

SMART CONTRACTS AND CONSUMER PROTECTION

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Abstract

With significant advances in hardware engineering and computer science, a phenomenon of technological disruption is occurring, mainly due to the evolution of the blockchain and artificial intelligence. This has been called a fundamental paradigm shift. The Internet is becoming a market where products, services, and business models converge. For its part, digital technology has been introduced into homes, and we have learned to live with it; this is the “digitalization of the everyday.” This all contributes to the existence of risks for the consumer, especially risks concerning their freedom and particularly their freedom to make conscious decisions. It is, therefore, the duty of European institutions to regulate consumer rights concerning blockchain services and smart contracts, particularly the rights to information.

Keywords

smart contracts, blockchain, consumers, distributed ledger technology (DLT), disruptive technologies, consumer law, digital contract, oracles.

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I. Disruptive technologies, consumers, and legal challenges

According to Losano, the history of law has been conditioned by three revolutions: writing, printing, and electronic data processing.² The professor of the Philosophy of Law and Legal Informatics at the University of Milan was right when he said these words 25 years ago. A long time has passed in the context of IT as a science, and several milestones have already occurred: the Web 2.0, the Internet of value, cloud computing, Big Data, distributed registration technologies (such as blockchain and smart contracts), artificial intelligence, the Internet of things (IoT), robotics, the 4.0 industrial revolution, etc. Today, more than ever, we require a peaceful union between science and law.

The irruption of these technologies has been exponential because of the significant advances in hardware engineering and computer science. Moreover, many researchers have been discussing disruptive technologies and what has been called a fundamental model or paradigm shift. As Kushida *et al.* argue, we have moved from computing scarcity to computing abundance.³ This revolution in computing is accelerating the commoditization of products, services, and business models, and substantially modifying existing information and communication technologies. Of all the technological advances occurring, blockchain and artificial intelligence produce or can produce the most significant legal impacts and pose the most problems.

The question is whether the legal systems, rooted in history as they are, can adapt from their current bases and foundations or, on the contrary, if adoption will disrupt the legal systems? In this sense, the use of blockchain must be accompanied by the establishment of an appropriate ethical and legal framework, as has been reiterated in the various documents published by the European Union institutions on this subject. It is essential that there be a proportional intervention in the sector and that clear criterion be established to determine which applications are based on “high risk” blockchains or those that pose significant risks, particularly in terms of consumer rights. However, it is a fact that, today, the so-called phenomenon of empowerment of consumers is occurring, with a variety of norms, rules, and judicial decisions favoring the client/consumers; this phenomenon is based on the now traditional idea of contractual imbalance.

² Mario Losano, *Los grandes sistemas jurídicos. Introducción al derecho europeo y extranjero* (Ed. Debate 1993) 41.

³ Kenji E. Kushida, Jonathan Murray, and Jonh Zysman, ‘Cloud Computing: From Scarcity to Abundance’ [2015] JICT.

In general, the business possibilities online and the interaction of users and consumers have multiplied clearly. Consumers have become accustomed to the use of digital technology in their daily lives, to the “digitalization of everyday life,” which entails constant interaction with companies. This interaction translates into the large production of data that are used for social and economic indexing and whose purpose is, above all, consumption. However, more dangerous purposes exist, including ideological, political, and religious indexing.

Since the 1990s, the Internet has changed our lives. It has become the standard platform for the free flow of information. People, data, and business models have relied on the Internet as their major platform. Online governance is based more on trust than the protection provided by specific legal rules. In short, we share information and make purchases because companies give us confidence, not because the rules that protect us; we interact out of habit, for business, or because of a particular need.

Today, because of public-key cryptography and distributed registration technologies, we are witnessing a new era in which the value and digital patrimony is a fact. We are moving from trust as the driving force behind the circulation of information to security. Thus, the so-called Internet of value has emerged because it is possible to carry out acts and conduct legal business in a secure manner using cryptographic techniques and decentralized networks, where consensus is preferred to trust.

Lee states that “[b]lockchain is expected to be a key technology that enables new protocols for the establishment of a token economy in the future, leading to a new economic paradigm.”⁴ Visconti explains that the symbolic economy is breaking with traditional business models and is a reality today in such sectors as commercial transactions, real estate, transport, e-commerce in general, the stock market, insurance, and loans; in short, the new model is the transfer of value through open standards.⁵

From a legal point of view, the Internet of value implies the pseudonymization of people and the tokenization of things and services. It is a qualitative leap from the real to the symbolic. However, all this has its risks. Blockchain technologies can significantly affect freedom, especially, the freedom to make conscious decisions and particularly freedom of contract and pacts in the field of consumption.

The digitalization of everyday life is resulting in the disappearance of the freedom to

⁴ Jei Young Lee, ‘A Decentralized Token Economy: How Blockchain and Cryptocurrency Can Revolutionize Business’ [2019] BH.

⁵ Roberto Moro Visconti, ‘Blockchain Valuation: Internet of Value, Digital Networks and Smart Transactions’ (2019) SSRN <<http://dx.doi.org/10.2139/ssrn.3533860>> accessed 10 October 2020.

make contracts, which was enshrined in old Europe with the implementation of the ideas of the French Revolution and which took shape in the codification of civil law; thus, human will becomes unconscious and predictable. The equality of the parties to a contract does not even exist in the application of consumer protection regulations since the change of paradigm affects the rights and freedoms most precious to human beings.

Moreover, the implementation of distributed registration technologies and data processing, as far as their application to consumption is concerned, fundamentally affects individual freedom as it makes our conscience collective. In this sense, the digitalization of everyday life restricts freedom and commercializes our private life. This is a problem because the consumer assumes that this is a habitual and regular lifestyle. We have learned to live with it.

At present, legal rules do not provide answers to this problem because greater state control of information, monitoring of advertising, etc. are not enough. There is a need for blockchain and smart contracts to be associated with a specific regulatory framework. Smart contracts will undoubtedly have a broad impact because they allow the formalization of any legal relationship. Furthermore, from this point of view, their treatment must be twofold:

A) the study of the legal implications of smart contracts, primarily in the field of consumption and

B) as an instrument for making intelligent laws in general, such as in the drafting of legal rules, which serve as tools that are classified as legal tech.

At this stage, consumers and the challenges of blockchain technologies and smart contracts must be considered. The consumer–customer binomial takes precedence over the value of a “person” through the modification of the law’s very structures and of civil law in particular. It is necessary to establish legal norms and rules that consider the person as an end in itself and not merely a commercial instrument. For, as Martínez de Aguirre states, the meaning and purpose of civil law is “the protection and service of the person, understood as a human being.”⁶

The debate is open, in our opinion, consumer law is not exclusively patrimonial; instead, the person/consumer is an underlying value in his or her entirety, and therefore his or her humanization is necessary. Technology must be an instrument that contributes to this. The phenomenon of technological disruption must, therefore, be accompanied by a high level of

⁶ Carlos Martínez de Aguirre, *El Derecho civil a finales del siglo XX* (Ed. Tecnos 1991) 111.

consumer protection. With the forthcoming generalization of the use of distributed registration technologies and crypto-contracts, legal rules and principles must be added to provide legal certainty, apart from technical security. It is common practice, in the field of the internal market, for European Union bodies to generalize through an abundance of documents and rules that come to overwhelm legal operators in general and consumers in particular. Rather than provide clarity to postulates, this produces the effect opposite to the one they seek.

As the linchpin of any system for protecting consumer rights, information and transparency must be translated into clear, concise, straightforward rules. Moreover, a unified code of European digital contracting that would aim to unify criteria, rules, and practices should be proposed. In our opinion, this would be the real legal disruption in the face of the market changes resulting from new digital technologies. The main reasons could be the supranational dimension of many of these companies, the trend towards standardization of their contractual models, and the increasing incidence of electronic procurement. These reasons have given rise to the term “e-contract law,” which legislators often have to take into account since technical developments are often far beyond their control.

II. Distributed ledger technology and blockchain

At this time, a study of digital legal traffic cannot be conducted without addressing cryptographic and computer sciences since they are essential for understanding the technical systems needed for the legal treatment of digital traffic. This is why we must delve deeper into blockchain: it is the technology on which intelligent contracts are based.

Blockchain is a class of so-called distributed ledger technology (DLT). In 2008, one or several anonymous authors, under the pseudonym “Nakamoto,” claimed that there was the possibility of a decentralized peer-to-peer electronic cash network.⁷ In general terms, this technology that creates a chain of data block structures, in which the union or link between blocks is made using the meta-information of the previous block. It is like a large transaction log with a “debit” and a “credit,” with each page representing a block and showing information from the previous page. In turn, the accounting book is stored in every computer in the network (nodes). The accountants are called miners and are responsible for

⁷ Satoshi Nakamoto, ‘Bitcoin: A Peer-to-Peer Electronic Cash System’ (Satoshi Nakamoto Institute, 31 October 2008) <<https://nakamotoinstitute.org/bitcoin/>> accessed 25 February 2021.

recording the book's "debits" and "credits" and verifying the reality of the entry. When a miner closes a page, it can no longer be modified without conflicting with the subsequent page. Therefore, each page in this "virtual accounting book" is immutable, providing indisputable evidence of the contract or specific transaction.

The reason for its existence or usefulness lies in the reliability and integrity of the data. This represents a significant advance in security and, therefore, an instrument at the service of the law. Thus, blockchain is one of the most reliable techniques for establishing relationships in digital legal traffic, and immutability is one of its essential characteristics. Thus, the information contained in the blocks cannot be modified for the following reasons:

a) The number (hash) of each block is unique. This also depends on the information it contains; if the information is modified, the hash changes. Changing the unique number is not identified by the previous or subsequent block, so the string is broken and invalidated in the particular node that has been maliciously modified.

b) Each node contains a copy of the blocks. There is no single chain of blocks because it is replicated in all the nodes (distributed registration). If a user were to alter any block, the altered node would not coincide with those of the other nodes. In such a case, it would be invalidated.

The nodes must follow the same rules, protocols, and updates. The miners validate the transactions and blocks by agreement between them. This is called "consensus" and is based on rules and records. The rules are the agreed parameters for valid transactions. The records are the sequence of the system's transactions and the miners' actions. The result of consensus is decentralization, though this characteristic is not synonymous with an "unstructured" system.⁸ The blockchain network has no owner, no intermediaries, and no government regulating it. It is not hierarchical, as typical client-server computer relations are, but rather, the network is distributed since all nodes act on an equal plane and are connected (peer-to-peer).

c) As a consequence, the reliability of the data is provided by the nodes without dependence on third parties. The nodes act as certification service providers.

d) The blockchain is used by two types of subjects, the users who use the service and the miners who mine transactions and close down or create new blocks. The reason the latter are needed is that as transactions and contracts are made, the vast amount of data must be

⁸ Raina S. Haque *et al.*, 'Blockchain Development and Fiduciary Duty'[2019] SJBLP.

placed in new blocks. The miners are responsible for creating these blocks using very complex techniques. However, it is not enough to create them; the new blocks must also be authorized by the rest of the community, thereby joining the chain.

As for their classes, blockchain networks are classified according to network access as either public, on which anyone can operate (read and write), or private, which is restricted to a group of trusted people. Depending on the access control in the permissioned blockchains, transaction processing is carried out by known persons. For permissionless blockchains, there are no restrictions for block processing or creation. Blockchains can, therefore, be classified in one of three ways: public without permission, public with permission, and private with permission.

III. Contribution of blockchain to consumer law and reliable legal traffic

Legal transactions can be classified in many different ways, depending on the type of legal relationship they involve. For example, we can discuss commercial and civil legal traffic. However, in our opinion, a current distinction must be made between traditional and digital legal transactions. The need for this distinction is determined by the characteristics of the digital environment in which such transactions occur.

It is a historical reality that companies have always borne in mind the security of acts and businesses in legal transactions; even the very origin of the scriptures had legal, memorial, and accounting functions regarding legal security of transactions. In short, there has always been a tendency to seek reliable legal transactions. As in historical periods, the digital world of business has gone through different stages, generally from mistrust to confidence, based above all on technological advances and the digital education of users. What is clear is that without trust, there is no digital business.

The advent of distributed registration technologies has helped to make digital legal traffic reliable. Thus, Eenmaa and Schmidt-Kessen claim that smart contracts create trust in these environments.⁹ Some authors refer to this as “digital preservation” or “value preservation,” for, as De la Rosa states, there is a new need for digital preservation to prevent or cure the

⁹ Helen Eenmaa and M. Jose Schmidt-Kessen, ‘Creating Markets in No-trust Environments: The Law and Economics of Smart Contracts’ [2019] CLSR.

obsolescence of digital materials regardless of how they are stored.¹⁰ To this end, the contribution of distributed recording technologies such as blockchain is significant. One of the contributions of blockchain technologies to consumption law has, therefore, been that they provide reliability and proof of transactions. Much more than traditional e-commerce, which is based on trust in business rather than on material evidence. This is a big step; as e-commerce becomes more reliable, it will be able to develop in other areas such as real estate business.

IV. Smart contracts according to Szabo's vision

It was Szabo who, in 1995, first discussed the concept of smart contracts and defining them as a “set of promises, including protocols within which the parties perform on the other promises. The protocols are usually implemented with programs on a computer network, other forms of digital electronics, thus these contracts are ‘smarter’ than their paper-based ancestors. No use of artificial intelligence is implied.”¹¹

In Szabo's vision, the smart contract is configured as a technical instrument to formalize legal relations through computer networks without involving the use of artificial intelligence. The idea is that many of the contractual clauses can be integrated into specific hardware and software. In this way, remedies are provided for non-compliance or, as the author says, expensive breaches of contract.¹² Thus, for Szabo, when designing a smart contract, several principles must be applied, the purpose of which are to ensure that non-compliance entails a significant burden or cost¹³:

- Observation. The judicial systems enforce obligations in respect to non-compliance reactively and ex-post facto. The smart contract must be designed from a perspective of proactive observation so that any sign of non-compliance minimizes losses.

- Objective verifiability. An objective system for verifying third parties' compliance or

¹⁰ Josep Lluís De la Rosa, ‘On Value Preservation with Distributed Ledger Technologies, Intelligent Agents, and Digital Preservation’ in Javier Prieto, Ashok Kumar Das, Stefano Ferretti, António Pinto, and Juan Manuel Corchado (eds), *Blockchain 2019: Blockchain and Applications* (Springer 2020).

¹¹ Nick Szabo, ‘Smart Contracts Glossary’ (Satoshi Nakamoto Institute, 1995) <<https://nakamotoinstitute.org/smart-contracts-glossary/>> accessed 8 April 2020.

¹² Nick Szabo, ‘Formalizing and Securing Relationships on Public Networks’ (1997) 2–9 FMPJI <<https://journals.uic.edu/ojs/index.php/fm/article/view/548/469>> accessed 12 January 2020.

¹³ Nick Szabo, ‘Smart Contracts: Building Blocks for Digital Markets’ (2016) *Entropy* <http://www.fon.hum.uva.nl/rob/Courses/InformationInSpeech/CDROM/Literature/LOTwinterschool2006/szabo.best.vwh.net/smart_contracts_2.html> accessed 23 March 2020.

non-compliance with the contract must be implemented.

- Privacy. Knowledge and control of the content of the smart contract must be reserved for the parties.

- Applicability of the law. Smart contracts should be designed to enforce the law but, at the same time, minimize the need for coercive compliance. Instruments such as reputation, incentives, self-enforcement protocols, and objective verifiability reduce the need for coercive enforcement.

- Certification of acts, which Szabo calls “notarization,” comparing them to the notary’s function of guaranteeing and ensuring the authorship and content of legal relations. Szabo makes use of digital certification authorities, making it necessary to accredit the person using a digital identity, which he calls a “nym” and is configured as an identifier that links only a small amount of information related to a person.¹⁴

V. Smart contracts, smart legal contracts, and crypto-contracts

The term “smart contracts” is not correct since, as Szabo states, such contracts do not use artificial intelligence models or techniques. In our opinion, the smart contract concepts that have been proposed over time describe what a computer program does. In other words, the successive lines of code, actions, and events that respond to stimuli or events and the particularity of their storage. Thus, for example, Tur Faúndez says: “smart contracts are sequences of code and data that are stored in a certain direction in the block chain.”¹⁵ According to Savelyev, “DLT-enabled smart contracts are virtual agreements encoded in the network that are automatically executed according to logical conditions,”; and their automatic execution is their main attribute.¹⁶ Coderch claims that this is the ideal of every contracting party since the self-performance of the services avoids the application of the typical remedies of traditional contracting. The services are performed automatically or, as the author writes, “contract and I forget”.¹⁷

In general, these are computer software (usually in the Solidity language) that are contained in various platforms, such as Ethereum (the most significant, according to

¹⁴ Nick Szabo, ‘Smart Contracts: Building Blocks for Digital Markets’ *loc. cit.*

¹⁵ Carlos Tur Faúndez, *Smart Contracts. Análisis jurídico* (Editorial Reus 2018) 51.

¹⁶ Alexander Savelyev, ‘Contract Law 2.0: “Smart” Contracts as the Beginning of the End of Classic Contract Law’ [2017] ICTL.

¹⁷ Pablo Salvador Coderch, ‘Contratos inteligentes y derecho del contrato’ [2018] *InDret* 2.

programmers). Moreover, these platforms, which are based on blockchain, will perform many more jobs or actions than contracts in the future. In short, the term “smart contract” refers to those lines of software code that automatically execute the agreements or services of the contract, without the intervention of subsequent consent or activity by any of the parties.

It is true that, as Tur Faúndez and others has said, not all smart contracts have legal significance.¹⁸ Legerén-Molina affirms that they do not constitute a contract in the legal sense since their essence involves computation, sequences of code, and blocks. Their legal repercussions arise when those strings of code (scripts) form part of the traditional electronic contract so that it is more accurate to speak of “smart legal contracts.”¹⁹ For this reason, many say that it is more accurate to speak of “smart legal contracts,” ones that have legal transcendence.

As we discussed earlier, when discussing Szabo’s vision, the smart legal contract is configured as a technical instrument that formalizes legal relations through decentralized networks (DLT). Of all the innovative ideas that Szabo has contributed to the field, we must pause concerning his notion that smart contracts do not use artificial intelligence even though they are “more intelligent” than traditional contracts. In our opinion, smart contracts use computer programming to automate the execution of a contract and provide proactive solution mechanisms, but nothing more. Therefore, we should question the very concept of smart contracts; instead, we should speak of “crypto-contracts” because, as software, they use cryptographic techniques. There are projects, however, currently developing artificial intelligence applications for electronic transactions.

Buterin himself, the founder of the Ethereum protocol, on which many applications related to these contracts are now being deployed, recently said that “at this point I rather regret the adoption of the term smart contracts. They should have been called something more boring and technical, perhaps something like ‘persistent scripts.’”²⁰ In the same vein, Szabo also recently stated that “asking whether a smart contract is ‘legally enforceable’ reflects a deep misunderstanding”²¹ because “not all smart contracts or their use cases will

¹⁸ Carlos Tur Faúndez, *Smart Contracts. Análisis jurídico*, *loc. cit.*, 51.

¹⁹ Antonio Legerén-Molina, ‘Los contratos inteligentes en España. La disciplina de los smart contracts’ [2018] *Revista de Derecho Civil* 195.

²⁰ ‘Guidance Note Regarding the Relation between the Uniform Electronic Transactions Act and Federal E-SIGN Act, Blockchain Technology and “Smart Contracts”’ (Uniform Law Commission, 2019) <<https://www.uniformlaws.org/HigherLogic/System/DownloadDocumentFile.ashx?DocumentFileKey=d2026984-1040-3c6f-62c8-a676b12d7bff>> (accessed 25 February 2021) 4.

²¹ ‘Guidance Note Regarding the Relation between the Uniform Electronic Transactions Act and Federal E-SIGN Act, Blockchain Technology and “Smart Contracts”’ *loc. cit.* 4.

fall under the definition of a contract at all.”²²

For our part, we will continue to talk about smart contracts but will account for the appraisals and criticisms of the concept. Therefore, to be able to propose a concept of a smart legal contract or a crypto contract, we must pause and examine in-depth their configuring elements compared to traditional contracts and electronic contracts. From a structural and not strictly legal point of view, the elements of a contract are the subjects, the object, the agreements or clauses, and finally, the form. Let us analyze each:

- The subjects. In a traditional contract, subjects are specified by the parties’ information. In an electronic contract, the subjects’ data are contained in a database. In an intelligent contract, after registration in a database, these data are encrypted using cryptographic techniques (hash) and recorded in a unique electronic identification.

- The object. In a traditional contract, the object is described in reference to an external reality. In an electronic contract, the object is also described and reported. In a smart contract, the externally real object is represented by tokens through a tokenization process.

- Agreements or clauses. In a traditional contract, many kinds of clauses that describe the legal consequences of facts or events are agreed upon; in clauses, the execution must necessarily be carried out by the subjects. In an electronic contract, the clauses are generally self-executing as they are written in lines of computer code. In a smart contract as in an electronic contract, the clauses are written in computer language and are executed utilizing conditional or Boolean logic. There is little difference between electronic contracts and smart contracts.

- The form. In a traditional contract, the form can be either oral or written. If it is written, it can sometimes be recorded in a public register. In an electronic contract, the form is defined by the electronic technique, and it is recorded in a centralized database. Moreover, it can be transformed into a standardized and readable file. In a smart contract, the form is electronic but cryptographic techniques are applied. Furthermore, it is recorded in a decentralized blockchain.

There are two elements that differentiate smart contracts and electronic contracts:

- The application of cryptographic techniques both in the identification of subjects and in the content of the contract; and

²² ‘Guidance Note Regarding the Relation between the Uniform Electronic Transactions Act and Federal E-SIGN Act, Blockchain Technology “Smart Contracts,”’ *loc. cit.* 5.

- Registration using cryptographic techniques and the way filing is organized in distributed registration networks.

Therefore, we stress the idea that, since the application of cryptographic techniques is the foundation of such contracts, it would be more convenient to speak of crypto-contracts since self-execution is not the essential property that distinguishes them. In this sense, we define crypto-contracts as those contracts that, utilizing cryptographic techniques and interpreted in computer code, determine the parties, self-execute the obligations, create rights, tokenize the objects and behaviors of external reality, and are securely registered in distributed registration networks.

VI. Subjects, complex structure, digital identification, and oracles

We must first explain that in order to operate in a blockchain, a process of “pseudonymization” is necessary; pseudonymization gives the parties to the contract a digital pseudonym, uniquely identifying a natural or legal person or a representative of one.²³ As Alamillo says, “under the expression ‘digital identity,’ we refer to techniques that allow people and organizations to identify themselves and act on networks, using more or less strong authentication mechanisms.”²⁴

Apart from this technical assessment, blockchain services will be so diverse that they will be aimed at businesses and professionals as well as consumers. These services are or will be offered by large and medium-sized enterprises that, following the Community acquis, are known as “providers” of information society services, or more specifically, “blockchain service providers.” The role of the blockchain provider is to provide services for the creation and execution of smart contracts, the creation, transmission, registration, and storage of tokens, and other secondary functions. However, the users of such services can be companies, professionals, or consumers. We call this a complex contract subject structure.

Thus, the third party (blockchain providers) is positioned in the contract as a subject linked to it. Moreover, because of the interoperability, the third-party actively participates in the services. Therefore, a “complex” legal relationship arises that is very different from the traditional relationship between the parties: there is a relationship between the transferor and

²³ Regulation (EU) No 910/2014 of The European Parliament and of The Council, of 23 July 2014, on electronic identification and trust services for electronic transactions in the internal market and repealing Directive 1999/93/EC. Art. 3.1.

Ignacio Alamillo, ‘SSI eIDAS Legal Report. How eIDAS Can Legally Support Digital Identity and Trustworthy DLT-based Transactions in the Digital Single Market’ [2020] *European Commission* 8.

the transferee (smart contract), who in turn are linked to the service provider (service contract).

Additionally, for the proper functioning of smart contracts, third parties (other suppliers) are needed. These are the so-called “oracles.” In general, oracles are third party services and usually sources of information. Many applications must interact with third party systems external to their environment. They provide the necessary information for the development and greater functionality of blockchain applications and smart contracts. As Vallery explains, a blockchain oracle is a third-party service that provides smart contracts with external information (off-chain).²⁵

Blockchains and smart contracts cannot function in isolation, so data from the outside world is required because the blockchain network is data-limited.²⁶ This interaction takes place through the oracle (query layer or queries in computer language) via an application programming interface (API), so that the smart contract, if faced with an event (programmed in a particular code), can “talk” to the platform of the third party or contractual party (programmed on a different platform). The importance of this layer between the third party and the blockchain network is the fact that it verifies and authenticates the external data; in short, since reliability is one of the problems that arises the oracles must be reliable.

However, oracles pose a problem for data reliability. According to Kuang Lo *et al.*, the technological challenges to be accounted for are:

- Guaranteeing that accurate data taken by physical sensors are not manipulated;
- Guaranteeing the real identity of the entity or the third party providing external information; and
- In general, guaranteeing that the third-party is reliable.

The participation in third-party blockchain systems carries an obvious risk for consumers. Is this an issue that should be specially regulated? Should blockchain providers have a general obligation regarding how the information is used by oracles? The answer to both questions is yes: the functionality and interoperability of third-party blockchain systems should be identified and substantiated, and their use may affect the scope of privacy and liability.

²⁵ Mou Vallery, *Guía sobre los Oráculos Blockchain* [2020] < <https://academy.binance.com/es/articles/blockchain-oracles-explained> > accessed 18 January 2020.

²⁶ Sin Kuang Lo *et al.*, ‘Reliability Analysis for Blockchain Oracles’ [2020] CEE.

VII. The object of smart contracts, tokens, and digital assets

VII.1. *On the intangibility of things*

The object of any intelligent contract is the exchange of goods, rights, and the delivery of services. As in general, the object of the law is things and behaviors. By “thing,” says Díez-Picazo, “we usually mean any reality of the outside world that has a material existence.” However, there are also “those realities, which, lacking corporeal existence and being a product or intellectual creation of the human spirit, the legal system values as possible objects of subjective rights.”²⁷ However, the traditional distinction between movable and immovable property, which is fundamentally based on the material mobility of things, must be overcome in today’s reality. Today it is more accurate to focus on the concept of the “tangibility” or the possibility of appropriation or the lack thereof. For the classification of property as movable or immovable should only refer to material things.

In general, the very existence of immaterial things that, over time, have acquired vital importance in digital society makes it necessary to rethink the very classification of things as objects of legal relations. Incorporeal things or rights are intangible, immaterial, and are configured so as to be susceptible to appropriation, the same as tangible things. Among intangible things, information and communication technologies have produced digital goods or goods produced and supplied in digital form.²⁸ However, a distinction must be made between data, code, and digital behavior.²⁹ Only those data and behaviors that represent rights or obligations are the proper digital object.

The digital is the expression of reality in discrete numerical values, in ones and zeros (binary). In this sense, digital data are intangible abstract goods, and they express reality in the form of the automatic processing or treatment of information using computer systems. The “digital services” available to consumers and organizations include the following³⁰:

²⁷ Luis Díez-Picazo, *Fundamentos del Derecho Civil Patrimonial* (Vol. III, Editorial Aranzadi 2008) 184, 186.

²⁸ Art. 2.6 of the Directive (EU) 2019/771 of the European Parliament and of the Council, of 20 May 2019, on certain aspects concerning contracts for the sale of goods, according to which: digital goods mean data that are produced and supplied in digital form; Directive 2011/83/EU of the European Parliament and of the Council, of 25 October 2011, on consumer rights, item 11.

²⁹ Directive (EU) 2019/770 of the European Parliament and of THE Council, of 20 May 2019, on certain aspects concerning contracts for the supply of digital content and digital services, Art. 2.2.b): “data in digital form uploaded or created by the consumer or other users.”

³⁰ Directive (EU) 2019/771 of the European Parliament and of the Council, of 20 May 2019, on certain aspects concerning contracts for the sale of goods, Art. 2.7.

- (a) A service enabling the consumer to create, process, store, or consult data in digital form or

- b) A service that allows the sharing of data in a digital format, which has been uploaded or created by the consumer; or, alternatively, the capacity to interact in any other way with such data.

However, digital goods and services are not exclusively the subject of smart contracts; they constitute, in general, a variety of goods, including those that are tangible, movable, and immovable. This is why, for both technical and legal reasons, it is necessary to represent all kinds of goods and rights, as well as behaviors, in their digital form. This results in digital assets and their technical process, that is, tokenization.³¹

VII.2. The tokenization of things and behaviors; digital assets – tokens

As explained above, based on material and immaterial goods, and behaviors, their representation in digital legal traffic must be created, as a higher step, around the blockchain, as the object of the smart contract. Once this is created, a concept emerges, namely, the token and the action or process of transforming things into tokens: tokenization or symbolization (token modelling). In the event of a conflict, the token produces the effect of accessibility, and, therefore, the accreditation of the legal ownership of the right.

A token is a “utility,” an asset (digital assets); it is the digital representation of tangible, movable, or immovable property or of incorporeal property such as rights or credits and conducts, and the process of creating such representations is called tokenization. They are configured as the digital technology solution for exchanging goods and providing services in distributed database technologies as they generate a smart contract. The tokenization process is based on scripts that give the token the characteristics of tangible or intangible goods and credit rights, which are the object of legal transactions. In short, its creation corresponds to smart contracts. In general, tokens are found in the blockchain in a native form (native

³¹ Directive (EU) 2019/771 of the European Parliament and of the Council, of 20 May 2019, on certain aspects concerning contracts for the sale of goods: “Whereas: ... (14) The term ‘goods’ as provided for under this Directive should be understood to include ‘goods with digital elements’, and therefore to also refer to any digital content or digital service that is incorporated in or inter-connected with such goods, in such a way that the absence of that digital content or digital service would prevent the goods from performing their functions. Digital content that is incorporated in or inter-connected with a good can be any data which are produced and supplied in digital form, such as operating systems, applications and any other software. Digital content can be pre-installed at the moment of the conclusion of the sales contract or, where that contract so provides, can be installed subsequently. Digital services inter-connected with a good can include services which allow the creation, processing or storage of data in digital form, or access thereto, such as software-as-a-service offered in the cloud computing environment, the continuous supply of traffic data in a navigation system, or the continuous supply of individually adapted training plans in the case of a smart watch.”

tokens), such as cryptosystems, or above this, at the application level (application tokens). The tokens operate in the chain as long as they are first assigned to a smart contract. As a result, they can be individualized through personal balance sheets or unique identification when they are not fungible. In short, “I can carry my tokens in my pocket.”

This process can be summarized in this judgement: “Tokens are the native crypto actives of a blockchain application. They are driven by smart contracts (code-based financial agreements) that are programmed in Ethereum. When an artist tokens, he is turning his intellectual property into a financial asset, so an artist’s file reflects the value of his creative output.”³² However, what is the relationship between tokens and cryptocurrencies? Unlike crypto monies, which are a unit of value, tokens represent any good, right, or behavior, that is, only the pecuniary obligation is carried out with crypto monies.

VII.3. Token classes and token standards

It is necessary to start from the traditional distinction of things as fungible or non-fungible to delimit the classes of tokens. Expendable tokens are those that can be replaced by one another (ERC-20), such as cryptosystems. Non-fungible tokens are those that, by their nature, cannot be replaced (ERC-721). They can represent physical assets, such as all kinds of movable and immovable property, digital assets or digital goods, and obligation assets (credit claims). From the technical point of view, for the correct functioning of the system, everyone must agree on what kind of tokens should exist. For this reason, token standards, or proposals agreed upon by the community of users, programmers, and companies, emerge (as a symbolic delivery by consensus).

In general, there are two types of tokens: “utility tokens” and “security tokens”:

- Utility tokens are tokening whose possession; they give the right to a good or service.
- Security tokens are those that represent ownership of a good or right.

Currently, several protocols or token standards have been agreed upon by consensus. The important thing is that, as they form part of the programming, their functions in the smart contract environment must be known.

VIII. Consumer protection measures

³² USA. Judgment 9.07.2018, Court: United States District Courts, 9th Circuit, Southern District of California.

Currently, there is no specific regulation for smart contracts. There is, moreover, much contention regarding whether or not blockchain networks and smart contracts must be regulated. For some, the different extant regulations on electronic transactions and signatures are sufficient. In some US states, legislation has been passed on blockchain technologies and smart contracts. In general, they concern the concept of blockchain and intelligent contracts, their validity, the storage and recording of digital transactions, and cryptographic verification and assurance.³³ In the European Union, the European Union Blockchain Observatory and Forum (Working Group, European Parliament) has been established. It seems that the philosophy of this group is not to regulate blockchain and smart contracts specifically or if certain issues arise, such as the following:

- Allocation of responsibilities
- Competent jurisdiction
- Determination of applicable law
- Application of legal rules³⁴
- Scope of digital assets
- Self-executing agreements
- Decentralized organizations
- Autonomous agents.³⁵

³³ - 'North Dakota Century Code § 9-16-19: Signatures and records secured through blockchain technology – Smart contracts – Ownership of information – Definitions'.

<advance.lexis.com/api/document?collection=statutes-legislation&id=urn:contentItem:8VC5-HBD2-D6RV-H4YM-00000-00&context=1516831> accessed 4 April 2020; 2019 N.D. HB 1045, 2019 N.D. Laws 94, 2019 N.D. Ch. 94, 2019 N.D. ALS 94 (24 April 2019).

<advance.lexis.com/api/document?collection=statutes-legislation&id=urn:contentItem:5W01-FJ11-JKB3-X4V4-00000-00&context=1516831> accessed 5 April 2020.

- 'Tennessee Code Annotated. § 44-7061. Signatures and records secured through blockchain technology; smart contracts; ownership of information; definitions'

<advance.lexis.com/api/document?collection=statutes-legislation&id=urn:contentItem:8MP8-XFN2-8T6X-724P-00000-00&context=1516831> accessed 5 April 2020.

- Arizona Annotated Revised Statutes. § 44-7061. Signatures and records secured through blockchain technology; smart contracts; ownership of information; definitions,'

<advance.lexis.com/api/document?collection=statutes-legislation&id=urn:contentItem:8MP8-XFN2-8T6X-724P-00000-00&context=1516831> accessed 5 April 2020.

- 'Law Project, Kentucky. AN ACT relating to blockchain technology., 2020 Bill Text KY S.B. 55' (24 February 2020) <advance.lexis.com/api/document?collection=statutes-legislation&id=urn:contentItem:5Y97-HHY1-F2F4-G35N-00000-00&context=1516831> accessed 5 April 2020.

³⁴ The European Union Blockchain Observatory & Forum (Working Group, European Parliament). 'Legal and Regulatory Framework of Blockchains and Smart Contracts' (2019) 6.

³⁵ The European Union Blockchain Observatory & Forum (Working Group, European Parliament). 'Legal and Regulatory Framework of Blockchains and Smart Contracts' (2019) 6.

In general, the European Union Blockchain Observatory and Forum speaks of a “natural evolution” of the law regarding the regulation of the blockchain,³⁶ without taking into account, in our opinion, the impact of disruptive technologies on the market.

Additionally, in the field of consumer protection, cryptographic or intelligent legal contracts present several difficulties. This occurs mainly in the context of information and transparency, given their technical nature. In this respect, how are consumers currently protected, or should they be protected in smart contracts? Above all, legal certainty and confidence must be guaranteed.³⁷ To this end, if standards don not already exist, legal measures and rules must be published on the following topics.

A) Place of establishment of and general information about the blockchain service provider

Blockchain should be developed by service providers who, in most cases, are already established. There will be no obstacles, in terms of legal certainty, as long as the service provider’s establishment and information requirements are met by Article 5 of the Directive on Electronic Commerce.

B) Transfer of rights in rem

The tokenization of property rights and other rights in rem is a fact (e.g., in the USA). As seen above, a smart contract’s object may be the transfer of property using non-expendable tokens. Therefore, it is necessary to remove the limitation on the creation and transfer of rights in real estate in the Directive on Electronic Commerce.³⁸

C) Right to information

The right of information is the cornerstone of the entire system of consumer protection regarding the use of blockchain and smart contracts. In our opinion, the right to information and transparency should have a particular impact on the following issues:

- Information about a previous digital service contract with the blockchain provider;
- Information about the sequence or chain of computer programming, which is part of the contract;
- Information on tokens and the tokenization process;

³⁶ The European Union Blockchain Observatory & Forum (Working Group, European Parliament). ‘Legal and Regulatory Framework of Blockchains and Smart Contracts’ (2019) 6.

³⁷ Directive on Electronic Commerce (7, 10).

³⁸ Directive on Electronic Commerce, art. 9.2.a.

- Information on the implementation of contractual obligations from the scripts; and
- Information on the registration in the blockchain and storage of the tokens in digital format.

Clear and comprehensible prior information is required when contracting at a distance as is currently provided for in the following European regulations: Articles 6 and 6 bis of Directive 2011/83/EU of the European Parliament and of the Council of 25 October 2011 on consumer rights. Thus, the following information must be available before the contract and must refer to:

- The main characteristics of the services of the blockchain platform, primarily its operation and cost (GAS);
- Clear information on the scope of token transmission, both in the field of technical security and in its legal repercussions;
- Information on the identity and geographical address of the blockchain platform's headquarters;
- Determination of the object of the contract, with transparent information on whether the price has been personalized with the use of such techniques as artificial intelligence;
- Compliance with a principle of transparency in the code and algorithms (if any) and information on the use of applications from third-party service providers outside the contractual relationship;
- Information on contract execution clauses, apart from the programming code, particularly clear, comprehensible, and transparent information on the event giving rise to the performance ("IF," or successive events "ELIF"), the legal consequence ("THEN"), and the alternative consequences ("ELSE");
- Information on the right of withdrawal and its cost;
- Information on the blockchain service contract, its term, and the conditions for cancellation;
- Information on the functionality of the blockchain network and smart contracts; and
- Information on interoperability with third parties (oracles) for network functionality;

Additionally, according to Article 10 of the Directive on Electronic Commerce, the following must be included:

- Information on the different technical steps to be taken to conclude the smart contract;

- Information on the process of recording transactions in addition to its accessibility to the contract and the storage and disposal of tokens; and

- Mechanisms, if any, for alternative dispute resolution and, if they exist, information on codes of conduct.

D) Consent and clauses

- There must be prior and express consent for the use of a blockchain platform. Article 23(2) of the Directive on Electronic Commerce must be amended accordingly. This is necessary because it does not require the prior agreement of the parties regarding the use of electronic means.

- The terms will be subject to control for transparency and abusive behavior. Most importantly, the computer code is included, which must be transcribed and be able to be understood by the average consumer.

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