# Jurisprudential and Legal Analysis of Smart Contracts and Challenges to Their Validity in Iranian Law

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**ABSTRACT**

Blockchain-based smart contracts have created a fundamental transformation in contract law. This study, employing a descriptive-analytical method and a comparative approach, examines the jurisprudential and legal foundations of these contracts and the challenges to their validity in Iranian law. The main question is to what extent smart contracts comply with the general principles and rules of contracts in Imāmī jurisprudence and Iranian law, and what obstacles exist in the way of their legal validity. The findings show that from a jurisprudential perspective, smart contracts can be analysed within the framework of rules such as "the believers are subject to their terms" (al-muʾminūn ʿinda shurūṭihim), "obligation to contracts" (al-ʿaqd sharīʿat al-ʿāqidīn), and the obligation to fulfil contracts (luzūm al-wafāʾ bi-l-ʿuqūd), although challenges such as gharar (ambiguity/excessive risk), lack of genuine consent, and conditions contrary to Sharia are raised. From a legal perspective, the most important challenges to the validity of these contracts include: lack of explicit legal recognition, the need to establish the coordination of the inner will with the outward expression (intent and consent), the difficulty of proving claims, the impossibility of unilateral termination in some cases, and conflict with mandatory rules (qawāʿid āmirah). The present study, through comparative analysis of the approaches of leading legal systems (the United States and the European Union) and by citing valid jurisprudential principles, offers solutions for recognising and validating smart contracts in the Iranian legal system.

**Keywords:** Smart Contract, Blockchain, Imāmī Jurisprudence, Iranian Law, Validity of Contract, Intention and Consent (Qaṣd wa Riḍā)

## 1.Introduction

The emergence of blockchain technology and smart contracts is among the most transformative innovations of the digital age in the sphere of legal and economic relations. Smart contracts, first introduced by Nick Szabo in 1994, are defined as computer protocols that, upon the occurrence of pre-determined conditions, automatically execute the terms of the contract without the need for an intermediary (Szabo, 1997). This technology, which operates on the blockchain platform using computer code, promises to eliminate intermediaries, reduce transaction costs, increase execution speed, and enhance transparency. However, these very novel features pose serious challenges to traditional legal systems founded on concepts such as inner will and outward expression (qaṣd wa riḍā), capacity (ahliyyah), options (khiyārāt—the right of rescission), and the binding force of contracts.

The necessity and significance of this research arise from the fact that in recent years, the volume of blockchain-based transactions and smart contracts has grown exponentially worldwide. According to reports from certain international bodies, the total value of transactions conducted through smart contracts exceeded USD 500 billion in 2023. In Iran, despite economic sanctions, the uptake of digital currencies and decentralised platforms is increasing. This has confronted legislators, judges, and economic actors with a new situation that demands deep jurisprudential and legal analysis and answers to numerous questions.

In Iranian law, contracts are primarily analysed on the basis of Imāmī jurisprudential rules and the provisions of the Civil Code (Articles 183 to 195). Rules such as al-mu’minūn ‘inda shurūṭihim (the believers are subject to their terms), al-‘aqd sharī‘at al-‘āqidīn (the contract is the law of the contracting parties), al-qudrah ‘alā al-taslīm (capacity to deliver), nafy al-gharar (negation of ambiguity/excessive risk), and lā ḍarar wa lā ḍirār (no harm nor reciprocal harm) are among the jurisprudential foundations that determine the validity and effect of contracts (Anṣārī, 2010; Khū’ī, 1410 AH). On the other hand, the Civil Code also considers the essential elements for the validity of a transaction to include intention and consent (qaṣd wa riḍā—coordination of inner will with outward expression), capacity (ahliyyah), a specified subject-matter, and the legitimacy of purpose (mashrū‘iyyat-e jahat) (Article 190 of the Civil Code). The fundamental question is: to what extent do smart contracts comply with these elements and jurisprudential-legal rules? Can computer codes properly express "intention and consent"? Is the self-execution of the contract compatible with the right of termination (khiyār) and the principle of the binding force of contracts? Is gharar (ambiguity and risk) in smart contracts—due to programming errors or cyber attacks—acceptable? These are questions that must be answered to determine the validity of smart contracts in the Iranian legal system.

The novelty of the present research lies in the fact that, for the first time in Iran, it undertakes a deep jurisprudential analysis (with an ijtihādī approach using primary Imāmī jurisprudential sources), systematically identifies the challenges to the validity of smart contracts in the Iranian legal system, and then, with a comparative approach, introduces the solutions of leading legal systems (the United States and the European Union) as adaptable models. Furthermore, this research goes beyond mere description and offers a practical framework for the legislator (draft provisions), judges (judicial criteria), and economic actors (a practical guide to using smart contracts).

The experience of leading legal systems shows that different approaches have been adopted towards smart contracts. In the United States, states such as Arizona, Nevada, and Tennessee have enacted explicit laws recognising smart contracts and blockchain-based electronic signatures (Arizona, 2017; Nevada, 2017). In the European Union, the eIDAS Regulation (2014) and the proposed MiCA Regulation have provided a framework for recognising smart contracts, although this recognition is more oriented towards technical and operational aspects than the substantive aspects of contract law (European Commission, 2020). In contrast, in Iranian law there is still no explicit and codified law concerning smart contracts, and judicial practice in this area is very limited and rudimentary. This legal vacuum leaves economic and legal actors in a state of ambiguity and legal insecurity.

The research background on smart contracts in Iran is largely confined to academic articles and theses that have addressed simple technical or legal aspects (Naṣr-Iṣfahānī & Karīmī, 2019; ʻAbbāsī & Jaʻfarī, 2021). In the jurisprudential domain, there are limited works that have generally addressed the compatibility of smart contracts with jurisprudential rules, but detailed and case-specific analysis (such as analysing gharar in smart codes or analysing intention and consent in interaction with machines) is less commonly seen. Furthermore, a comprehensive comparative study covering all three aspects (jurisprudential, legal, and comparative) is not found in domestic or foreign sources. This research gap reinforces the necessity and originality of the present study.

The main objective of this research is the jurisprudential and legal analysis of smart contracts and the identification of challenges to their validity in the Iranian legal system. The sub-objectives are:

(1) To explain the jurisprudential foundations that can be relied upon for smart contracts in Imāmī jurisprudence;

(2) To examine the compatibility of the elements of smart contracts with the provisions of the Iranian Civil Code;

(3) To conduct a comparative analysis of the approaches of leading legal systems in recognising smart contracts;

(4) To offer practical solutions for recognising and validating smart contracts in Iranian law.

The main research question is: "To what extent do smart contracts comply with the general principles and rules of contracts in Imāmī jurisprudence and Iranian law, and what obstacles stand in the way of their legal validity?" The sub-questions are:

(1) What are the acceptable jurisprudential foundations for smart contracts?

(2) What are the main challenges to the validity of smart contracts in Iranian law?

(3) What solutions do the experiences of leading legal systems offer for Iranian law?

The main hypothesis of this research is that despite numerous challenges, smart contracts can be analysed within the framework of the general rules of contracts in Imāmī jurisprudence and Iranian law and are largely acceptable, subject to compliance with specific requirements in the areas of intention and consent (qaṣd wa riḍā), absence of gharar (ambiguity), and the possibility of exercising options (khiyārāt—right of rescission). The sub-hypothesis is that by drawing inspiration from leading legal systems and utilising the capacity of jurisprudential rules such as mā lā yatimmu al-wājibu illā bi-hi fa-huwa wājib (that without which the obligatory cannot be accomplished is itself obligatory) and the obligation to fulfil contracts, a suitable legal framework for validating smart contracts can be formulated in Iran.

The research method in this article is descriptive-analytical and comparative, details of which will be presented in the methodology section (Section 3).

The structure of the article is as follows: after the introduction, Section 2 reviews the research background and theoretical foundations, including basic concepts (smart contract, blockchain, and the elements of contract validity in Iranian law). Section 3 is devoted to the research methodology. Section 4 analyses the jurisprudential foundations of smart contracts with reference to primary Imāmī jurisprudential sources. Section 5 examines the legal foundations and challenges to the validity of smart contracts in Iranian law, applying each of the essential elements for the validity of a transaction (intention and consent, capacity, subject-matter, legitimacy of purpose) to the features of smart contracts. Section 6 presents a comparative analysis with the legal systems of the United States and the European Union. Section 7 is devoted to the final discussion and analysis of the findings, and Section 8 presents the conclusion and practical solutions.

This research is significant because, while filling the existing theoretical gap, it can guide legislators, judges, and economic actors in dealing with smart contracts. Given the rapid growth of blockchain technology and the increasing applications of smart contracts in areas such as

crowdfunding, supply chains, real estate, and insurance, the necessity of a jurisprudential-legal analysis of this phenomenon is felt more than ever.

## 2. Research Background and Theoretical Foundations

### 2.1. Research Background

A review of the research background shows that the study of smart contracts in Western legal systems has a history of nearly two decades, but in Iranian law this subject has largely been considered only in the past decade. Below, the most important domestic and foreign studies are categorised.

**(a) Foreign Studies**

In Western legal systems, one of the first and most influential analyses was conducted by Nick Szabo in 1997. Szabo defined a smart contract as a combination of computer protocols and user interfaces aimed at reducing transaction costs and increasing transaction security (Szabo, 1997). Subsequently, Werbach (2005) examined the enforceability of smart contracts in the common law system and argued that these contracts are recognisable provided they satisfy the traditional elements (offer and acceptance, consideration, and intention to create legal relations) (Werbach, 2005).

In the 2010s, with the expansion of blockchain technology and the Bitcoin and Ethereum networks, further studies were conducted. Fairmaud (2016), emphasising the difference between blockchain-based smart contracts and traditional smart contracts, stressed the necessity of redefining concepts such as "intention" and "consent" (Fairmaud, 2016). Additionally, Raskin et al. (2017), with an interdisciplinary approach, analysed the technical-legal challenges of smart contracts and offered solutions to eliminate gharar arising from programming errors (Raskin et al., 2017).

In the comparative and legislative domain, Werbach et al. (2018) analysed the laws of Arizona, Nevada, and Tennessee as successful models for the recognition of smart contracts (Werbach et al., 2018). These studies have largely focused on recognising smart contracts as valid and enforceable electronic contracts and have paid less attention to substantive challenges such as conflict with mandatory rules.

**(b) Domestic Studies**

In Iranian law, the first serious studies in this field date to the late 1390s (c. 2018–2020). Naṣr-Iṣfahānī and Karīmī (2019), in an article entitled "The Legal Nature of Smart Contracts in the Context of Blockchain Technology," analysed the nature of smart contracts and their

compatibility with the general rules of contracts and concluded that smart contracts can be analysed as "computer-based contracts" (Naṣr-Iṣfahānī & Karīmī, 2019). ʿAbbāsī and Jaʿfarī (2021), in an article entitled "Legal Challenges of Smart Contracts in the Iranian Legal System," examined the legal and practical obstacles to these contracts and identified the most important obstacle as the lack of explicit legal recognition (ʿAbbāsī & Jaʿfarī, 2021).

In the jurisprudential domain, Muḥaqqiq Dāmād et al. (2020), in a study entitled "A Jurisprudential Examination of Smart Contracts in Imāmī Jurisprudence," analysed the jurisprudential foundations of these contracts on the basis of rules such as ilzām (obligation), lā ḍarar (no harm), and nafy al-gharar (negation of ambiguity) and concluded that smart contracts are not inherently incompatible with Sharia standards, provided they do not create a context for gharar and harm (Muḥaqqiq Dāmād et al., 2020). Furthermore, Shams and Aḥmadī (2022), in a comparative study, compared smart contracts with the contract of ṣulḥ (settlement) and the contract of wakālah (agency) in Imāmī jurisprudence and proposed the possibility of analysing a smart contract as a "programmed agency contract" (Shams & Aḥmadī, 2022).

However, a comprehensive study that simultaneously addresses the jurisprudential (with an ijtihādī approach), legal (with a focus on challenges to validity in Iranian law), and comparative (with leading systems) aspects is not found in domestic sources. This article seeks to fill this gap.

### 2.2. Theoretical Foundations

#### 2.2.1. Definition of a Smart Contract

A smart contract can be briefly defined as: "a protocol or computer code that runs on a blockchain platform and is programmed to automatically execute specific operations (usually the transfer of assets or the performance of obligations) without the need for an intermediary, upon the occurrence of pre-determined events." This definition is derived from the definition provided by Szabo (1997) and supplemented by Raskin et al. (2017).

The main features of a smart contract are:

(1) Self-executing;

(2) Transparency and immutability;

(3) Removal of intermediaries;

(4) High security.

Important note: A smart contract is not necessarily always a "contract" in the legal sense. Sometimes it is merely a technical tool for executing obligations arising from the main contract, and sometimes it directly replaces a traditional written agreement. This distinction is highly significant in jurisprudential and legal analysis.

### 2.2.2. Blockchain Technology

Blockchain is a distributed and decentralised ledger in which transactions are recorded in connected blocks, and the use of cryptography and network consensus prevents the alteration or deletion of information (Naṣīrī & Qāsimī, 2021). Ethereum, as one of the most important platforms for smart contracts, has enabled the execution of complex codes (Raskin et al., 2017).

### 2.2.3. The Elements of Contract Validity in Iranian Law

Under Article 190 of the Iranian Civil Code, the essential conditions for the validity of a transaction (contract) are:

Intention and Consent of the Parties (qaṣd wa riḍā): genuine and free agreement; that is, the coordination of inner will with outward expression.

Capacity of the Parties (ahliyyat): having the legal capacity to enter into a transaction.

Defined Subject-Matter (mawḍū‘-e mu‘ayyan): the subject of the transaction must be specified and definite.

Legitimacy of Purpose (mashrū‘iyyat-e jahat): the purpose and motive for the transaction must not be contrary to Sharia or law.

In subsequent sections, each of these elements will be compared with the features of smart contracts. Additionally, the jurisprudential rules governing contracts, including luzūm al-wafā’ bi-l-‘uqūd (obligation to fulfil contracts), nafy al-gharar (negation of ambiguity/excessive risk), and lā ḍarar (no harm), will be analysed in detail. 3. Research Methodology

This section is devoted to explaining the methodological framework governing the present research. Since the research method was briefly mentioned in the introduction, this section addresses the details and implementation method.

### 3.1. General Research Approach

This research is applied-developmental in terms of its objective, as its results can be used to reform Iranian laws and regulations concerning smart contracts and to offer practical solutions to economic and legal actors. In terms of nature and method, this research is descriptive-analytical and comparative.

The philosophical approach governing this research is interpretivism (Interpretivism); because legal concepts such as "intention and consent," "gharar," and "binding force of contracts" are abstract concepts dependent on cultural and social context, and cannot be analysed solely through quantitative and statistical methods.

### 3.2. Data Collection Method

The data for this research was collected through library (documentary) research. The sources used include four main categories:

(a) Jurisprudential Sources: including Makāsib (Anṣārī), ʻUrwat al-Wuthqā (Yazdī), Mustamsak al-ʻUrwah (Ḥakīm), and Miṣbāḥ al-Fiqāhah (Khūʾī). Furthermore, jurisprudential rules such as al-muʾminūn ʻinda shurūṭihim (the believers are subject to their terms), luzūm al-wafāʾ bi-l-ʻuqūd (obligation to fulfil contracts), nafy al-gharar (negation of ambiguity), and lā ḍarar (no harm) have been used as the main foundations.

(b) Legal Sources: The Iranian Civil Code (Articles 183 to 195 and Article 190), the Iranian Electronic Commerce Act, authoritative domestic legal books and articles (Kātūziyān, Ṣafāʾī, Shahīdī), and peer-reviewed academic articles related to smart contracts.

(c) Foreign Sources: US state laws (Arizona, Nevada, Tennessee), EU regulations, and reputable international academic articles from databases.

(d) Technical Sources: Ethereum platform documentation, reports from reputable research centres.

### 3.3. Data Analysis Method

Data analysis in this research was conducted using three methods:

(a) Inferential and Ijtihādī Method (Jurisprudential Section): Referral to primary Imāmī jurisprudential sources, extraction of rules governing contracts, and then analysis of the compliance of smart contracts with those rules through textual analysis, jurisprudential analogy (qiyās), and prioritisation of evidence.

(b) Analytical-Critical Method (Legal Section): Description of existing regulations, identification of weaknesses and ambiguities, and presentation of corrective solutions using legal reasoning.

(c) Comparative Method (Comparative Section): Use of the "description-analysis-comparison-transfer" model to examine the legal systems of the United States and the European Union and the possibility of transferring successful solutions to Iran.

### 3.4. Study Population and Sampling

The "study population" includes all laws, regulations, jurisprudential sources, and judicial practices related to smart contracts in Iran, the United States, and the European Union. These two legal systems were chosen because of the United States' leadership in enacting explicit state laws and the European Union's transnational approach to regulating digital matters.

### 3.5. Research Tool

The main tool is note-taking. Persian keywords: smart contract, blockchain, Imāmī jurisprudence, Iranian law, validity of contract, intention and consent, gharar, khiyārāt.

### 3.6. Validity and Reliability

Validity was ensured through triangulation (simultaneous use of jurisprudential, legal, and technical sources) and peer review (two fourth-level seminary students from Qom). Reliability was examined using the inter-coder agreement method and re-testing.

### 3.7. Research Limitations

- Novelty of the subject and limited domestic sources.
- Absence of judicial practice in Iran.
- Rapid technological change.
- Limited access to some foreign sources due to sanctions.

### 3.8. Research Ethics

Accurate citation, impartiality in analysis, honesty in quotations, and transparency regarding conflicts of interest (no conflicts of interest) have been observed.

## 4. Jurisprudential Foundations of Smart Contracts

A jurisprudential examination of smart contracts requires analysing this new institution in light of the general rules of contracts in Imāmī jurisprudence. In this section, the most important jurisprudential rules governing contracts are first introduced, and then the compatibility of smart contracts with each of them is analysed. Finally, the jurisprudential challenges facing these types of contracts and solutions to them are presented.

### 4.1. General Rules Governing Contracts in Imāmī Jurisprudence

In Imāmī jurisprudence, contracts are subject to general rules that are explained in authoritative jurisprudential sources such as Makāsib (Anṣārī, 2010), ‘Urwat al-Wuthqā (Yazdī, 1429 AH), and Mustamsak al-‘Urwah (Ḥakīm, 1416 AH). The most important of these rules are:

Rule of al-mu’minūn ‘inda shurūṭihim: The believers are bound by their conditions. This rule, derived from authentic hadiths, is considered the main basis for the obligation to fulfil contracts in Imāmī jurisprudence (Anṣārī, 2010, p. 345).

Rule of al-‘aqd sharī‘at al-‘āqidīn: The contract is the law of the contracting parties. This rule refers to the autonomy of the will and the sovereignty of the parties over the terms of the contract, as long as it does not conflict with mandatory rules and Sharia provisions (Khū’ī, 1410 AH, vol. 2, p. 128).

Rule of al-qudrah ʻalā al-taslīm: Capacity to deliver the subject-matter is a condition of validity. If someone sells something they are unable to deliver, the transaction is void (Yazdī, 1429 AH, vol. 2, p. 215).

Rule of nafy al-gharar: Negation of gharar (ambiguity and excessive unusual risk). On the basis of this rule, transactions involving excessive gharar (ambiguity and risk beyond the ordinary) are void. This rule is derived from the famous hadith: "The Messenger of Allah prohibited the sale of gharar" (Ḥakīm, 1416 AH, vol. 8, p. 42).

Rule of lā ḍarar wa lā ḍirār: Negation of any harm and reciprocal harm. On the basis of this rule, no one has the right to harm another or to inflict reciprocal harm in response to harm from others. In contracts, any condition contrary to this rule is void (Anṣārī, 2010, p. 402).

Rule of al-ikrāh yubṭilu al-ʻaqd: Duress (compulsion and threat) renders the contract void. If a person is forced to conclude a contract under pressure and threat, that contract is invalid (Khū'ī, 1410 AH, vol. 3, p. 56).

### 4.2. Analysis of the Compatibility of Smart Contracts with Jurisprudential Rules

#### 4.2.1. Rule of al-mu'minūn 'inda shurūṭihim and the Self-Execution of Smart Contracts

The aforementioned rule establishes the obligation to fulfil conditions (Anṣārī, 2010, p. 347). Smart contracts, with their self-executing feature, achieve the highest level of fulfilment of conditions, because as soon as the conditions are met, obligations are performed without the need for any further action by the parties. From a jurisprudential perspective, not only is there no prohibition on self-execution, but it can also be considered a form of emphasis on the obligation to fulfil the condition. A condition of self-execution, if explicitly agreed upon by the parties, is covered by the rule of al-mu'minūn 'inda shurūṭihim and is binding.

Challenge: Sometimes computer codes, due to errors or technical defects, act contrary to the agreed conditions. In that case, can it be said that the condition of self-execution is "contrary to Sharia," or has there merely been a failure to achieve the purpose? It appears that this problem is of the "defect in execution" type, not "contravention of Sharia," and can be remedied by observing trustworthiness in programming. Furthermore, an implied condition of "correct execution of the

code" can be considered as an implied condition of the contract, breach of which gives rise to an option of rescission (khiyār).

### 4.2.2. Rule of nafy al-gharar and Risks Arising from Smart Codes

Gharar linguistically means danger, ignorance, and lack of knowledge about the outcome of a matter (Ḥakīm, 1416 AH, vol. 8, p. 44). In jurisprudence, a gharārī sale (transactions accompanied by ambiguity and excessive unusual risk) is void. The question is: are smart contracts inherently gharārī?

Jurisprudential analysis shows that the smart contract itself, if transparent and predictable, is not gharārī, because its provisions are available to the parties in the form of precise and reviewable codes. However, sources of gharar in smart contracts may arise from the following:

Programming errors: If the code contains defects, the execution result will differ from what the parties expected. This type of gharar arises from a technical defect, not from the nature of the contract. It can be reduced through code auditing and the development of technical standards (Raskin et al., 2017).

Cyber attacks: If the platform or contract is hacked, there is a risk of loss of assets. This risk is also considered a type of unusual gharar and can be managed through a warranty condition or the use of insurance.

Uncertainty in external events: Smart contracts often require external data (e.g., currency prices or the outcome of an event) for decision-making. This data is provided by centralised or decentralised service providers (Oracles). If this data is incorrect or manipulated, the contract executes erroneously. This source of gharar is one of the serious jurisprudential challenges, because the parties do not in practice have confidence in the accuracy of the information coming from an external source.

Jurisprudential solution: To eliminate gharar, it can be stipulated that external data must be sourced from multiple and reliable sources, and in the event of an error, the party at fault is responsible for compensating the loss. Furthermore, on the basis of the rule of lā ḍarar, any harm arising from an error can be imposed on the provider of that data.

### 4.2.3. Rule of lā ḍarar and the Impossibility of Rescission in Some Smart Contracts

One of the important challenges of smart contracts is the impossibility of unilateral termination in some of them. After a contract is recorded on the blockchain, due to its immutability, it cannot be cancelled or amended. This issue conflicts with the rule of lā ḍarar, because one party may, after the conclusion of the contract, acquire a right of rescission (khiyār) for reasons such as a defect in the goods, fraud (tadlīs), or duress (ikrāh), but be unable to exercise it (Muḥaqqiq Dāmād et al., 2020).

Jurisprudential analysis: The rule of lā ḍarar states "lā ḍarar wa lā ḍirār" (no harm nor reciprocal harm). If a contract is designed in such a way that the parties cannot rescind it even in necessary cases (such as hidden defects or fraud), this contract causes harm to the harmed party, and on the basis of the rule of lā ḍarar, such a condition (a condition of absolute non-rescindability) is void (Anṣārī, 2010, p. 405).

Jurisprudential solution: To address this problem, the smart contract can be programmed to include a "stop button" or a "review period." For example, a right of rescission may be available to the parties for the first 24 hours after the conclusion of the contract. Alternatively, an "automated arbitrator" can be defined that automatically decides in the event of a dispute. From a jurisprudential perspective, the inclusion of such conditions in the contract is compatible with the rule of al-muʾminūn ʿinda shurūṭihim, because the parties have consented to them.

### 4.2.4. Rule of nafy al-ikrāh (Negation of Duress) and Informed Consent in Interaction with Machines

On the basis of the rule of al-ikrāh yubṭilu al-ʿaqd (duress renders the contract void), if a contract is concluded under pressure and threat, it is void (Khūʾī, 1410 AH, vol. 3, p. 58). In smart contracts, the question is: does a user who clicks on the "execute" button without reading the codes or without fully understanding the consequences have informed consent?

Jurisprudential analysis shows that merely clicking a button or providing a digital signature can be considered as "consent" if the user has received the necessary warnings and has had the opportunity to study the codes (which are usually available as open source). However, if the codes are too complex and incomprehensible, or if the user has been deceived, the possibility of duress or fraud (tadlīs) may arise (ʿAbbāsī & Jaʿfarī, 2021).

Jurisprudential solution: Platforms offering smart contracts must provide clear and understandable terms of use and inform the user of the existing risks (such as code errors or cyber attacks). Furthermore, a "plain language summary of the contract" can be provided for non-professional users to establish informed consent.

### 4.3. Summary of the Jurisprudential Analysis

On the basis of the foregoing analysis, it can be concluded that smart contracts are not inherently incompatible with the standards of Imāmī jurisprudence and can be analysed within the framework of the general rules of contracts (Muḥaqqiq Dāmād et al., 2020). However, to resolve the jurisprudential challenges (particularly in the areas of gharar, lā ḍarar, and duress), the following requirements must be observed:

- Transparency of code: The contract code must be publicly available and reviewed by independent auditors.
- Rescindability in necessary cases: Provision of a "stop button" or "review period" mechanism in the contract.
- Sourcing external data from multiple and reliable sources: Use of multiple data sources or reliance on reputable decentralised sources to reduce gharar.
- User awareness: Provision of sufficient information to ordinary users to establish informed consent.
- Sharia supervision: Establishment of a jurisprudential committee on major smart contract platforms (such as Ethereum) to review the compliance of contracts with Sharia standards.

## 5. Legal Foundations and Challenges to the Validity of Smart Contracts in Iranian Law

In this section, the legal framework governing contracts in Iran is first described, and then each of the essential elements for the validity of a transaction (Article 190 of the Civil Code) is compared with the features of smart contracts. Subsequently, the main challenges to the validity of these contracts in the Iranian legal system are identified and analysed.

### 5.1. The Legal Framework Governing Contracts in Iran

The Iranian Civil Code, which is largely derived from Imāmī jurisprudence, determines the elements and conditions for the validity of contracts. Articles 183 to 195 of the Civil Code are devoted to the general principles of contracts. The most important articles are:

Article 183: "A contract is constituted by one or more persons undertaking an obligation towards one or more other persons, and the acceptance thereof by them."

Article 190: "The following conditions are necessary for the validity of any transaction: 1. Intention and consent of the parties; 2. Capacity of the parties; 3. A definite subject-matter which is the object of the transaction; 4. Legitimacy of the purpose of the transaction."

Article 191: "A contract produces effects only in respect of the contracting parties and their successors, except in the case provided for in Article 196."

In addition to the Civil Code, the Iranian Electronic Commerce Act (adopted 2003) is also significant in the field of electronic contracts. Articles 6 to 16 of this Act are devoted to "electronic contracts" and include provisions such as the validity of electronic messages (Article 6), conditions for the use of electronic signatures (Articles 8 to 12), and the time and place of message dispatch (Articles 13 to 16). However, the Electronic Commerce Act does not specifically refer to blockchain-based contracts and smart contracts, and this legal vacuum is one of the main challenges.

## 5. 5.2. Comparison of the Essential Elements for the Validity of a Transaction with Smart Contracts

### 5.2.1. Intention and Consent (qaṣd wa riḍā)—Inner Will and Outward Expression

Intention and consent mean the coordination of the inner will with the outward expression (Kātūziyān, 2016, p. 85). In smart contracts, the expression of will usually takes place through clicking the execute button, providing a digital signature, or sending a transaction to the blockchain network. The question is: can this method of expressing will be as valid as signing a paper contract?

Under Article 6 of the Electronic Commerce Act, "Wherever the law requires a writing or document, the existence of a valid electronic message shall be deemed to satisfy the requirement of a writing or document, except in exceptional cases provided for in this Act." Furthermore, Article 7 of this Act considers a valid electronic signature to be equivalent to a handwritten signature. On the basis of these provisions, it can be said that the expression of will through a blockchain-based digital signature is valid under Iranian law, provided that it meets the conditions of a valid electronic signature (including being exclusive, capable of identifying the signatory, and linked to the message).

Main challenge: In many smart contracts, users accept the contract without reading the source code and merely by clicking the "execute" button. Can it be said that these users have "informed consent"? In Iranian law, consent must be "informed," meaning that the parties are aware of the nature and contents of the contract. If the codes are very complex and incomprehensible to the public, the possibility of "ignorance of the contents of the contract" or even "fraud" (tadlīs) may

arise (‘Abbāsī & Ja‘farī, 2021). The solution is that platforms offering smart contracts should be required to provide a "plain language summary of the contract" alongside the codes.

### 5.2.2. Capacity (ahliyyat)

Capacity in Iranian law is divided into two types: "capacity to enjoy rights" (ahliyyat-e tamattu‘) and "capacity to exercise rights" (ahliyyat-e istīfā’). To conclude a contract, both types of capacity are required. Article 211 of the Civil Code: "For parties to be capable of contracting, they must be adult, sane, and prudent (rāshid)."

The challenge of capacity in smart contracts arises from the fact that the real identity of users is unknown on many blockchains (possibility of using anonymous wallets). If a smart contract is concluded by a person lacking capacity (e.g., a minor or an imprudent person) using an anonymous wallet, it will be very difficult to detect and prove the invalidity of the contract.

Solution: Use of wallets with identity verification or decentralised identity systems that confirm the user's identity without revealing sensitive information. At present, Iranian law does not recognise such a system, and this constitutes a legal vacuum.

### 5.2.3. Definite Subject-Matter (mawḍū‘-e mu‘ayyan)

Article 214 of the Civil Code: "The subject-matter of a transaction must be property or an act which each of the contracting parties undertakes to deliver or perform." Article 215: "The subject-matter must be definite, and if it is uncertain and not subsequently specified, the contract is void."

In smart contracts, the subject-matter of the transaction is usually specified in the code within the contract. For example, a smart contract for the purchase of tokens specifies the number of tokens and the price precisely. From this perspective, the condition of specification of the subject-matter is well satisfied. However, in some cases, the subject-matter of the contract depends on external data (Oracles). For example, a contract that makes payment conditional on the price of gold on a specific date. If the external data is unavailable or ambiguous on that date, the subject-matter becomes uncertain. This is the same challenge of "gharar" referred to in the jurisprudential section. In Iranian law, this ambiguity can also constitute grounds for voidness of the contract on account of the "subject-matter being unspecified" (Article 215 of the Civil Code).

### 5.2.4. Legitimacy of Purpose (mashrū‘iyyat-e jahat)

Article 217 of the Civil Code: "In transactions, the purpose of the transaction must be legitimate." Purpose means the motive and objective of the parties in entering into the transaction. Smart contracts are in themselves neutral tools, and their lawful or unlawful character depends on the content and purpose of the transaction. For example, a smart contract for the purchase and sale of a lawful commodity or the provision of legal services has a legitimate purpose. However, if used for gambling, usury, or unlawful transactions, it has an illegitimate purpose and is void. The main challenge here is supervision. In a decentralised space, who can determine whether a user has used a smart contract for an illegitimate purpose? And after such determination, how can its execution be prevented? At present, there is no clear answer in Iranian law.

## 5.3. The Most Important Challenges to the Validity of Smart Contracts in Iranian Law

On the basis of the foregoing analysis, the most important legal challenges to the validity of smart contracts in Iran are:

| No. | Challenge | Explanation |
|---|---|---|
| **1** | Lack of explicit legal recognition | No law in Iran specifically refers to "smart contracts," and this legal ambiguity makes economic actors hesitant. |
| **2** | Establishing informed intention and consent | Do ordinary users who do not read the codes have informed consent? |
| **3** | Capacity problem in anonymous blockchains | Inability to verify the identity and capacity of parties on many blockchains. |
| **4** | Ambiguity of subject-matter (*gharar*) arising from Oracles | Dependence on external data can cause *gharar* and the voidness of the contract. |
| **5** | Impossibility of termination in some contracts | Failure to provide for options (*khiyārāt*) in the code conflicts with Civil Code provisions (such as option of defect, option of fraud). |
| **6** | Difficulty of proving claims | Evidence of proof (including testimony, presumptions, and confessions) is difficult to gather in a decentralised space. Iranian courts also lack sufficient technical knowledge to handle these cases. |
| **7** | Conflict with mandatory rules (*qawā‘id-e āmirah*) | Certain mandatory rules such as *lā ḍarar*, *nafy al-gharar*, and anti-money-laundering laws may conflict with the characteristics of smart contracts (such as anonymity or immutability). |

| No. | Challenge | Explanation |
|---|---|---|
| **8** | Supervision and enforcement of judgments | How can a court judgment for the rescission of a contract recorded on an immutable blockchain be enforced? |

### 5.4. Summary and Legal Solutions

Despite numerous challenges, smart contracts cannot be considered entirely invalid in Iranian law. By virtue of Articles 10 and 149 of the Civil Code (the principle of autonomy of will and freedom of contracts), any agreement that is not explicitly contrary to law is valid. The proposed solutions are as follows:

- Immediate legislation: The Islamic Consultative Assembly (Majlis) should, as soon as possible, by amending the Electronic Commerce Act or enacting an independent law, address the definition of "smart contract," "blockchain signature," and "decentralised identity verification" (Naṣr-Iṣfahānī & Karīmī, 2019).

- Development of judicial practice: Judges should become familiar with blockchain technology and smart contracts through training courses. Furthermore, the Statistics and Information Technology Centre of the Judiciary should establish a system for the registration and inquiry of blockchain transactions.

- Inspiration from leading systems: By modelling the laws of Arizona (Arizona, 2017) and Nevada (Nevada, 2017) in the United States, and the (draft) regulations of the European Union (European Commission, 2020), a suitable legal framework can be formulated. Details of these systems will be presented in Section 6 (Comparative Analysis).

- Use of hybrid contracts: Until the complete resolution of the challenges, it is recommended that economic actors use hybrid contracts (traditional written contract + smart code for the automatic execution of part of the obligations) so as to benefit from the advantages of the technology while preserving legal security.

## 6. Final Discussion and Analysis of the Findings

In this section, the findings from the jurisprudential, legal, and comparative analyses are first summarised separately. Then, with a systemic perspective, the proposed model for recognising

and validating smart contracts in the Iranian legal system is presented. Finally, a definitive answer is given to the research questions.

### 6.1. Summary of the Jurisprudential Findings

The jurisprudential analysis of smart contracts in Section 4 showed that this new institution has no inherent conflict with the general rules of contracts in Imāmī jurisprudence, but is subject to certain requirements, as summarised in the following table:

| Jurisprudential Rule | Challenge in Smart Contracts | Jurisprudential Solution |
|---|---|---|
| ***al-mu'minūn 'inda shurūṭihim*** | Possibility of breach of condition due to code errors | Implied condition of correct execution + option for breach |
| ***nafy al-gharar*** | Programming errors, cyber attacks, uncertainty of Oracles | Code auditing, insurance, use of multiple Oracles |
| ***lā ḍarar*** | Impossibility of unilateral termination in some contracts | Provision of a "stop button" or "review period" |
| ***nafy al-ikrāh*** | User's lack of awareness of complex code provisions | Provision of a plain-language summary of the contract |

plain-language summary of the contract

**Final jurisprudential conclusion:** Smart contracts are valid and binding from the perspective of Imāmī jurisprudence if they are transparent, predictable, and include compensation mechanisms. The obligation to fulfil such contracts is covered by the rule of al-mu'minūn 'inda shurūṭihim and the noble verse "Awfū bi-l-'uqūd" (Fulfil your contracts) (Qur'an 5:1) (Muḥaqqiq Dāmād et al., 2020).

### 6.2. Summary of the Legal Findings

The legal analysis in Section 5 identified eight main challenges to the validity of smart contracts in Iranian law. The severity, priority, and proposed solution for each challenge are summarised below:

| No. | Challenge | Severity (out of 5) | Priority | Proposed Solution |
|---|---|---|---|---|
| **1** | Lack of explicit legal recognition | 5 | First | Enactment of a specific law or amendment of the Electronic Commerce Act |
| **2** | Establishing informed intention and consent | 5 | First | Requirement to provide a plain-language summary of the contract |
| **3** | Capacity problem in anonymous blockchains | 4 | Second | Use of wallets with identity verification |

| No. | Challenge | Severity (out of 5) | Priority | Proposed Solution |
|---|---|---|---|---|
| **4** | Ambiguity of subject-matter (*gharar*) from Oracles | 3 | Second | Use of multiple reliable data sources |
| **5** | Impossibility of termination | 4 | First | Provision of options (*khiyārāt*) in the contract code |
| **6** | Difficulty of proving claims | 4 | Second | Establishment of a judicial system for registering blockchain transactions |
| **7** | Conflict with mandatory rules | 3 | Third | Identification of cases of conflict and their exclusion by law |
| **8** | Supervision and enforcement of judgments | 4 | Second | Definition of an "automated arbitrator" in the contract code |

**Final legal conclusion:** Despite numerous challenges, smart contracts are not entirely invalid in Iranian law. The principle of freedom of contracts (Article 10 of the Civil Code) and the recognition of electronic contracts in the Electronic Commerce Act provide a preliminary basis for their acceptance. However, until the legal challenges (particularly the lack of explicit legal recognition and the establishment of intention and consent) are resolved, it is recommended that hybrid contracts (traditional + smart) be used (Naṣr-Iṣfahānī & Karīmī, 2019).

### 6.3. Summary of the Comparative Findings

The comparative analysis in Section 6 (which will follow) shows that leading legal systems have adopted two different approaches:

- United States approach (state laws): Focus on explicit and detailed recognition of smart contracts and blockchain signatures. In the Arizona and Nevada laws, a smart contract is defined as "an event that is automatically executed," and a blockchain signature is treated as equivalent to a handwritten signature (Arizona, 2017; Nevada, 2017).

- European Union approach (eIDAS and MiCA Regulations): Focus on a general and harmonising framework without entering into technical details. The eIDAS Regulation considers a valid electronic signature to be equivalent to a handwritten signature, and the proposed MiCA Regulation regulates the provision of services related to crypto-assets, without specifically referring to smart contracts (European Commission, 2020).

Adaptable strengths for Iran:

- From the US: explicit and detailed definition of "smart contract" and "blockchain signature" in the law.
- From the EU: creation of a harmonised framework for the provision of blockchain services and determination of the liability of providers.
- From both: recognition of blockchain-based digital signatures as valid and admissible signatures in court.

### 6.4. Proposed Model for the Iranian Legal System

By combining the jurisprudential, legal, and comparative findings, the following model is proposed for the recognition and validation of smart contracts in Iran:

**Model of "Conditional Recognition with a Requirement of Transparency and Supervision" — this model has four main pillars:**

#### First Pillar: Explicit Legal Recognition

Adoption of an article or supplementary articles in the Electronic Commerce Act in which "smart contract" is defined and a blockchain signature is treated as a type of valid electronic signature.

Inspiration should be taken from the Arizona and Nevada laws in this regard.

#### Second Pillar: Requirement of Transparency

Providers of smart contract platforms (such as Ethereum) should be required to provide a "plain-language summary of the contract" alongside the main codes, so that ordinary users can give informed consent.

This pillar addresses the challenge of "intention and consent" (Section 5.2.1) and the rule of "negation of duress" (Section 4.2.4).

#### Third Pillar: Provision of Options (Khiyārāt)

All smart contracts should include a "review period" mechanism (e.g., 24 hours) or an "emergency stop button" (for cases of compulsory rescission such as defect, fraud, or duress).

Otherwise, the contract will be considered rescindable from a Sharia and legal perspective, and the aggrieved party may apply to the court for rescission.

This pillar addresses the challenge of "impossibility of termination" (Section 5.3) and the rule of lā ḍarar (Section 4.2.3).

**Fourth Pillar: Supervision and Automated Arbitration**

For high-risk smart contracts (e.g., large financial transactions), an "automated arbitrator" (Arbitration Smart Contract) may be defined that automatically makes a decision in the event of a dispute.

Furthermore, the Judiciary should establish a system for registering and inquiring about blockchain transactions to facilitate the proof of claims.

### 6.5. Final Answers to the Research Questions

Answer to the main question: "To what extent do smart contracts comply with the general principles and rules of contracts in Imāmī jurisprudence and Iranian law, and what obstacles stand in the way of their legal validity?"

Answer: Smart contracts, jurisprudentially, can be analysed within the framework of rules such as al-mu'minūn 'inda shurūṭihim, nafy al-gharar, and lā ḍarar, and are not inherently incompatible with Sharia standards. Legally, despite numerous challenges (such as lack of explicit legal recognition, difficulty in establishing intention and consent, and impossibility of termination), they cannot at present be entirely invalidated, but full validity requires law reform and compliance with transparency and supervision requirements.

**Answers to the sub-questions:**

What are the acceptable jurisprudential foundations? The rules of al-mu'minūn 'inda shurūṭihim, nafy al-gharar, lā ḍarar, nafy al-ikrāh, and the obligation to fulfil contracts are the most important foundations.

What are the main challenges to validity in Iranian law? Eight main challenges including lack of legal recognition, establishing intention and consent, capacity, gharar, impossibility of termination, proof of claims, conflict with mandatory rules, and supervision and enforcement (detailed in Section 5.3).

What solutions do the experiences of leading systems offer? Explicit legal recognition (US) and the creation of a harmonised framework (EU) are two main solutions that can be combined with the proposed model of "conditional recognition with a requirement of transparency and supervision" and implemented in Iran.

### 6.6. Confirmation or Rejection of the Hypotheses

Main hypothesis (smart contracts can be analysed within the framework of general rules and are largely acceptable, subject to compliance with requirements in the areas of intention and consent, absence of gharar, and possibility of exercising options) is confirmed, because the jurisprudential and legal analysis showed that with transparency of code, provision of a termination mechanism, and user awareness, these contracts are valid.

Sub-hypothesis (by drawing inspiration from leading systems and utilising the capacity of jurisprudential rules, a suitable legal framework can be formulated) is also confirmed, because the proposed model of "conditional recognition with a requirement of transparency and supervision" is a synthesis of jurisprudence, domestic law, and comparative experiences.

## 7. Conclusion

The present research was conducted with the aim of the jurisprudential and legal analysis of smart contracts and the identification of challenges to their validity in the Iranian legal system. The findings of the research showed that:

First, from the perspective of Imāmī jurisprudence, smart contracts are not inherently incompatible with Sharia standards and can be analysed within the framework of rules such as al-mu’minūn ‘inda shurūṭihim, nafy al-gharar, lā ḍarar, and nafy al-ikrāh. However, to resolve the jurisprudential challenges (particularly in the areas of gharar arising from code errors and the impossibility of termination), compliance with requirements such as transparency of code, provision of a termination mechanism (stop button or review period), and sourcing external data from multiple sources is essential.

Second, from the perspective of Iranian law, smart contracts face eight main challenges: (1) lack of explicit legal recognition; (2) establishing informed intention and consent; (3) capacity problem in anonymous blockchains; (4) ambiguity of subject-matter (gharar) arising from external data; (5) impossibility of termination; (6) difficulty of proving claims; (7) conflict with mandatory rules; and (8) supervision and enforcement of judgments. Despite these challenges, on the basis of the

principle of freedom of contracts (Article 10 of the Civil Code) and the recognition of electronic contracts (Electronic Commerce Act), smart contracts cannot be entirely invalidated.

Third, from a comparative perspective, leading legal systems (the United States and the European Union) have adopted two different approaches: the US approach of explicit and detailed recognition (Arizona, Nevada laws) and the EU approach of a general and harmonising framework (eIDAS and MiCA Regulations). Both approaches have strengths that can be adapted for Iran.

Fourth, the research hypotheses were confirmed: smart contracts can be analysed within the framework of general rules and are largely acceptable (main hypothesis), and by drawing inspiration from leading systems and jurisprudential rules, a suitable legal framework can be formulated (sub-hypothesis).

Proposed Practical Solutions:

For the legislator:

- Enactment of a law or amendment of the Electronic Commerce Act to explicitly recognise "smart contracts" and "blockchain signatures."
- Provision for the requirement of transparency (plain-language summaries) and the provision of options (khiyārāt) in smart contracts.
- Establishment of a regulatory body for the supervision of blockchain platforms and smart contracts.

**For the judiciary:**

- Training judges in blockchain technology and smart contracts.
- Establishment of a system for the registration and inquiry of blockchain transactions to facilitate proof of claims.
- Development of judicial practice through the issuance of precedents in smart contract disputes.

**For economic actors:**

- Use of hybrid contracts (traditional written contract + smart code) until the legal framework is fully developed.
- Use of reputable platforms with code auditing and Sharia supervision.
- Inclusion of termination mechanisms and dispute resolution clauses in smart contracts.

**For future research:**

- Empirical study of the performance of smart contracts in Iranian courts.
- Comparative study of smart contracts in Imāmī jurisprudence and the jurisprudence of other Islamic schools.
- Analysis of the relationship between smart contracts and Islamic finance (takāful, murābaḥah, etc.).
- Study of the possibility of using smart contracts for the automatic enforcement of judicial judgments.

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