018).

[4] In order to 'hack' the blockchain somebody would need at least 51 per cent of the network mining hashrate (ie, the individual would need to be confirming 51 per cent of transactions). This would be extremely expensive due to the quantity of computer power and electricity needed to do so.

[5] Nick Szabo*, Smart Contracts: Building Blocks for Digital Markets*, see **www.fon.hum.uva.nl/rob/Courses/InformationInSpeech/CDROM/Literature/LOTwinterschool2006/szabo.best.vwh.net/smart_contracts_2.html (http://www.fon.hum.uva.nl/rob/Courses/InformationInSpeech/CDROM/Literature/LOTwinterschool2006/szabo.best.vwh.net/smart_contracts_2.html)** (accessed 28 May 2018).

[6] See **www.ethereum.org (http://www.ethereum.org)** (accessed 28 May 2018).

[7] Number portability allows users to change their company while retaining their original phone number. In most places, this is a semi-manual process in which the user has to apply to the new company. In turn, the new company have to contact the old company which could take some days. The smart contract technology could help to automate the process in a trusted manner. This parenthesis could be eliminated if desired.

[8] Blockchain@Telco, 'How blockchain can impact the telecommunications industry and its relevance to the C-Suite', Blockchain Institute, Monitor Deloitte, pp. 10–11, see **www2.deloitte.com/content/dam/Deloitte/za/Documents/technology-media-telecommunications/za_TMT_Blockchain_TelCo.pdf (http://www2.deloitte.com/content/dam/Deloitte/za/Documents/technology-media-telecommunications/za_TMT_Blockchain_TelCo.pdf)** (accessed 28 May 2018).

[9] IBM Institute for Business Value, *Reimagining telecommunications with blockchains from concept to reality*, see **https://public.dhe.ibm.com/common/ssi/ecm/gb/en/gbe03901usen/reimagining-telecommunications-with-blockchains.pdf (https://public.dhe.ibm.com/common/ssi/ecm/gb/en/gbe03901usen/reimagining-telecommunications-with-blockchains.pdf)** (accessed 28 May 2018).

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