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The mechanism of smart contract conclusion in the Italian and Iranian legal systems.

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Abstract

The conclusion of smart contracts is placed on the blockchain platform due to the special features of this platform, including the two features of transparency and decriminalization. After being completed on the blockchain network, these contracts' transparency feature enables the public to observe and offer them. In this case, all the people who have access to this platform have the possibility of knowing what was transferred by whom to whom, and this not only prevents the occurrence of many related lawsuits but also many crimes related to property.

La conclusione degli smart contract avviene sulla piattaforma blockchain la quale è connotata da peculiari caratteristiche di trasparenza e depenalizzazione. Tali aspetti rendono senza dubbio lo smart contract uno strumento utile ai fini di una sicura esecuzione del contratto, ma contemporaneamente, espongono le parti al rischio di una non modificabilità di quanto pattuito anche in caso di accordo tra le stesse.

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Keywords: smart contract; international laws; blockchain; Secure development; technologies.

Summary: Introduction – 1. The civil law debate on smart contracts. – 2. The regulation of smart contracts in the European context and in the Italian legal system. – 3. The debate in Italy around the nature of the smart contract and the problems related to the use of smart contracts. – 4. Iranian law's implementation of smart contracts. – 5. The standards for the legality of smart contracts under Iranian law. – Conclusions.

Introduction[1]

In order to modify the mechanism of smart contracts' conclusion to the rules governing transactions in the legal systems of Iran, Italy, and the European Union, and to express the challenges facing this system in the implementation of these policies, the main question that this research seeks to address is how to make policies for the conclusion of smart contracts.

An advanced type of electronic contract is a smart contract. The primary difference between these contracts and non-electronic ones is how they are concluded. Otherwise, they are identical to non-electronic contracts. These contracts have protocols that describe the commitments made by each contracting party due to the mechanism used in them.[2] These contracts are self-executing and enforceable agreements that, despite the fact that they sometimes call for an operator to oversee the proper execution of the contract, they are executed by a computer and are made enforceable by following the rules established by the laws underlying the applicable legal system.[3]

1. The civil law debate on smart contracts.

In Italy, there is a particularly heated debate on the usefulness of using smart contracts and the 'blockchain' system, which are considered new technologies destined to change our reality in consideration of the growing importance that they assume following the diffusion of digitization processes and the networking of public and private activities and goods. Their widespread use is linked to the growing need for automation in the market.

The Italian civil law doctrine is committed to analysing these new figures in the light of contract law by posing the problem of the regulation of smart contracts, which are functional contracts for the circulation of wealth and which can be implemented, for example, through the use of blockchain technology.[4]

[1] Par. 1-2-3 belongs to Roberta Marino, Associate Professor of Private Law- University of Naples Federico II; Par. 4-5 belongs to Seyed Milad Mahmood Kashani, Ph.D. student - University of Naples Federico II.

[2] S H Safaie, *Preliminary Course of Civil Rights, Tehra*n (2nd edn, Mizan Publications 2012), 135.

[3] R O'Shields, *Smart contracts: Legal agreements for the blockcha*in (NC Banking Inst 2017), 177.

[4] He considered that these modalities give rise to real exchange operations without an agreement N. Irti, 'Scambi senza accordo' (1998) 1, Riv. trim. Proc. civ.,347 ss. On the other hand, do you believe that these are cases in which the dialogic dimension of the agreement is still present, but conveyed by means other than

The 'smart contracts' formula indicates programmable applications aimed at carrying out online exchanges, whose automaticity, speed, and security are guaranteed by the use of blockchain technology.[5] suitable to safeguard the correctness of the contract and to eliminate the risk of default, given the automation of the execution of the performance or services deduced in the contract, thus ensuring, in relation to the context in which they are called to operate and their functioning mechanisms, on the one hand, greater speed, safety, and efficiency of and in traffic, and on the other, fulfilling a deflationary purpose of the dispute.

The smart contracts are distinguished by the fact that they constitute scripts (i.e. codes), which dictate rules and commands, which the parties must compulsorily observe at the time of an exchange so that the transaction is carried out in an automated manner. The main feature of these contracts is that the operation can be carried out peer-to-peer, i.e., directly between two users, without the intermediation of a central control and verification entity, which, for example, establishes the exchange rates.[6]

All this is made possible thanks to the use of 'blockchain' technology (literally, 'a chain of blocks'), by means of which the inputs and outputs deriving from the contract become blocks of encrypted language, stored in a public register (the so-called ledger), which exploits the characteristics of a computer network of 'nodes' (the various participating subjects), whose data are managed and updated in a unique and secure way and cannot be distorted or modified.[7]

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verbal language G. Oppo, *'Disumanizzazione del contratto?'* (1998) 1 Riv Dir civ., 525. He believes that the agreement is in any case present due to the behaviour of the parties, CM Bianca, Diritto civile, Vol 3. *Il contratto* (III ED Giuffré 2019), 43.

[5] The first definition is due to N. Szabo, 'Formalizing and Securing Relationships on Public Networks' (1997) 2 First Monday, 9; which states: «The general objectives of smart contract design are to satisfy common contractual conditions (such as payment terms, liens, confidentiality, and even enforcement), minimize exceptions both malicious and accidental, and minimize the need for trusted intermediaries. Related economic goals include lowering fraud loss, arbitration and enforcement costs, and other transaction costs.

[6] Among the various contributions on the subject, cf. MR Maugeri, *Smart Contracts e disciplina dei contratti. Smart Contracts and Contract Law* (Il Mulino, 2021); ID, Autonomia e costruzione dello spazio digitale, in P. Perlingieri, S. Giova, I. Prisco (eds), *Il trattamento algoritmico dei dati tra etica, diritto ed economia* (ESI, 2020), 162 ss.; E. Battelli, 'Le nuove frontiere dell'automatizzazione contrattuale tra codici algoritmici e big data: gli smart contract in ambito assicurativo, bancario e finanziario' (2020) 4 Giust. civ., 681 ss.; G. Finocchiaro, Il contratto nell'era dell'intelligenza artificiale (2018) 2 Riv. trim. dir. proc. civ., 441 s.; A. M. Gambino, *Buona fede e rapporti telematici, Principi, clausole generali, argomentazione e fonti del diritto*, a cura di F. Ricci (Giuffré, 2018), 615-616; I. A. Caggiano, Il contratto nel mondo digitale, in L Gatt (ed) *Il contratto del terzo millennio. Dialogando con Guido Alpa* (Editoriale Scientifica 2018), 55 ss.; P. Cuccurru, 'Blockchain ed automazione contrattuale. Riflessioni sugli smart contracts' (2017) 1 Nuova giur. civ. comm., 107; D Di Maio EG Rinaldi, 'Blockchain e la rivoluzione legale degli Smart Contracts', [2016] www.dirittobancario.it; M.Bellini, 'Smart Contracts: che cosa sono, come funzionano, quali sono gli ambiti applicativi' [2018] in www.blockchain-innovation.it.

[7] The Blockchain platform is a distributed, shared, decentralized and encrypted database that acts as a huge public register on which a list of information is recorded. Part of the Distributed Ledger Technology (DLT), the Blockchain ensures the shared management of an archive (ledger or ledger) between different users of a network (so-called nodes). The data recorded in the ledger can be read and written by all users, but they are stored in such a way that the modification of the register is possible only after the acquisition of consent to the operation by all the other nodes in the network. This guarantees considerable resistance to external attacks, since in order to be able to modify a single part of the chain, it is necessary to obtain the 'consent' of all the other nodes. Among the main advantages of Blockchain technology is first of all the reliability of the archive, which, being managed by several nodes of a network in a decentralized manner, is less exposed to cyber-attacks. In fact, to compromise the database it would be necessary to hit all the network nodes that manage it at the same time. It follows, therefore, that the information, once registered, is irrevocable and

The non-modifiability of the data in the blockchain allows for the creation of a relationship of trust in a totally disintermediated environment between parties who, while not knowing each other at all, want to carry out financial transactions and operations.

Thus, it happens that two or more subjects who identify a common interest put in place a smart contract, providing within it clauses containing the desired conditions and effects.

Subsequently, the parties insert the smart contract into the chosen blockchain, which, in turn, becomes the guarantor of the contract and ensures that the instructions given to it are no longer modifiable.

At this point, the smart contract becomes part of a block (identified by a hash code), which is validated by the nodes, i.e., by the participants in the blockchain, who are called to give their consent. Once the latter is obtained, the block is added to the chain, immutable, and certified.

In this way, the contract acquires the ability to enforce its clauses and to have prompt and immediate execution as soon as the agreed conditions occur, without, however, the parties having to carry out checks or activate paper or manual procedures.

The smart contract, therefore, is mainly characterized by the following characteristics:

i) Irretractability, as once inserted in the blockchain, it can no longer be cancelled unless the parties have expressly provided for the kill function;

ii) Unchangeability, as once inserted in the blockchain, the smart contract can no longer be changed;

iii) Unstoppability: following its implementation, the operation of the smart contract cannot be blocked or cancelled.

Such aspects undoubtedly make the smart contract a useful tool for the purpose of ensuring the safe execution of the contract, but at the same time, as the other side of the coin, they expose the parties to the risk of the non-modifiability of what was agreed, even in the event of an agreement between them.

2. Regulation of smart contracts in the European context and in the Italian legal system.

For some time now, the European legislator has shown that it carefully monitors the developments of new technologies in an attempt to arrive at an appropriate regulation. In this direction, the Resolution of the European Parliament of October 3, 2018 on distributed ledger and blockchain technologies Within the European Union, extensive reflections and insights have been dedicated to the application implications of the blockchain and smart contracts. On this point, the work carried out by the European Parliamentary Research Service deserves mention, which highlights the need

is also completely traceable. Blockchain technology then guarantees the convenience and speed of transactions, which, being completely digitized, are performed directly between the parties without the need for third party intervention.

to start a work of integration and harmonization of contract law regulations with the new tool represented by smart contracts.

Other interesting initiatives are the establishment, by the European Commission, of the Blockchain Observatory and Forum, the 'Blockchain4EU' project, and, finally, the establishment of the European Blockchain Partnership (EBP) for the creation of blockchain-based infrastructures aimed at the provision of cross-border public services within the framework of the European Union.

Furthermore, the resolution of the European Parliament of October 3, 2018, entitled 'Distributed ledger technologies and blockchain: creating trust through disintermediation' in which, in addition to highlighting the benefits of DLT technologies in terms of strengthening trust, transparency, and security of transactions, with particular reference to smart contracts, it is underlined that 'smart contracts are an important element enabled by DLTs and can act as key drivers of decentralized applications' and, at the same time, the European Commission is invited to promote the development of technical standards at the level of relevant international organizations, such as ISO, ITU, and CEN-CELE, and to conduct an in-depth analysis of the existing legal framework in the various Member States in relation to the app In view of the digital single market, Parliament also notes that 'legal certainty can be strengthened through legal coordination or mutual recognition between Member States in the field of smart contracts'.

Finally, it is worth recalling the Ministerial Declaration of the Southern European Countries on Technologies Based on Distributed Ledgers, of 4 December 2018, signed in Brussels by the Southern European Countries belonging to the EuroMed 7 (France, Italy, Spain, Portugal, Greece, Cyprus, and Malta), which highlights the need to undertake greater close technological collaboration in order to promote the shared development of DLT technologies, in compliance with the fundamental European principles and neutrality. The declaration also reads that: 'smart contracts represent a potential turning point, capable of transforming the methods of providing services in areas such as 'the certification of the origin of products, education, transport, mobility, maritime navigation, cadastral registers, customs, company registers, and health care'.

The Italian legislator was among the very first in Europe to intervene to regulate the notions of technologies based on distributed registers and Smart Contracts by the Decree Law of 14 December 2018, n. 135, containing 'Urgent provisions on support and simplification for businesses and the public administration',[8] converted with amendments by Law 11 February 2019, n. 12.[9]

This is a particularly significant intervention since the homeland legislator was among the first at European level to regulate the two phenomena.[10]

More precisely, art. 8-ter, paragraph 1, of Legislative Decree No. 135/2018, provides a definition of technologies based on distributed registers, qualifying

[8] Published in the Official Gazette n. 290 of 14 December 2018.

[9] Published in the Official Gazette n. 36, of 12 February 2019.

[10] *See* the contributions of D. Belloni – F. Vasoli, 'Blockchain, smart contract e decreto semplificazioni, in Cammino e diritto', 15 April 2020, 8.; A. Davola, 'Blockchain and Smart Contract as a Service: market perspectives to regulatory criticalities of BaaS and SCaaS performance in the light of an uncertain legal qualification' (2020) 6 Dir. ind, 155.

them as technologies and IT protocols that use a shared, distributed, replicable, simultaneously accessible, architecturally decentralized register on a cryptographic basis, such as to allow the registration, validation, updating, and archiving of data both unencrypted and further protected by encryption verifiable by each participant, non-alterable, and non-modifiable. Art. 8-ter, paragraph 2, of Legislative Decree No. 135/2018, on the other hand, defines smart contracts as 'a computer program that operates on technologies based on distributed registers and whose execution automatically binds two or more parties on the basis of the effects predefined by them'.

Furthermore, in paragraph 3 of the same article, it is established that the memorization of an IT document through the use of the blockchain produces the legal effects of the electronic time stamp pursuant to Regulation (EU) 910/2014 (eIDAS Regulation).

The legislative intervention for the regulation and definition of the smart contract implicitly recognizes the existence of these new technologies and the operations that can take place through them, and therefore the transactions that take place through DLT and/or with the use of a smart contract are recognized by law and can acquire a certain date and probative value of private writing.

The law has mainly dealt with the definitional aspect, meagre but essential, and with the formal aspect of the blockchain and the smart contract, for which the theme specifically addressed is that of the value, precisely from a formal point of view, of the IT document stored on a blockchain.

The definition provided by the legislator in art. 18-ter, paragraph 2, of Legislative Decree No. 135/2018, seems to attribute to the smart contract the legal qualification of contract: the law indicates, in fact, that the smart contract is the source of a legal bond between the parties, taking care to define the criteria for identifying the parties to the transaction.

It is established that, following the execution of a smart contract, an automatic bond is generated between the parties ('on the basis of the effects predefined by them'). This provision, in particular, referring to 'effects predefined by the parties', suggests that there must necessarily exist a moment of formation of the agreement and, therefore, a contractual obligation, prior to the smart contract.

For these reasons, it is not entirely clear whether, in the intentions of the legislator, a smart contract is, or can be considered, a contract - understood in its classical legal meaning referred to in Art. 1321 of the Civil Code.[11]

The legislative definition has raised doubts in the part in which it refers to the smart contract as a program whose execution binds the parties, meaning that the bond arises from the execution of the program. Instead, in accordance with the consensual principle in force, it can only originate from the meeting of wills, which is the basis of the intelligent contract.

Of course, it should be noted that the execution of the contract, which derives from the previously assumed contractual obligation, has the peculiar characteristic of taking place independently of the will of the parties, but it is not the execution of the program that binds the parties; rather, the parties, in

[11] G Finocchiaro, C Bomprezzi, 'A legal analysis of the use of blockchain technology for the formation of smart legal contracts' (2020) 2, mediaLaws – Riv. di diritto dei media, 117.

exercising their private autonomy, accept that the constraint assumed by them is performed automatically and cannot be modified by the program itself.

The smart contract is a computer program that is 'executed' by processing the instructions contained within it; this automatic execution will be imposed on the parties, who will be unable to intervene. In this sense, the smart contract is understood as a way of managing a contractual agreement reached between the parties 'before and elsewhere'. In fact, in computer language, 'execution' means launching the program on the computer, which does not necessarily coincide with the complete execution of the operations envisaged in the program itself.

It is reasonable to believe that when the legislator defines the smart contract as a 'computer program (...) the execution of which automatically binds two or more parties', he uses the term 'execution' in a technical and non-juridical sense, referring to the program and not to the contract. It is, therefore, execution in the computer sense, i.e., a process by which the program is started and, therefore, executed by the device (usually a computer). In other words, once the parties have transfused the negotiating will into the algorithmic code and added the smart contract in a permanent and unchangeable manner to the Blockchain platform, the IT execution of the code will start the program, with consequent reading of the instructions uploaded by the parties for the self-execution of the services.

In the second part of Art. 8-ter of Legislative Decree No. 135/2018, the legal and probative value of a contract in written form is attributed to the IT protocol. More specifically, the rule specifies that the smart contract satisfies the requirement of the written form, provided that it proceeds to the prior IT identification of the parties through a process whose requirements are delegated to the AgId with guidelines to be adopted within ninety days from the date of entry into force of the law converting the decree. The regulation, however, does not expressly refer to national and European legislation on the formation of the electronic document—in particular, Regulation (EU) No. 919/2014, known as eIDAS, and Legislative Decree 82/2005 establishing the Digital Administration Code (CAD)—and this inevitably poses coordination problems. In the opinion of the writer, however, a reminder would have been necessary in order to avoid, especially in the application dimension of the phenomenon, the onset of interpretative doubts and application uncertainties.[12]

Indeed, it is undeniable that smart contracts fall within the concept of 'electronic document', defined by art. 3, point 35, of EU Regulation 910/2014 (the eIDAS Regulation), as 'any content stored in electronic form, in particular text, sound, visual, or audio-visual recording', whose legal validity is recognized by article 46 of the eIDAS Regulation.

In the case of DLTs, it has been observed that the legislator, by requiring their unmodifiability and immutability for the sole purpose of configurability, creates confusion between distributed registers in general and blockchains in particular, the latter's peculiar inalterability and immutability being the main and distinguishing feature of the latter and not of all DLTs. Precisely because

[12] M Giaccaglia, 'Considerazioni su Blockchain e smart contracts (oltre le criptovalute)' (2019) 3 Contratto e impresa, 956.

of these characteristics, it has been argued that, at times, intervening on the chain may be necessary to ensure the rights of the participants, such as, as we will see, the right to confidentiality, for which the definition appears excessive in its rigidity and absoluteness. Therefore, the interpreters have read the law, not in the sense of claiming the absolute inalterability and unchangeability of the chain, which is, at present, as mentioned, neither possible nor desirable, but in the sense of imposing that, for the purposes of the legal qualification of the DLTs, it must not be an identifiable (single) subject holding the power to alter or modify the register, which must be and remain a 'distributed' register.[13] This must be guaranteed not only in public and permissionless blockchains but also in private and permissioned ones.[14]

3. The debate in Italy around the nature of the smart contract and the problems related to the use of smart contracts.

Precisely in consideration of the aforementioned characteristics of modifiability and self-execution, scholars wonder whether smart contracts can be qualified as real contracts.

According to some scholars, smart contracts have the legal nature of a contract, since the computer code underlying the process would represent the transposition of the will of the parties into the language of the machine, with the consequent completion of the contract, which will therefore have the force of law between the parties (ex. art. 1372 of the Italian Civil Code) and the ability to be executed automatically.[15]

This approach would be confirmed by the definition provided by art. 18-ter, paragraph 2, of Legislative Decree No. 135/2018, since the smart contract is indicated as the source of a legal bond between the parties, to which the value of a written document is attributed, elements that would end up bringing the case in question closer to an actual contract.

Others, on the other hand, believe that smart contracts cannot be classified as contracts since they are not real agreements in themselves but, at most, 'tools' for the management of pre-existing agreements, logically prior to the smart contract. In support of the aforesaid interpretative option, the reference in the regulation to 'effects predefined by the parties', which would at least suggest the existence of a pre-existing contractual bond between the parties that the smart contract will allow to execute automatically, would serve. To believe that the computer code underlying the process has the force of law between the parties would be equivalent to stating that any error, illegal clause, or non-compliance with mandatory rules would become part of the contract. In this way, it would be an instrument that could not be controlled by the third judge.

This is also supported by the aforementioned definition, which underlines that it is the execution of the smart contract that binds the parties. According to this doctrine, the term 'execution' used in the formulation of the standard

[13] G Passagnoli, 'Ragionamento giuridico e tutele nell'intelligenza artificiale' (2019) 3 Persona e Mercato.
[14] G Finocchiaro, C Bomprezzi, (n. 11), 119.
[15] Mr Maugeri, (n 6), 162; E. Battelli, (n 6), 688.

suggests the existence of an agreement reached upstream between the parties, thus positioning the smart contract in the merely executive phase of the contractual relationship.[16]

In an intermediate position, another doctrine has observed that the qualification or not of smart contracts as contracts cannot be given in a general and abstract way but depends to a large extent on the specific characteristics assumed from time to time, without prejudice to the attitude of the smart contracts to pass the assessment of merit pursuant to art. 1322, paragraph 2, of the Italian Civil Code.[17]

One of the limitations of smart contracts is the difficulty in modifying them if the need arises, because an agreement between the parties is insufficient, and the intervention of a computer programmer who was responsible for initially preparing the 'code' of the smart contract is required.

There may also be cases of impossibility of performance for reasons not attributable to the debtor. Accordingly, the contract can only be performed in partial terms with respect to what was agreed, without a real breach occurring and without there being a concrete possibility for the parties to discuss this partial breach, in order to overcome it.

Therefore, the need arises to increase the degree of detail of smart contracts, but this would end up increasing their initial negotiation costs, with the risk of eliminating the savings obtained during the execution of the smart contract.

Therefore, it has become necessary to distinguish between 'weak' and 'strong' smart contracts to affirm that smart contracts will be able to find diffusion only with reference to less complex types of agreements.

Another problem is the possibility of non-performance and contract defects, which can happen with any sort of agreement.

Deemed necessary to facilitate as many dispute resolution mechanisms as possible by inserting clauses in the contract that leave the first attempt at resolving any dispute to the figures of mediators or allow the weaker party to withdraw from the contract when the mediator considers the weaker party's request to be founded.[18]

However, this would involve the risk of choices being made by unpredictable groups of decision-makers who lack responsibility and would not be able to lead to the correct resolution of the dispute.

To overcome the problem, it was proposed to set up a panel of mediators from which to extract the single decision-maker of the concrete case, developing the so-called 'online dispute resolution' (ODR).[19]

As regards the judicial settlement of disputes, the use of smart contracts and their diffusion, especially in contracts involving final consumers, could have a significantly deflationary effect on the work of the courts.

The trend that is establishing itself globally provides for the introduction of an arbitration clause in smart contracts. If the arbitration were robotic, the issue would be whether the arbitration process should also be managed by the

[16] IA Caggiano, 'Il contratto nel mondo digitale' (2018) 7-8 La nuova giurisprudenza civile commentata, 1154.
[17] M Giaccaglia, (n 12) 956.
[18] The problem was immediately highlighted by N. Szabo, (n 5) 12.
[19] Aj Schmitz, C. Rule, Online dispute resolutions for smart contracts [2019] J. disp. res

blockchain or whether the decisions are made by a mechanism outside the blockchain. In this regard, in Italy, a problem that arises for robotic arbitration is that relating to the validity of the award.

Italian law provides that the award must be signed by all the arbitrators. Indeed, according to art. 823 cpc the award is approved by majority vote with the participation of all the arbitrators and is therefore drawn up in writing. The provision opens with the indication of a fundamental requirement for the validity of the ruling, i.e., the presence of all the arbitrators at the deliberative moment. On this point, it should be noted that it is permissible for the arbitrators to operate separately in relation to the drafting of the justification or the written formation and signing of the award, but separate votes or votes cast outside the arbitration panel are not permitted.

A further requirement for the validity of the award pursuant to art. 823 CPC is the written form ad substantial. However, the robot arbitrator will not be able to sign, as he has no legal personality. It is also true that, given that formally the arbitrator is the manager of the program, the question could be easily resolved by having the legal representative of the manager of the robotized arbitration service sign it.[20]

4. Iranian law's implementation of smart contracts.

The procedure for establishing smart contracts in the context of a blockchain is based on factors relating to the intention and satisfaction of the participants, including the two parameters of these contracts' self-execution and their accuracy. Smart contracts' self-execution results in the conclusion of contract provisions under the direction of artificial intelligence from the start of contract negotiations to their final approval. This is accessible if the parties engaged in the signing of these contracts are identified. Ensuring the intention or eligibility of the parties can be included in the accuracy of these contracts and the accessibility of Oracle information systems during contract negotiations.[21] Contracts that are executed through the blockchain technology are known as smart contracts. This system is a distributed digital ledger that uses a computer network. Transactions concluded on this platform are recorded between the parties to be executed in a completely safe manner, and after they are finished, they are made available electronically in the blockchain area.

In smart contracts, the contract substitutes in acquisition transactions are smart assets or cryptocurrencies. The government recognizes the ownership of 'smart properties', which are assets with information stored in the form of cryptographic codes on the blockchain network.[22]

Due to the fact that Iran's legal system has not yet adopted blockchain technology, it may be stated that these contracts are concluded in the

[20] G Bonato, '*La natura e gli effetti del lodo arbitrale. Studio di diritto italiano e comparato*' [2012] , Naples.
[21] M Sadeghi – M. Nasser, 'Smart contract technology, a tool in the development of e-commerce' [2018] Requirements and policies, Tehran university, 143-167.
[22] A Wright, P De Filippi,. Decentralized blockchain technology and the rise of lex cryptographia. Available at SSRN 2580664 (2015).

electronic domain using computer instructions, and once they have been accepted, they are registered in the blockchain technology. The blockchain technology itself then serves as the final record of these contracts. Document registration in this context is regarded as document registration in the register office system since it is a centralized information system that is utilized by other systems, such as the document and real estate registration systems. Although countries are sensitive to the value of property in terms of people's property and its political nature in terms of each government's regional territory, and as a result, its transfers are subject to registration in the government real estate office, it is necessary to register these transactions in the notary office and to recognize the legitimacy of the parties involved.

The introduction of smart contracts into any country's legal system can introduce a new surface of technology into that system. A technology that can prevent many law suits and commercial real estate stability, resulting in the development of the economic system and other systems. Smart contracts are a viable alternative to traditional contracts due to their security, speed, high accuracy, and low cost. Using them helps to relieve people of the time-consuming process of registering documents with registration authorities and forms the basis for the best possible development of the registration system.

In some cases, the parties mention conditions in the contract that, despite being enforceable under their will, are in conflict with social norms and cannot be implemented. Such conditions are not possible with smart contracts, which means that these contracts are also transparent between parties given that they are governed by a system designed in accordance with specific instructions that has the ability to reread the contract or attract attention to any uncertain or invalid clauses. It is not possible for either party, or both, to intentionally or unintentionally make any clauses of the contract in this sort of contract null and void. Due to the conflict between the enforceability of these contracts and the fact that unclear, invalid, or null-and-void acts are sufficient circumstances for the impossibility of implementing the contract.

Since smart contracts and paper contracts are the same under the assimilation approach, no separate legal system is established for smart contracts, and the substantive and formal rules that govern other contracts also govern these types of contracts. The working group on electronic commerce of the United Nations Commission on International Trade Laws examined some legal concepts of electronic commerce as well as the issue of concluding a smart contract and concluded that the United Nations Convention on International Sales can be cited as the substantive law governing smart contracts.

However, in Iranian law, it is possible to demonstrate the legality and validity of smart contracts by pointing to a few civil code laws, such as articles 219[23] and 223.[24] Iran's e-commerce law, which was passed as a result of numerous changes in the nation, legalized transactions made over the Internet and

[23] Article 219 - Contracts made according to the law between the parties and their representatives are binding unless they are terminated by the consent of the parties or due to legal reasons.
[24] Article 223: 'Every transaction that has taken place is predicated on authenticity unless its corruption is known'.

through new communication technologies as well as regulated the electronic business process.

By recognizing and validating the legal status of electronic message data, Iran's e-commerce law has also accepted the principle of functional equality of message data and writing. A contract may be created and assembled virtually, but it does not need necessarily be signed there as well. The smart contract actually conforms to the general principles of the law of contracts and obligations in terms of the fundamental assumptions guiding the contract and the justification of the result.

Solving these challenges on an international level can lay the foundation for these contracts in general legal systems, and the policy-making process of concluding these contracts in accordance with the general rules for validating contracts concluded in the Iranian legal system can be adapted to the conditions of Article 190[25] of Iran's Civil Code. According to Article 190 of the Iranian Civil Code, the intention and satisfaction of the parties, their eligibility, the certainty of the transaction, and its legitimacy are the fundamental requirements for transactions. The parties to the contract, both legal and natural persons, must be eligible to conduct transactions. Therefore, bankrupt or mentally disabled people are considered ineligible. Lack of eligibility can be considered one of the defects of intention. In smart contracts, it is possible to verify the existence of eligibility and, in other words, the full intention of parties in concluding a contract by predicting the procedures for assigning digital signatures and allowing the possibility of acquiring virtual currencies. In Iran's legal system, according to Article 183 of the Civil Code, a 'contract' means that one or more persons make a commitment to one or more other persons, and it is accepted by them.

The nature of smart contracts in relation to the validity of their form and their conformity with the general rules and regulations of civil law regarding contracts is one of the new topics; knowledge and examination of the legal relations and works resulting from them are dependent on the formal structure of the electronic environment and the communication technology concepts known in this field.[26]

Smart contracts are similar to traditional contracts in many ways, but the formal structure of the electronic environment has given these contracts new features and concepts. In terms of the basic conditions of the contract and the regulation of its effects, smart contracts are subject to the general rules and regulations of the law of contracts and obligations; however, in terms of technical characteristics, methods of conclusion, and methods of protecting legal works, it necessitates their recognition and strict adherence to the general principles and rules governing contracts.

Smart contracts, in fact, do not have a different nature from conventional contracts in terms of the accuracy of the case or the subject matter, but are

[25] Article 190: The following conditions are essential for the validity of any transaction:
1) The intention of the parties and their consent
2) Eligibility of the parties
3) The specific subject to be traded
4) Legitimacy of the transaction.

[26] M Megaki Nia, 'How to conclude electronic contracts and its features' (2012) 1 Scientific and research biannual knowledge of civil rights, 85-98.

considered a new description of the contract formation environment, for which the legislator has not provided special regulations.

According to some legal experts, a smart contract is 'an agreement in which the parties' offer and acceptance are exchanged through the open international network of remote communication with audio and video tools'.[27]

Smart contracts cover a wide range of aspects of electronic transactions, including commercial or non-commercial practices as well as electronic offer and acceptance. Each of these may be a demonstration of the will and its effects in the electronic environment, such as the supply of goods and services to invite parties to conclude a contract, electronic purchase orders, electronic bank statements, and electronic payment orders.

In general, the formation of a legal relationship in the internet environment, particularly the conclusion of contracts in accordance with the principle of autonomy of the will and freedom of contracts, is not subject to special forms or formalities, as long as there is no explicit provision to the contrary in the law or the will of the parties; that is, the conclusion of contracts is based on the principle of consent. Individuals can also enter into any type of contract they want within the limitations of the law.[28]

In terms of the electronic nature of the contract conclusion environment, the subject of the contract has no distinguishing features when compared to traditional contracts. As a result, the parties to the contract have no restrictions in choosing the subject of the smart contract within the framework of the law, based on the principles of autonomy and freedom of will.

In principle, any type of property can be the main topic of a smart contract as the subject of a purchase and sale contract or the provision of services, but three items cannot be considered the subject of a smart contract, according to the implication of Article 6 of the Electronic Commerce Law. These include:

A: Real estate ownership documents

B: Sale of pharmaceuticals to final consumers

C: Announcing warnings or similar phrases that issue special orders for the use of goods or forbid the use of certain methods in the form of verbs or refraining from verbs.

According to the Iranian e-commerce law, in order to conclude a legal relationship in the electronic environment, the existence of the originator and the recipient and the exchange of message data between them are necessary. However, the term 'parties' does not include any person who acts as an intermediary in connection with the data of the message, according to clauses B and C of Article 2 of the Electronic Commerce Law.

As mentioned in the above discussions, the data of the message implies the expression of the will; it can be cited in lawsuits like other reasons, and its invalidity can also be proven through other evidence. According to Article 12 of the Electronic Commerce Law, the documents and evidence to prove the claim may be in the form of message data and may be presented in any court or government office. Based on the existing evidence rules, the probative value

[27] MM Ahmed, 'Obligations arising from the contract of subscription to the network connection services' (2020) (9(3) Academic Journal of Nawroz University, 74-93.

[28] SM Qasimzadeh, Civil Laws, Principles of Contracts and Obligations, Dadgostar Publishing House, Tehran, (2ND EDN,2005).

of the message data, one of the basic elements for the validity of the contract, cannot be simply rejected because of its shape and form.[29]

In these instances, the legislator incorporated the message data into the written ruling because, according to the cited article, whenever the existence of a writing is required by law, the message data is written in the ruling.

According to Article 190 of the Civil Code, the parties' intention is the most basic condition of contract validity and accuracy.[30] In addition to this condition, the validity of the contract requires the provision of other conditions, such as the eligibility of the parties, the determination of the subject of the contract, and the legitimacy of its purpose.

Contracts concluded by means of electronic tools, in their structural essence, are among the forms of contracts that the parties can conclude in this way with a prior agreement, but this is not legally required in any way. It is worth noting that according to Article 6 of the Electronic Commerce Law, whenever the existence of a writing is required by law, the data of the message, which according to the legal conditions is the expression of the will to be sent or received through electronic means, is written in the order.

Despite the fact that different laws generally tend to eliminate the formalities of concluding a smart contract, because the transaction is virtual and requires legal security, minimum formal conditions, such as the consumer's consent, are frequently required for the contract's conclusion in an electronic process. The provision of preliminary information and the ability to store the conditions of the contract have been imposed, and it is necessary to comply with them to conclude the contract. Based on this, the supplier must take steps to ensure that the consumer can complete the smart contract without hesitation.

There will therefore be no chance for a private agreement with the consumer to choose a different law than Iranian law as the ruling law if the chosen legislation offers less protection for the consumer than Iranian law. As a result, the destination country principle of protective jurisdiction has been approved by Iran's e-commerce law as a principle of conflict of laws in smart contracts. By reinforcing the rule of will and accepting the requirement of choosing the governing law in international smart contracts, this approach expresses the further limitation of the subjective factor of determining jurisdiction in determining the governing law in Iranian law, which is contrary to the policy of predictability of the governing law.

As a consequence, unless the parties to the contract have agreed otherwise and the chosen legislation has not offered less protection for the consumer than Iran's law, the rule is that smart consumer contracts are governed by Iranian law.

[29] Iran's e-commerce law approved in 2002. (https://dotic.ir/news/5144/)
[30] N Katouzian, *General principles of contract* Majd Publication (1996) 102-103.

5. The standards for the legality of smart contracts under Iranian law.

From the point of view of the legislator, the law of smart contracts is generally considered to apply to written contracts, except for the cases mentioned in the law, and when the contract is subject to the written form due to the law, its conclusion through electronic data will be sufficient. Of course, the signature is an important point in written contracts because it represents the parties' final will. With the creation of an electronic signature and its legal validity in smart contracts, an important flaw in the validity of electronic contracts has been removed.

In the meanwhile, using digital signatures to sign smart contracts is one of the requirements for doing so; otherwise, these contracts cannot be completed. The use of digital signatures might, of course, be considered in this context as one of the special requirements for concluding smart contracts, which need the approval of special laws to enforce their conclusion in individuals' transactions. A challenge like this is one that the Legislative Assembly in Iran's legal system should deal with. Although two simple and secure types of electronic signatures have been made public under Iran's e-commerce law, none of its provisions have mandated the usage of this kind of information.

In Iran's e-commerce law, electronic message data is recognized as a valid expression of will.[31] According to Article 2 of the Electronic Commerce Law, message data is any symbol of an event, information, or concept that is produced, sent, received, stored, or processed by electronic, optical, and new information technology devices. Therefore, electronic requests in the form of message data are created or sent according to the creator's will through the Internet or new information technologies.

In the e-commerce law of Iran, according to clause B of article 2, in the concept of electronic technologies, the term ‘originator’ is required. According to this law, the originator is the principal cause of the message data that he generates and sends, but this does not include the person who acts as an intermediary for the message data.

Acceptance in the course of concluding a contract is an expression of will that is declared in accordance with the other party's will. Acceptance, in other words, is the unconditional acceptance of the given offer to conclude a contract. Declaring consent to the requirements in the electronic environment is called ‘electronic acceptance’.

Electronic or non-electronic declaration of acceptance does not affect the nature of the will or how it implies the creation of legal relations. Electronic acceptance does not have a special status compared to traditional acceptance in the nature of the expression of will in contracts, but in terms of the form and manner of the declaration of will, a different situation can be observed in electronic acceptance. Electronic acceptance is usually achieved exclusively by clicking on the electronic expression of agreement to the terms of the electronic request provided in the Internet environment.

[31] Article 12 of Iran's e-commerce law states that documents and evidence to prove a claim may be in the form of message data, and the message data is valid for the purpose of litigation or defence.

The transmission of message data is valid, according to Article 26 of Iran's e-commerce law, when it is entered into an information system that is not under the control of the originator or his deputy. According to the provisions of this article, the message data is valid for the purpose of determining the recipient's willingness to accept when it is entered from the computer information system in a way that is out of the control of the acceptor and into the requesting information system. Some authors consider the sending and receiving of the electronic consent as concluding the electronic contract.

As long as the offeror has not stipulated a certain method of electronic notification, the electronic acceptance can be announced by any electronic method, such as by email, by filling out the form on the website page, or in the form of electronic payment of the sale price. If, despite the agreement of the parties to declare acceptance electronically, the recipient declares his acceptance through traditional mail, fax, or telephone communication, this acceptance is not considered electronic acceptance, and the declared acceptance will not be valid.

The validity of the time of conclusion of smart contracts is subject to the general rules governing contracts in civil law and usual procedures, but according to the methods of electronic communication and the special regulations that the legislator has explicitly provided in the law of electronic commerce, the time of conclusion of electronic contracts is considered upon submission. Despite the fact that the 2002 e-commerce law did not explicitly mention the time of contract conclusion, the e-commerce law requires that the validity of sending message data is dependent on the fact that this data is entered into an information system outside the control of the originator or his deputy. In terms of validity and the ability to refer to the message's data, it is important to note that the electronic commerce law considers the message's data to be a written ruling, as stated in Article 6.

According to Article 29 of the mentioned law, the Iranian legislator has determined the location of demand realization and acceptance in the smart contract. According to this article, if the location of the data transmission information system is the same as the location of the information system for receiving the same data, then the data transmission location and the data reception location are the same location, but if these two locations are different from each other, in this case, the legislator has provided three options:

A: If the parties have not agreed otherwise, the first option is that the location of the message data is the originator's business or commercial place, and the location of the message data receiving is also considered a business or commercial place.

B: The second option is that, if the originator has multiple business or commercial locations, the location closest to the original transaction is given credit for shipping; otherwise, the company's main location is considered to be the same business and commercial location.

C: The third option is that their legal residence will be the criterion if they do not have a place of business or commercial.

In drafting and approving the e-commerce law, the Iranian legislator is claimed to have paid special attention to the international aspect of smart

contracts in the field of e-commerce law. In this way, the provisions of the Electronic Commerce Law have been formulated and stipulated in accordance with the UNCITRAL Model Law's basic provisions and concepts. Of course, this is one of the rules that are expected to be established in international practice of various legal issues related to international electronic transactions, because local and domestic laws governing electronic transactions are insufficient in their international dimensions to address legal consequences arising from international law relations in this field.

The legal conditions desired by the legislator exist in Iran's e-commerce law for smart contracts, and these contracts qualify for authenticity due to the presence of reliable methods of verifying intent, because the legislator defined a secure electronic record in articles 10 and 11 of the e-commerce law of 2009.

According to Article 10, the secure electronic signature must have the following conditions:

A: Be unique to the signatory.

B: Find out the identity of the message data signer.

C: Issued by the signatory or under his exclusive will.

D: Connect to message data in such a way that any change in that message data can be recognized and discovered.

Also, according to Article 11 of the secure electronic record, 'data' is a message that is stored in accordance with the conditions of a secure information system and is accessible and understandable when necessary.

Digital signatures are a more advanced type of electronic signature, also known as encrypted electronic signatures. In terms of the security factor, it is ranked higher than other signatures and has three unique features as follows:

1. License or permit
2. Confirmation; and
3. Fraud protection.

According to Article 16 of the Electronic Commerce Law, any message data that is recorded and stored by third parties in accordance with Article 11 of this law is reliable. In addition, the existence of decentralized, independent systems can be considered the reason for the intention of their creators to conclude a transaction.

Though since Iran's e-commerce law appears to lack specific provisions for determining the governing law in smart contracts, the rules of conflict of laws contained in civil law should be applied in this regard. Some detailed safeguards have been established in articles 33 to 49 of the e-commerce law to protect consumer rights in the electronic environment. The principle is that smart consumer contracts are governed by Iranian law unless the parties to the contract agree otherwise and the chosen law does not provide less protection to the consumer than Iranian law. In the case of other smart contracts, the objective communication factor used to determine the governing law is the contract's location. As a result, determining the place of conclusion of electronic contracts is critical in determining the governing law as well as the rights and obligations of the contract's parties.

According to Article 27 of Iran's Electronic Commerce Law, the time of receiving the message data is the time when the data of the acceptance

message is entered into his information system, regardless of whether the addressee has determined the information system or not.

According to Article 28 of Iran's Electronic Commerce Law, the location of the information system should not be considered when determining the time and place of receiving message data. As a result, the location of information systems, according to Iran's e-commerce convention and law, is ineffective in determining the location and, as a result, the time of sending or receiving message data.

Accepting the electronic signature in cases where a signature is required also accepts the validity of the electronic signature, as does the fact that the documents and proofs of the lawsuit may be in the form of data messages. It compelled courts and government agencies to accept the evidentiary value of message data, and thus accepted the principle of the equality of validity of electronic evidence with other evidence in litigation.

Therefore, the data of the messages that have been created and stored in a secure way, in terms of the content and signature included in them, is considered the source of the obligations of the parties or the committed party and their legal representative, and as a result, in terms of execution and other effects, they are valid documents and can be cited in judicial and legal authorities.

Conclusions.

The adoption of smart contracts into any country's legal system can demonstrate new technological developments in legal systems, including a technology that can reduce the probability of numerous legal claims and improve transaction stability, both of which will advance the economy. However, the establishment of such structures in legal systems necessitates the supply of significant infrastructure to ensure that, once this system is put into place, it can successfully complete the specified aims. All individuals must be classified by a comprehensive system and given authorization to use one under law in order to construct this system.

Technology advancement over time has resulted in the introduction of new exchange system tools. By abandoning the traditional procedure of concluding paper contracts, these tools have led to the creation of a new space for concluding electronic contracts based on binary information, data-oriented contracts, and finally smart contracts. The newest kind of digital contracts, known as ‘smart contracts’, are made on the blockchain platform and are managed by artificial intelligence.

In order to conclude smart contracts, the parties need to obtain a license. In addition to the parties' final approval, the contracts also need the approval of artificial intelligence. Despite the similarity of smart contracts and traditional contracts in most of the governing rules, the emergence and expansion of electronic commerce have caused a new challenge in current contract law. Aside from the general ambiguity of electronic relations, the contracts made in this setting also include some legal questions and uncertainties.

The introduction of new financial instruments into the legal system of any country requires the approval of new laws in order to identify and recognize the different aspects of these instruments in the legal system. With the development of technology, developed countries have always tried to adapt their legal systems to new technologies, and in this way, they try to create new mechanisms in the legal relations of individuals in order to stabilize their property rights and their properties.

Smart contracts are viewed as a very acceptable replacement for traditional contracts because of their security, speed, high accuracy, and low cost. Due to their self-executing capabilities, transparency, and correctness, smart contracts are effective in lowering legal claims. Smart contracts prevent the occurrence of many legal and criminal lawsuits, as well as the occurrence of crimes such as financial frauds, the sale of other people's property, and the conclusion of fraudulent transactions.

These contracts reduce the costs of concluding transactions, avoid wasting time, and prevent the occurrence of some legal claims, such as the necessity of preparing official documents, enforcement of ownership, etc., because they are self-executing in relation to the implementation of the provisions of the contracts. Additionally, it stops numerous financial abuses by providing transparency features.

However, due to the unique characteristics of the electronic environment and in order to be able to assign legal actions, some minimal form requirements have been established. Smart contracts are not specifically foreseen in terms of the form of contracts, accepting the principle of the freedom of the parties to choose the form of the contract as the basis of legislation in this regard‹.

The replacement of traditional contracts with smart contracts not only saves money by reducing the costs of concluding and registering transactions but also leads to more supervision by the competent authorities over the financial transactions of individuals. The result of this is an increase in exchange security and, in other words, the stabilization of the property rights of individuals, which leads to an increase in foreign investment and the entry of countries onto the global stage in terms of transactions.

According to the materials mentioned, it was found that popularizing such contracts has many advantages and greatly increases the security and strength of transactions. This will reduce lawsuits, increase speed and accuracy in the markets, and, in general, lead to security and economic growth.

It is possible to justify the various aspects of these contracts, but in any case, the foundation of a new process in any legal system requires the approval of laws to formalize the validity of these contracts in that system and create a general obligation to oblige individuals to conclude their contracts in the form of these contracts.

The findings indicate that in the context of substantive rules, the principles of technical neutrality and functional equality are the basis for establishing laws governing smart contracts so that a person can understand that changing the constituent elements of the contract does not change the legal regime governing it, and smart contracts also have the same protections as traditional contracts. When addressing formal conditions in smart contracts, the response taken by countries and international organizations demonstrates the

acceptability of the method of removing formal restrictions. However, some formal regulations, such as the need to provide relevant information before closing a contract and the requirement of having a stable history, are still in force due to the necessity of identifying in the virtual world and establishing confidence.

Due to the special characteristics of smart contracts, developed countries have made efforts in recent years to validate these contracts. However, with the introduction of smart contracts, legal systems have decided to replace these contracts with traditional contracts.

The use of smart contracts depends on overcoming obstacles like educating the general public, defining the contract-closing procedure, resolving conflicts between national and international laws, harmonizing national and international laws to avoid conflicts, ensuring that third parties do not have access to the parties' private commercial and non-commercial information, and improving information security.

The issue of trust is the biggest concern for organizations requesting to use ‘electronic’ or ‘smart’ contracts. A person must have enough trust in the smart contract and transaction for them to be willing to send items, transfer money, or enter into binding contracts in real time. Securing that the smart contract conforms with legal standards is one challenge.

According to the mentioned materials, it was found that smart contracts have special qualities that contribute significantly to the growth of the exchange system and also popularizing such contracts has many advantages and greatly increases the security and strength of transactions. This will reduce lawsuits, increase speed and accuracy in the markets, and, in general, lead to security and economic growth.